COMP8270

Network System Architecture and Cloud Technologies

Session 1, Special circumstances, North Ryde 2021

School of Computing

Contents

Notice

As part of Phase 3 of our return to campus plan, most units will now run tutorials, seminars and other small group activities on campus, and most will keep an online version available to those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face activities for your unit, please go to timetable viewer. To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

General Information

Unit convenor and teaching staff
Rajan Shankaran
rajan.shankaran@mq.edu.au
Contact via 02-98509537
Room 285, Level 2, 4 Research Park Drive
TBA

Lecturer/Tutor
Zawar Hussain
zawar.hussain@mq.edu.au
Contact via zawar.hussain@mq.edu.au
TBA

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

Your assignment is to be submitted online using Turnitin.

No extensions will be granted without an approved application for Special Consideration. There will be a deduction of 10% of the total available marks made from the total awarded mark for each 24 hour period or part thereof that the submission is late. For example, 25 hours late in submission for an assignment worth 10 marks – 20% penalty or 2 marks deducted from the total. No submission will be accepted after solutions have been posted.

This penalty does not apply for cases in which an application for special consideration is made

and approved. If you cannot submit assignments on time because of illness or other circumstances, please contact the convener at the earliest possible time.

Assessment Tasks

Name	Weighting	Hurdle	Due
Quiz 1	20%	No	Week 5
Quiz 2	20%	No	Week 10
Assignment 1	20%	No	Week 8
Assignment 2	40%	No	Week 11 (Report Due)

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.

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

Assignment 1

Assessment Type [1]: Problem set
Indicative Time on Task [2]: 20 hours
Due: **Week 8**
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:

- 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

Assignment 2

Assessment Type [1]: Project
Indicative Time on Task [2]: 40 hours
Due: **Week 11 (Report Due)**
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.

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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:

COMP 8270 is in the handbook as "**special circumstances, North Ryde**", which implies **it cannot be fully done online.**

COMP8270 is taught via lectures and informal tutorial/practical sessions. Lecture Classes are held **online** on **Monday 6 pm-8 pm**.. A lack of attendance may result in a switch from live streaming mode to prerecorded mode.

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

Problem solving session: 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 these questions are often previous exam questions or structured like test/exam questions. The more practice you have at such questions, the more likely you are to do yourself justice in quizzes/exams. Solutions to these exercises will be regularly posted on ilearn unit site. If need be, this will also allow you to discuss the problems effectively with your lecturer/peers and maximise the feedback you get on your work. In case of any difficulty, seek help from the teaching staff.

Practical

The purpose of practical sessions is to reinforce the concepts that were taught in the lectures.

Note: Practical classes are not held every week. Please refer to the ilearn unit web page for updates.

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	
Week 4	Packet Classification	
Week 5	Address Lookup	Quiz 1
Week 6	Software Defined Networking	
Week 7	Cloud Architecture	
Break		
Week 8	Virtualization	Assignment 1 due
Week 9	Data Centre Design/Cloud Security Issues	
Week 10	SD-WAN/Network Slicing	Quiz 2
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
- Grade Appeal Policy
- Complaint Management 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

Student Support

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

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- Getting help with your assignment
- Workshops
- StudyWise

- 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

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

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.