

Assessment Methods and Criteria for HET104/706

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LTS503 - Assessment, Evaluation and Support
Assignment 2

I. INTRODUCTION

HET306 is a Unit taught within the Telecommunications Engineering course at Swinburne University. The primary aim of this Unit is to expose students to the Unix operating system and how it can be used in Telecommunications Engineering. This is particularly important as the vast majority of Telecommunications services on the Internet are provided via Unix based systems.

As most students will only have used Windows, this Unit introduces the concept of alternative Operating Systems, and explores how Unix systems function “under-the-hood”. This then provides a background where we can begin to consider how we might use this functionality to provide networked services.

This Unit is strongly based in “real-world” experiences which is reflected in both how the material is taught - via examples on real systems - and how students apply their knowledge - system design via case studies and system construction via a real-world project.

In this paper I discuss how the project is used within this Unit to assess students understanding of the presented material and their skills in building real-world telecommunications systems.

II. PROJECT TASK

In order to properly develop an assessment criteria, it is essential that the assessment task be properly constructed. In this section I outline both the details of the task requested of students and it’s validity in terms of assessment purposes.

A. Assessment Validity

In order to properly assess a students capabilities, it is essential that the required task is relevant to a problem they may be required to solve once they leave University. The aim is to develop a task that is complex enough that it is not trivial, yet simple enough that it can be completed within the confines of a single semester Unit.

This project is not a group project, however students will be encouraged to post problems on the Blackboard website and to utilise all available resources in solving the problem. In the “real-world”, they will have all these resources available to them.

The material taught in this Unit directly covers the half of the actual requirements of the practical assignment while also covering where and how to locate information in setting up networked applications under Unix. The second half of this assignment is used to assess the students knowledge in how

to gather information to solve a problem they have not been directly instructed in how to solve.

B. Task Description

The task being asked of students is to develop and build a web and email hosting service. These types of systems are in widespread use both within individual ISPs and by independent web service providers. All these companies provide services whereby a customer is provided with hosted web space and with a set of managed email accounts. The primary reason a company would choose to use these services are that content can be served to the Internet at a faster rate - typically the ISPs are connected to the Internet at higher speeds than the end consumer - and that the web and email content will be backed up separately.

Students will not be asked to consider the issues of data backup, data retrieval and failover redundancy (what happens if the server fails). To make the task manageable, they will be asked to build a server that can host multiple web sites and manage sending and retrieving of email for a set of customers.

The resultant system will be required to:

- Host multiple web sites for different customers
- Manage the Internet Name Resolution scheme such that a request for a given site (eg: <http://mycompany.com>) will be directed to their web server
- Accept all email sent to users of a customers domain name
- Store and forward email as an end user requests it
- Interoperate with all existing standard end-user software (browsers and email clients)
- Fixed procedure for creating and deleting web/email accounts of new/leaving customers

It should be noted that while the installation and configuration of a web server is directly covered in the Unit teaching material and laboratory tasks, the configuration and installation of an email server is not. This allows for the task to extend students by requiring them to research the necessary procedure and apply these new skills in completing the task.

C. Task Authenticity

Setting up email and web servers is a task that graduates in the Telecommunications field will be required to address on an ongoing basis. By asking students to achieve this common task, it is hoped that they can see that the material is directly applicable to the real world and useful once they complete their undergraduate degrees.

The primary outcomes for students will include:

- Develop confidence in using Unix systems
- Develop confidence in setting up networked applications without being directly instructed
- Understand the working of telecommunications systems and applications
- Understand how different networked applications inter-operate with each other
- Obtain a sense of achievement in completing an actual product rather than an insignificant assignment

III. ASSESSMENT TOOLS

Students will be assessed using two assessable components, their actual server implementation, as well as a written report on the installation and configuration of their system.

A. Assessing the Implementation

Students are expected to build and implement the required systems. As in the real world, the best way to assess how successful they have been in their attempt is to use and test the functionality of their system. As per the rubric presented below, this includes a series of functionality tests that can be checked via a tick-box type approach. Variations to this include:

- Where functionality appears to be partially implemented, the students configuration is manually checked and result is confirmed
- The implementation should be marked while viewing the students presented written report - to ensure both that the report is consistent with the implementation and that the functionality tests are performed against how the student has designed the underlying system

The idea behind a checkbox type system of assessment is that of reliability. Marks are given for implementing certain features or not given if that requirement has not been implemented.

B. Assessing the Written Report

In all Engineering tasks, written documentation is of equal importance to any developed product. If a product is to be maintained and/or further developed, it is essential it be documented properly. The system designer may not always work for the same corporation, proper documentation is required for subsequent Engineers to understand the reasonings behind certain design decisions and how the final system is constructed into a working whole.

For this reason it is essential that the students written report form a key component of the assessment criteria. However this presents some difficulty as assessing a written report is a subjective task. While certain fixed requirements can be made as to what must/should be included in a report, part of the quality of a written report comes down to its clarity and readability - a very subjective measure.

Consistency of the report with the actual system is important, this aspect of the written report must be assessed whilst assessing the student implementation and comparing the implementation to the details in the written report.

In the assessment reburics presented below I try to minimise the subjective assessable components while understanding that some aspects of the criteria must remain so. At this stage - while the number of students taking this Unit are manageable - I enforce that all written reports are to be assessed by the same person to ensure consistency across reports.

IV. ASSESSMENT RUBRICS

This section covers the proposed assessment rubrics to be used to assess the two aforementioned assessable components. I use the inclusion of bonus marks to encourage students who wish to aim for honours results to go beyond the basic scope of the assignment.

A. Project Implementation

Requirement	Marks
DNS Configuration	
Installed and automatically started at system boot	1
Configured to return appropriate response when querying web sites	1
Configured to return appropriate response when querying email servers	1
Web Server	
Installed and automatically started at system boot	1
Support for multiple web sites configured	1
Properly configured to respond with the correct web site based on requested site name	2
Email Server	
Installed and automatically started at system boot	1
Accepts emails sent to registered accounts	2
Allows sending of email to other email addresses supported by system	1
Allows sending of email to external email addresses	1
Email can be accessed via standard email client (eg. Thunderbird)	2
Management	
Documented procedure to add/delete customer web/email accounts	2
Consistency of written report with actual implementation	1
Bonus Marks	
Graphical or CLI tool to add new customer web/email accounts	1
Graphical or CLI tool to delete customer web/email accounts	1
Support for customers to create multiple email accounts for their domain	1
Total	20

B. Written Report

Requirement	Marks
System Installation	
Documented version numbers of installed software	1
Documented installation steps for all software	2
Documented location of all configuration files	2
Discussion of alternative software packages	1
Configuration Procedure	
Description of how to configure DNS Server	1
Description of how to configure Web Server	1
Description of how to configure Email Server	1
Description of how to create/delete accounts	1
Instructions for configuring email client to use system	1
Discussion of why selected approach was used	2
Subjective Measures	
Report Structure	1
Report Completeness	2
Report Clarity and Readability	2
Bonus Marks	
Discussion of other things that might be of interest (eg. backup, power management, etc.)	2
Total	20

C. Final Result

The result given to the student is a summation of the assessment of the two sub-components - the report and im-

plementation is given equal weighting. There is no minimum result required for either component but the Unit Outline stipulates that a minimum result of 45% is required for the assignment/project assessment item in order to be eligible to pass the Unit. The provision of bonus marks are provided to allow - and encourage - students to go beyond the basic scope of the assignment and to be rewarded for doing so. It is still possible to achieve a high result (87.5%) without doing any extra work.

V. CONCLUSIONS

The primary aim of this Unit is to expose students to a new Operating System and how this may be used in the realms of Telecommunications Engineering. To this end, the goals of this Unit are both theoretical - discussion of Unix type systems and how they work - and practical - real experience in the lab setting up and configuring networked based applications on a Unix system. The practical component is managed via two separate assessable components:

- 1) Structured Laboratory sessions where students are required to complete set tasks
- 2) The assignment/project where students are asked - over a period of time - to build a telecommunications system

The structure and assessment criteria of the second assessable component is the core of this report.