COMP8270

Network System Architecture and Cloud Technologies

Session 1, In person-scheduled-weekday, North Ryde 2023

School of Computing

Contents

General Information

Unit convenor and teaching staff
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Credit points
10

Prerequisites
ITEC647 or COMP6250

Corequisites

Co-badged status

Unit description
This unit will focus on the design of network systems such as routers, switches, and virtual machines for building and managing large scale communication networks. Students will learn the applied theoretical and technological principles in network systems design such as packet processing and classification, lookup algorithms, and switching fabrics. The unit will systematise and further develop this knowledge of network systems in the area of cloud computing and virtualization. Students will gain a thorough understanding of cloud computing concepts such as datacentre design, network virtualization for systems and network devices. Students will also learn about the security issues that cloud deployments experience, and how these are addressed.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: Analyse different network system device architectures such as routers, switches, and hosts for design and management large-scale networks.

ULO2: Identify and solve key issues related to security as it applies to cloud computing and other virtualised environments.

ULO3: Configure and implement key cloud based technologies

ULO4: Collaborate and communicate with others in a professional setting in both written and oral form.

ULO5: Conduct professional work ethically with a high level of integrity, autonomy, and accountability.

General Assessment Information

General Notes

In this unit, you should do the following:

• Attend lectures, take notes, ask questions.

• Attend your tutorial/practical, seek feedback from your lecturer on your work.

• Prepare for and strive to do well in the quizzes

• Read appropriate sections of the text, add to your notes and prepare questions for your lecturer/tutor.

• Prepare answers to tutorial questions.

• Work on any assignments that have been released.

Please note it is to your benefit to attend most of the classes, prepared to participate in discussions, ask and answer questions, and provide perspectives from your own background and workplaces. Resources to assist your learning Digital recordings of lectures are available as Echo360 through iLearn login. These are provided for review material and in case of missing lectures. Recordings should not be relied upon and copyrighted material may be omitted. iLearn is used for out-of-class communication as well as forums where active discussion of issues is encouraged. iLearn can be found at can be found at http://learn.mq.edu.au. You are encouraged to review iLearn weekly and to do background reading before each class.

Assignment Submission Guidelines and Late Submission

Your assignment is to be submitted online using Turnitin.

Online quizzes, in-class activities, or scheduled tests and exam must be undertaken at the time indicated in the unit guide. Should these activities be missed due to illness or misadventure, students may apply for Special Consideration.

All other assessments must be submitted by 5:00 pm on their due date.

Should these assessments be missed due to illness or misadventure, students should apply for Special Consideration.

Late Submission

From 1 July 2022, Students enrolled in Session based units with written assessments will have the following late penalty applied. Please see https://students.mq.edu.au/study/assessment-exams/assessments for more information.

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. Submission time for all written assessments is set at **11:55 pm**. A 1-hour grace period is provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for Special Consideration.

In this unit, late submissions will be accepted as follows:

- Quiz 1: NO, unless Special Consideration is granted
- Quiz 2: NO, unless Special Consideration is granted
- Assignment 1: YES, Standard Late Penalty applies
- Assignment 2: YES, Standard Late Penalty applies

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment 2	40%	No	Report Due: Week 11 Presentation: Weeks 11 and 12
Assignment 1	20%	No	Week 7
Quiz 2	20%	No	Week 10
Quiz 1	20%	No	Week 5

Assignment 2

Assessment Type [1]: Project
Indicative Time on Task [2]: 40 hours
Due: **Report Due: Week 11 Presentation: Weeks 11 and 12**
Weighting: **40%**

Group Project- Report and Presentation: In this assignment, students will leverage their

knowledge of network systems and cloud computing to research and critically analyse relevant literature in the discipline and present conclusions. The assessment also allows students to further develop their team working and professional communication skills.

On successful completion you will be able to:

- Analyse different network system device architectures such as routers, switches, and hosts for design and management large-scale networks.
- Identify and solve key issues related to security as it applies to cloud computing and other virtualised environments.
- Configure and implement key cloud based technologies
- Collaborate and communicate with others in a professional setting in both written and oral form.
- Conduct professional work ethically with a high level of integrity, autonomy, and accountability.

Assignment 1

Assessment Type [1]: Problem set
Indicative Time on Task [2]: 20 hours
Due: **Week 7**
Weighting: **20%**

The purpose of this problem solving assignment is to help the students to get accustomed to dealing with real world problem situations/issues.It is designed to help students analyse a particular problem and find its best solution. Some questions may require an in depth research and will be a process to come up with an acceptable and reasonable answer

On successful completion you will be able to:

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Quiz 2

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 5 hours

Due: **Week 10**
Weighting: **20%**

A short test (closed book) that will be based on your previously covered lecture material.

On successful completion you will be able to:

- Identify and solve key issues related to security as it applies to cloud computing and other virtualised environments.
- Configure and implement key cloud based technologies

Quiz 1

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 5 hours
Due: **Week 5**
Weighting: **20%**

A short test (closed book) that will be based on your previously covered lecture material.

On successful completion you will be able to:

- Analyse different network system device architectures such as routers, switches, and hosts for design and management large-scale networks.
- Identify and solve key issues related to security as it applies to cloud computing and other virtualised environments.

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Note:

COMP8270 is an on campus offering.

COMP8270 is taught via lectures and informal tutorial/practical sessions. Lecture Classes wiill be held on **Wednesday 4 pm-6 pm**. (Room: **01CC 201**). .

Lectures

Lectures are used to introduce switch/router design and cloud architectures and protocols and put them in a wider context. You are encouraged to ask questions of the lecturer, both during and outside the lecture, to clarify anything you might not be sure of. Lecture notes will be made available each week but these notes are intended as an outline of the lecture only and are not a substitute for your own notes or the recommended reading list.

It should be noted that no single text book completely covers the content of this unit. A large portion of the lecture material is drawn from research papers, white papers and standard documents . Students are encouraged to read the weekly recommended reading list to gain a solid understanding of the topics that are covered.

Quizzes

There will be two quizzes in the following weeks: **5** and **10**. These quizzes will be held in the practical class. A quiz is a short test that will be based on your previously covered lecture material. For example, week 5 quiz will be based on lectures done in weeks 1-4. The quiz questions will be handed over to you at the beginning of your Lecture class. Each quiz contributes **20%** of the total mark and serves as a feedback mechanism to monitor your progress in the unit.

Assignments

There are two assignments in this unit. Assignment is a 1 problem solving assignment to help the students to get accustomed to dealing with real world problem situations/issues. Assignment 2 is a Group Project- Report and Presentation: In this assignment, students will leverage their knowledge of network systems and cloud computing to research and critically analyse relevant literature in the discipline and present conclusions

Tutorial

Tutorial classes will be held in the first half (weeks 1-7). These are **an hour long** problem solving sessions. These sessions provide the best forum for student/tutor interaction particularly if students come to tutorials prepared for the scheduled discussion. Tutorials are posted every Friday on ilearn. Even though these tutorial exercises are not formally assessed, it is important that students solve them on a weekly basis as they *provide* an opportunity to explore the course material in greater depth than lectures allow.. The more practice you have at such questions, the more likely you are to do yourself justice in quizzes and assignments.Solutions to these exercises will be regularly posted on unit ilearn space..

Practical

Practical classes will commence in the second half (starting week 8).. Practical exercises provide a hands on perspective to reinforce the unit's core concepts. These **two hour long** sessions also give insight into the importance and practice of teamwork in real-world scenarios.

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TEXT

There is no single text book containing material that could address all topics of unit. All necessary reading material and elaborate and detailed notes on lecture topics will be provided by the lecturer every week.

Other Useful Books (You need not buy unless you believe you need to own one)

- Dan C. Marinescu Cloud Computing, 2nd Edition Theory and Practice ISBN: 978-0-12-812810-7 eBook ISBN: 9780124046412:
- Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, Mastering Cloud Computing, Morgan Kaufmann, ISBN: 978-0-12-411454-8, Burlington, Massachusetts, USA, May 2013.
- Comer, D.E., Network Systems Design using Network Processors. Pearson (Prentice Hall):

Unit Schedule

Tentative Schedule		
Week 1	Unit Introduction Switching Design and Switched Architectures	

Week 2	Router Architectures	
Week 3	Interconnection Networks I	
Week 4	Interconnection Networks II	
Week 5	Packet Classification	Quiz 1 (in Week 5 Tutorial Class)
Week 6	Address Lookup	
Week 7	Software Defined Networking I	
Break		
Week 8	Software Defined Networking II	Assignment 1 due.
Week 9	Data Center and Cloud Computing	
Week 10	Virtualization	Quiz 2 (in Week 10 - Tutorial Class}
Week 11	Group Presentation	Assignment 2: Group Report Due.
Week 12	Group Presentation	
Week 13	Guest talk, Unit Review	

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy

- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity

- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues
- Student Advocacy provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Standards and Grading

Grades

At the end of the semester, you will receive a grade that reflects your achievement in the unit

• **Fail (F)**: does not provide evidence of attainment of all learning outcomes. There is missing or partial or superficial or faulty understanding and application of the fundamental concepts in the field of study; and incomplete, confusing or lacking communication of ideas in ways that give little attention to the conventions of the discipline.

• **Fail (FH)**: has obtained a raw mark over 50, yet failed all available attempt of at least one hurdle assessment.

• **Pass (P)**: provides sufficient evidence of the achievement of learning outcomes. There is demonstration of understanding and application of fundamental concepts of the field of study;

and communication of information and ideas adequately in terms of the conventions of the discipline. The learning attainment is considered satisfactory or adequate or competent or capable in relation to the specified outcomes.

• **Credit (Cr)**: provides evidence of learning that goes beyond replication of content knowledge or skills relevant to the learning outcomes. There is demonstration of substantial understanding of fundamental concepts in the field of study and the ability to apply these concepts in a variety of contexts; plus communication of ideas fluently and clearly in terms of the conventions of the discipline.

• **Distinction (D)**: provides evidence of integration and evaluation of critical ideas, principles and theories, distinctive insight and ability in applying relevant skills and concepts in relation to learning outcomes. There is demonstration of frequent originality in defining and analysing issues or problems and providing solutions; and the use of means of communication appropriate to the discipline and the audience.

• **High Distinction (HD)**: provides consistent evidence of deep and critical understanding in relation to the learning outcomes. There is substantial originality and insight in identifying, generating and communicating competing arguments, perspectives or problem solving approaches; critical evaluation of problems, their solutions and their implications; creativity in application.

In this unit, the final mark will be calculated by combining the marks for all assessment tasks according to the percentage weightings shown in the assessment summary. There are no hurdles in this unit.

Concretely, in order to pass the unit, you must obtain an overall total mark of **50%** or higher. Students obtaining a higher grade than a pass in this unit will (in addition to the above)

• have a total mark of 85% or higher to obtain High Distinction;

◦ have a total mark of 75% or higher to obtain Distinction;

◦ have a total mark of 65% or higher to obtain Credit.

You are encouraged to:

• set your personal deadline earlier than the actual one;

• keep backups of all important assessed tasks;.

• make sure no one else picks up your printouts. All work submitted should be readable and well presented.

You should never commit plagiarism in any of your submitted work, including tutorial and practical answers.