

Assignment

Network Design

B.Sc. Information Technology
CSA 2100- Techniques in Operating Systems
6th March 2006

This assignment carries 10% of the total marks for this credit. Make sure that you read this documentation very carefully before attempting the assignment. This will save you a lot of heartache later.

Objectives

In this project you are required to design a network for a typical company that needs internet connectivity.

Preliminaries

Company Requirements

A new company has just been setup that aims to start providing teaching materials using e-learning techniques. In other words, this company aims to start providing teaching material and resources using dedicated web servers. It being a startup company it has very limited resources. The company has just purchased one T1 connection providing 1.5Mbps for upload and download. The T1 connection is connected to a router on the provider's side with IP address 201.58.10.10. In addition, the company has leased a fixed ADSL connection providing 1Mbit of download and 256Kbps of upload yet expects much higher upload bandwidth for everyday operations than this ADSL connection can provide. The company has also purchased the range of public IP addresses: 193.192.31.64/29. In addition, an agreement was setup with the ADSL ISP such that the public IP address 201.56.45.5 will always be allocated to the ADSL connection.

It terms of PCs, the company has 2 web servers, each of which will be allocated a different DNS name. In addition, it has purchased a file server that will be used to store all the e-content that the web-servers offer to students. The contents vary from multimedia presentations to online exams. The company has also setup up 10 PCS in its premises, four of which will be used by tutors to have online conversations with the students that can be initiated by the web servers. Four other PCs will be used to upload data to the file server. One other PC will be used to process any payments. Thus it will connect to the company's bank to process any online transactions there may be. The last PC will be used for general testing of the system. The company director emphasized that it is of utmost importance that the file server is not easily corruptible from outside sources.

Your task is to design an adequate connectivity diagram for the above scenario. The company has allowed you 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. You should include in your report any considerations you have taken to guarantee this. 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.

Remarks

Please be reminded that this is an individual effort project and thus any evidence of copying in documentation will be dealt with appropriately, even risking to all parties involved the expulsion from the course. In addition, plagiarism will not be tolerated and appropriate references should be made for any material used. If in doubt about what constitutes plagiarism consult the departmental web-pages. Note also that I will be more than happy to discuss (through e-mails and individual meetings) any problems and queries you might have about this assignment.

Deliverables

Supply a document giving all the necessary network designs (enough information should be provided that will allow anyone to re-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 should also provide tables showing the IP addresses, subnet masks and any other relevant information for each PC and router in each network.

The deadline for this project is 20th May 2006. Make sure that by that day you have submitted a hard copy of the documentation to the Computer Science office. Late submissions will receive a 15% penalty per day.

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