MONASH University

FIT3130
Computer network design and deployment

Unit guide

Semester 2, 2008

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FIT3130 Computer network design and deployment - Semester 2 , 2008

Unit leader :

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Lecturer(s) :

Caulfield

- Vincent Lee

South Africa

- Mohan Das

Malaysia

- Simon Egerton

Tutors(s) :

Caulfield

- To be appointed by Vincent Lee

South Africa

- To be appointed by Mohan Das

Malaysia

- To be appointed by Dr Simon Egerton

Introduction

Unit synopsis

This unit aims to introduce the systematic design methodology, i.e. top-down network design approach for designing enterprise computer networks. A top down process focuses on requirements analysis and architecture design, which should be completed before the selection of specific network components. The unit provides students with tested processes and tools to help them understand traffic flow, protocol behaviour, and internetworking technologies. On completion of the unit, students are equipped to design enterprise networks that meet a user's requirements for functionality, capacity, performance, availability, scalability, affordability, security, and manageability.

Learning outcomes

Knowledge and Understanding

At the completion of this unit students should have:

- a detailed knowledge and understanding of all major business and technical requirements for an enterprise and how to gather the requirements for enterprise network design;
- an understanding the task of characterising the existing network, including the architecture and performance of major network segments and devices;
- a detailed knowledge and understanding of analysing network traffic, including traffic flow and load, protocol behaviour including the latest developments in TCP/IP (e.g. IPv6, IPSec, multicasting, VoIP, QoS, iSCSI);
- the knowledge to carryout logical network design via develop a network topology (from simple to complex) with hierarchy and modularity;
- the acquired knowledge and skill to devise a network layer addressing model, and selection of switching and routing protocols;
- exposition of security planning, network management design, and the initial investigation into which service providers can meet WAN and remote-access requirements;
- the knowledge of carrying out physical network design involving the selection of specific technologies and products (including cabling, Ethernet switches, wireless access points, wireless bridges, and routers) to realise the logical design;
- the practical skill to write and implement a test plan, build a protocol or pilot, optimise the network design, and document the design work;
- make recommendations for network performance improvement;

Students should gain practical skills in setting up TCP/IP connections and routing configurations for different environments. They will also gain experience in setting up LANs and WANs, and wireless LANs using standard protocols.

Workload

Unit relationships

Prerequisites

Before attempting this unit you must have satisfactorily completed

FIT1005 Networking and Data Communications or BUS2062 or CSE2004 or CSE2318 or CSE3318 or GCO3812 or CPE1007

, or equivalent.

Relationships

FIT3130 is a core unit in the [Netric Computing major of the BITS].

Before attempting this unit you must have satisfactorily completed one of the following seven units:

FIT1005 Networking and Data Communications or BUS2062 or CSE2004 or CSE2318 or CSE3318 or GCO3812 or CPE1007

, or equivalent..

You may not study this unit and

CSE3821, CPE3004, CSE5807, FIT3030, FIT3024

in your degree.

Continuous improvement

Monash is committed to ‘Excellence in education' and strives for the highest possible quality in teaching and learning. To monitor how successful we are in providing quality teaching and learning Monash regularly seeks feedback from students, employers and staff. Two of the formal ways that you are invited to provide feedback are through Unit Evaluations and through Monquest Teaching Evaluations.

One of the key formal ways students have to provide feedback is through Unit Evaluation Surveys. It is Monash policy for every unit offered to be evaluated each year. Students are strongly encouraged to complete the surveys as they are an important avenue for students to "have their say". The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied and areas for improvement.

Student Evaluations

The Faculty of IT administers the Unit Evaluation surveys online through the my.monash portal, although for some smaller classes there may be alternative evaluations conducted in class.

If you wish to view how previous students rated this unit, please go to
http://www.monash.edu.au/unit-evaluation-reports/

Over the past few years the Faculty of Information Technology has made a number of improvements to its courses as a result of unit evaluation feedback. Some of these include systematic analysis and planning of unit improvements, and consistent assignment return guidelines.

Monquest Teaching Evaluation surveys may be used by some of your academic staff this semester. They are administered by the Centre for Higher Education Quality (CHEQ) and may be completed in class with a facilitator or on-line through the my.monash portal. The data provided to lecturers is completely anonymous.
Monquest surveys provide academic staff with evidence of the effectiveness of their teaching and identify areas for improvement. Individual Monquest reports are confidential, however, you can see the summary results of Monquest evaluations for 2006 at http://www.adm.monash.edu.au/cheq/evaluations/monquest/profiles/index.html

Unit staff - contact details

Unit leader

Associate Professor Vincent Lee
Associate Professor
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Contact hours : Monday, 4:00 pm to 6:00 pm

Lecturer(s) :

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Contact hours : 4:00 pm to 6:00 pm

Mohan Das
Dr Simon Egerton

Tutor(s) :

To be appointed by Dr Simon Egerton
To be appointed by Mohan Das
To be appointed by Vincent Lee

Additional communication information

Associate Professor Vincent Lee (Caulfield campus);

Dr Simon Egerton (Malaysia campus); and

Mohan Das (South Africa campus).

Teaching and learning method

Two hours lecture per week; one hour tutorial/practical class per week

Communication, participation and feedback

Monash aims to provide a learning environment in which students receive a range of ongoing feedback throughout their studies. You will receive feedback on your work and progress in this unit. This may take the form of group feedback, individual feedback, peer feedback, self-comparison, verbal and written feedback, discussions (on line and in class) as well as more formal feedback related to assignment marks and grades. You are encouraged to draw on a variety of feedback to enhance your learning.

It is essential that you take action immediately if you realise that you have a problem that is affecting your study. Semesters are short, so we can help you best if you let us know as soon as problems arise. Regardless of whether the problem is related directly to your progress in the unit, if it is likely to interfere with your progress you should discuss it with your lecturer or a Community Service counsellor as soon as possible.

Unit Schedule

Week	Topic	References/Readings	Key dates
1	Introduction of unit, Part I Identifying network users' needs and goals: Analysing business goals and constraints; analysing technical goals and tradeoffs	Chapters 1 & 2 of Priscilla Oppenheimer (2nd edition)	14 July 2008
2	Characterising the existing internetwork; characterising network traffic	Chapters 3 & 4 of Priscilla Oppenheimer (2nd edition)	21 July 2008
3	Part II - Logical Network Design: designing a network topology	Chapter 5 of Priscilla Oppenheimer (2nd edition)	28 July 2008
4	Designing models for Addressing and Naming	Chapter 6 of Priscilla Oppenheimer (2nd edition)	4 August 2008
5	Selecting Switching and Routing Protocols	Chapter 7 of Priscilla Oppenheimer (2nd edition)	11 August 2008
6	Developing Network Security Strategies	Chapter 8 of Priscilla Oppenheimer (2nd edition)	18 August 2008
7	Developing Network Management Strategies	Chapter 9 of Priscilla Oppenheimer (2nd edition)	25 August 2008
8	Part III Physical Network Design: Selecting Technologies and Devices for Campus Networks	Chapter 10 of Priscilla Oppenheimer (2nd edition)	1 September 2008
9	Selecting Technologies and Devices for Enterprise Networks	Chapter 11 of Priscilla Oppenheimer (2nd edition)	8 September 2008
10	Part IV Testing, Optimizing, and Documenting Network Design: Testing the network design	Chapter 12 of Priscilla Oppenheimer (2nd edition)	15 September 2008
11	Optimizing your network design	Chapter 13 of Priscilla Oppenheimer (2nd edition)	22 September 2008
Mid semester break			
12	Documenting the network design		6 October 2008

		Chapter 14 of Priscilla Oppenheimer (2nd edition)	
13	Unit Revision and strategy for Examination	Revision of all chapters	13 October 2008

Unit Resources

Prescribed text(s) and readings

Required Textbook:

- Priscilla Oppenheimer, "Top-down Network Design", 2nd edition, CISCO press, 2004, ISBN: 1-58705-152-4

Recommended Reading:

- Peter Rybaczyk, "Cisco Network Design Solutions for Small Medium Business", 2005, CISCOpress, ISBN: 1-58705-143-5
- Stallings, W, " Computer Networking with Internet protocols and Technology", Pearson, 2004
- Comer, D & Stevens, D, Internetworking with TCP/IP Volume 1, Principles, Protocols, and Architectures, (4rd edition), Prentice-Hall, 2000.
- Comer, D & Stevens, D, Internetworking with TCP/IP Volume 2, Design, Implementation, and Internals, (3rd edition), Prentice-Hall, 1999.
- Held G. Enhancing LAN Performance, (4th Edition) Auerbach-CRC Press 1999.
- Lloyd-Evans R. Wide Area Network Performance and Optimization Addison-Wesley 1996.
- Jain R. The Art of Computer Systems Performance Analysis Wiley 1991.
- Halsall, F, Data Communications, Computer Networks and Open Systems, Addison-Wesley, (4th edition), Addition Wesley 1996.
- Halsall, F, Computer Networks and the Internet: with internet and multimedia applications, Addison-Wesley, (4th edition), Addition Wesley 2005.
- Schiller, J, Mobile Communications, Addison-Wesley, 2000.
- Williams Stalling Wireless Communications and Networking, ISBN: 0131863169, 2nd Ed, Prentice Hall, 2002.

Text books are available from the Monash University Book Shops. Availability from other suppliers cannot be assured. The Bookshop orders texts in specifically for this unit. You are advised to purchase your text book early.

Recommended text(s) and readings

As given at above

Required software and/or hardware

1) Network design tools

2) Microsoft VISIO software

3) MATLAB Network and optimisation tool boxes latest version

Equipment and consumables required or provided

Students studying off-campus are required to have the minimum system configuration specified by the Faculty as a condition of accepting admission, and regular Internet access.On-campus students, and those studying at supported study locations may use the facilities available in the computing labs.Information about computer use for students is available from the ITS Student Resource Guide in the Monash University Handbook.You will need to allocate up to 4 hours per week for use of a computer, including time for newsgroups/discussion groups.

Study resources

Study resources we will provide for your study are:

Library access

The Monash University Library site contains details about borrowing rights and catalogue searching. To learn more about the library and the various resources available, please go to http://www.lib.monash.edu.au. Be sure to obtain a copy of the Library Guide, and if necessary, the instructions for remote access from the library website.

Monash University Studies Online (MUSO)

All unit and lecture materials are available through MUSO (Monash University Studies Online). Blackboard is the primary application used to deliver your unit resources. Some units will be piloted in Moodle. If your unit is piloted in Moodle, you will see a link from your Blackboard unit to Moodle (http://moodle.monash.edu.au) and can bookmark this link to access directly. In Moodle, from the Faculty of Information Technology category, click on the link for your unit.

You can access MUSO and Blackboard via the portal: http://my.monash.edu.au

Click on the Study and enrolment tab, then Blackboard under the MUSO learning systems.

In order for your Blackboard unit(s) to function correctly, your computer needs to be correctly configured.

For example:

- Blackboard supported browser
- Supported Java runtime environment

For more information, please visit: http://www.monash.edu.au/muso/support/students/downloadables-student.html

You can contact the MUSO Support by: Phone: (+61 3) 9903 1268

For further contact information including operational hours, please visit:
http://www.monash.edu.au/muso/support/students/contact.html

Further information can be obtained from the MUSO support site:
http://www.monash.edu.au/muso/support/index.html

Assessment

Unit assessment policy

Faculty late submission penalty clause applies for late submission.

Assignment tasks

- **Assignment Task**

  Title :

  Description :

  Students are to write a multisite campus network specifications (business requirements and technical goals); carry out logical network design Topology and choice of routing protocols. etc), selection of technologies and devices for physical design, use the simulation package to test some input traffic, observe the network performance and optimise the parts of networks to improve performance.

  Weighting :

  Criteria for assessment :

  formal group report and presentation:

  - concise report and discussion of design specifications (10%)

  - evaluation criteria of network design parameters (10%)

  - selection criteria of technologies and devices (10%)

  - design documentation (5%)

  - Conclusion and limitation (5%)

  Due date :

Examinations

- **Examination**

  Weighting : 60 %

  Length : 2 hours

  Type (open/closed book) : Closed book

Assignment submission

Assignments will be submitted by **[electronic/paper]** submission to **[http://muso.monash.edu.au/FIT3130].** On-campus Students Submit the assignment to the **[FIT Caulfield student service @7th floor Building H]** by

[4.00 pm, Monday 6 October 2008], with the appropriate cover sheet correctly filled out. The due date is the date by which the submission must be received/the date by which the submission is to be posted.

Assignment coversheets

All members in the group must sign the assignment coversheet. Submission without signed copy of assignment coversheet will not be graded.

University and Faculty policy on assessment

Due dates and extensions

The due dates for the submission of assignments are given in the previous section. Please make every effort to submit work by the due dates. It is your responsibility to structure your study program around assignment deadlines, family, work and other commitments. Factors such as normal work pressures, vacations, etc. are seldom regarded as appropriate reasons for granting extensions. Students are advised to NOT assume that granting of an extension is a matter of course.

Late assignment

Assignments received after the due date will be subject to a penalty of **[5% per day penalty for late submission, the deadline for late assignment acceptance is before 4:00 pm on Monday, 13 October 2008. Assignments received later than 4:00 pm Monday, 13 October 2008 will not normally be accepted."]**

Return dates

Students can expect assignments to be returned within two weeks of the submission date or after receipt, whichever is later.

Assessment for the unit as a whole is in accordance with the provisions of the Monash University Education Policy at http://www.policy.monash.edu/policy-bank/academic/education/assessment/

We will aim to have assignment results made available to you within two weeks after assignment receipt.

Plagiarism, cheating and collusion

Plagiarism and cheating are regarded as very serious offences. In cases where cheating has been confirmed, students have been severely penalised, from losing all marks for an assignment, to facing disciplinary action at the Faculty level. While we would wish that all our students adhere to sound ethical conduct and honesty, I will ask you to acquaint yourself with Student Rights and Responsibilities (http://www.infotech.monash.edu.au/about/committees-groups/facboard/policies/studrights.html) and the Faculty regulations that apply to students detected cheating as these will be applied in all detected cases.

In this University, cheating means seeking to obtain an unfair advantage in any examination or any other written or practical work to be submitted or completed by a student for assessment. It includes the use, or attempted use, of any means to gain an unfair advantage for any assessable work in the unit, where the means is contrary to the instructions for such work.

When you submit an individual assessment item, such as a program, a report, an essay, assignment or other piece of work, under your name you are understood to be stating that this is your own work. If a submission is identical with, or similar to, someone else's work, an assumption of cheating may arise. If you are planning on working with another student, it is acceptable to undertake research together, and discuss problems, but it is not acceptable to jointly develop or share solutions unless this is specified by your lecturer.

Intentionally providing students with your solutions to assignments is classified as "assisting to cheat" and students who do this may be subject to disciplinary action. You should take reasonable care that your solution is not accidentally or deliberately obtained by other students. For example, do not leave copies of your work in progress on the hard drives of shared computers, and do not show your work to other students. If you believe this may have happened, please be sure to contact your lecturer as soon as possible.

Cheating also includes taking into an examination any material contrary to the regulations, including any bilingual dictionary, whether or not with the intention of using it to obtain an advantage.

Plagiarism involves the false representation of another person's ideas, or findings, as your own by either copying material or paraphrasing without citing sources. It is both professional and ethical to reference clearly the ideas and information that you have used from another writer. If the source is not identified, then you have plagiarised work of the other author. Plagiarism is a form of dishonesty that is insulting to the reader and grossly unfair to your student colleagues.

Register of counselling about plagiarism

The university requires faculties to keep a simple and confidential register to record counselling to students about plagiarism (e.g. warnings). The register is accessible to Associate Deans Teaching (or nominees) and, where requested, students concerned have access to their own details in the register. The register is to serve as a record of counselling about the nature of plagiarism, not as a record of allegations; and no provision of appeals in relation to the register is necessary or applicable.

Non-discriminatory language

The Faculty of Information Technology is committed to the use of non-discriminatory language in all forms of communication. Discriminatory language is that which refers in abusive terms to gender, race, age, sexual orientation, citizenship or nationality, ethnic or language background, physical or mental ability, or political or religious views, or which stereotypes groups in an adverse manner. This is not meant to preclude or inhibit legitimate academic debate on any issue; however, the language used in such debate should be non-discriminatory and sensitive to these matters. It is important to avoid the use of discriminatory language in your communications and written work. The most common form of discriminatory language in academic work tends to be in the area of gender inclusiveness. You are, therefore, requested to check for this and to ensure your work and communications are non-discriminatory in all respects.

Students with disabilities

Students with disabilities that may disadvantage them in assessment should seek advice from one of the following before completing assessment tasks and examinations:

- Faculty of Information Technology Student Service staff, and / or
- your Unit Coordinator, or
- Disabilities Liaison Unit

Deferred assessment and special consideration

Deferred assessment (not to be confused with an extension for submission of an assignment) may be granted in cases of extenuating personal circumstances such as serious personal illness or bereavement. Information and forms for Special Consideration and deferred assessment applications are available at http://www.monash.edu.au/exams/special-consideration.html. Contact the Faculty's Student Services staff at your campus for further information and advice.