School of Science, Computing and Engineering Technologies

SWINBURNE UNIVERSITY OF TECHNOLOGY

Unit Outline

COS20019

Cloud Computing Architecture

Semester May, 2023

Please read this Unit Outline carefully. It includes:

PART A Unit summary
PART B Your Unit in more detail
PART C Further information

PART A: Unit Summary

Unit Code(s)		COS20019
Unit Title		Cloud Computing Architecture
Duration		One semester
Total Contact Hours		48 hours
Requisites:		
	Pre-requisites	50 credit points
	Co-requisites	Nil
	Concurrent pre-requisites	Nil
	Anti-requisites	
	Assumed knowledge	Familiarity with PHP, database concepts and SQL
Credit Points		12.5
Campus/Location		Ho Chi Minh City
Mode of Delivery		Blended
Assessment Summary		HED Graded Mark

Aims

This unit covers generic principles of "everything as a service" in cloud computing, plus practical work doing design and development for one or more contemporary platforms, which may vary from year to year. Cloud computing undergoes constant evolution, and there are several competing platforms, such as Amazon Web Services.

Unit Learning Outcomes

Students who successfully complete this Unit should be able to:

1. Explain the principles and value of cloud computing
2. Create and manage cloud services using a cloud management platform.
3. Implement and deploy a cloud-based web site that is reliable, scalable, secure and cost effective.
4. Research available cloud services, then design and justify an architectural solution that uses these services.

Graduate Attributes

This unit may contribute to the development of the following Swinburne Graduate Attributes:

- Communication skills
- Teamwork skills
- Digital literacies

Content

- Introduction to cloud computing
- Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS)
- Data management in the cloud
- Virtualisation
- Security and privacy in the cloud
- State-of-the-art/practice R&D in the cloud

AWS Academy

This unit uses materials and infrastructure provided by Amazon Web Services (AWS) and partners. It covers knowledge required for **AWS Cloud Practitioner** and **Solutions Architect (Associate)** certifications. Swinburne is accredited to run this unit as part of the AWS Academy Program.

Passing the Certification exams may require additional knowledge of AWS services for which additional study and exam preparation is recommended.

Successful completion of this unit enables you to get access to free practice exams and discounted certification exam vouchers from AWS.

PART B: Your Unit in more detail

Unit Improvements

Feedback provided by previous students through the Student Survey has resulted in improvements that have been made to this unit. Recent improvements include:

- Updated materials and assignments

Unit Teaching Staff

Name	Role	Email	Consultation Time
Dr Quang Minh NGUYEN	Lecturer	Mqnguyen@swin.edu.au	By email appointment

Learning and Teaching Structure

Activity	Total Hours	Hours per Week	Teaching Period Weeks
Lectures	24 hours	2 hours	Weeks 1 to 12
Tutorials	24 hours	2 hours	Weeks 1 to 12

Week by Week Schedule

Week	Week Beginning	Teaching and Learning Activities	Student Task or Assessment
1	May 08	• Overview of the unit • Introduction to cloud computing o Virtualisation o Cloud providers o SaaS, PaaS, IaaS • Overview of AWS infrastructure and services.	Accessing AWS resources Intro to Linux
2	May 15	• Compute services o Virtual machines – EC2 o Serverless computing - Lambda o Other compute services • Container-based/Serverless services	ACF Lab 3: Introduction to EC2 (~45 min)
3	May 22	• Network services o Virtual Private Cloud - subnets o Security groups firewalls o Designing your Environment o Content Delivery Networks and caching – Cloud Front	ACF Lab 2: Build a VPC and launch a Web Server (~45 min) ACA Module 11 Guided Lab - Streaming Dynamic Content using Amazon CloudFront (~30 min)
4	May 29	• Storage services o File Storage – EBS, EFS o Object storage – S3, Glacier • *Web accessible content on S3*	**Assignment 1a - Progress check is due this week, Sun 04 June @23:59 (VN Time)** ACF Lab 4: Working with EBS (~45 min) *Lab Exercise - Create a publicly accessible S3 web page*

5	June 05	• Database services o SQL and NoSQL databases o RDS o DynamoDB o Other databases	ACF Lab 5: Build your DB Server and interact with your DB using an App (~45 min)
6	June 12	• Security o Access Control concepts o AWS IAM o Authorization using Policies o Securing your AWS account o AWS Authentication o Securing Data o Auditing	**Assignment 1b is due this week, Sun 18 June @23:59 (VN Time)** ACF Lab 1: Intro to AWS IAM (~45 min) Assignment 2 Q & A.
7	June 19	• Scalable Architectures o HA, Scaling and Fault tolerance o Scaling to Demand o Elastic Load Balancing Cloud Watch Auto-scaling **MCQ Test 1 (in class)**	ACF Lab 6: Scaling and Load Balance your architecture App (~45 min)
8	June 26	• Scaling (part 2) and Automation o Fault tolerance o Load balancing o Scaling policies o Lambda • Automating Infrastructure o Cloud Formation	ACA Lab Mod 9: Creating a Highly Available Environment (~60 min) ACA Lab Mod 10: Automating Infrastructure Deployment with AWS CloudFormation (~20 min)
Mid Semester Break. No classes from Mon, 03rd to Sat, 08th of July.			
9	July 10	• Decoupling applications o Interaction paradigms • Request-response • Message driven/Event driven Archs • Serverless apps - Lambda	**Assignment 2 is due this week, Sun 16 July @23:59 (VN Time)** ACA Lab Mod 13: Implementing a Serverless Architecture with AWS Lambda (~30 min) ACA Lab Mod 13: Implementing a Serverless Architecture for the Cafe (~45 min)
10	July 17	• DNS routing – Route53 • Design Patterns and Sample Architectures	ACA Lab Mod 9 - Creating a Scalable and Highly Available Environment for the Cafe
11	July 24	• Architecture Evaluation o Reliability o Security o Performance o Cost	Assignment 3 discussion
12	July 31	**Assignment 3 online interviews** **MCQ MCQ Test 2 (in class)**	**Assignment 3 is due this week, Sun 06 Aug @23:59 (VN Time)**

Assessment

a) Assessment Overview

Tasks and Details	Individual or Group	Assessment Prerequisite	Weighting	Unit Learning Outcomes that this assessment task relates to	Assessment Due Date
Labs	Individual	None	20%	2, 3, 4	Weeks 2 - 11
Assignment 1a	Individual	None	5%	2, 3	Week 4
Assignment 1b	Individual	None	10%	2, 3	Week 6
Online Tests 1 and 2	Individual	None	30%	1, 2, 3, 4	Week 7, 12
Assignment 2	Individual	Successful completion of Assignments 1a, 1b, Labs and Tests	15%	2, 3	Week 10
Assignment 3 (Design Project)	Group of 2 or 3 students	Successful completion of Assignment 2	15%	2, 3, 4	Week 12
Assignment 3 Interview	To be confirmed	Successful completion of Assignment 3	5%	2, 3, 4	Week 12 Interviews may extend over into Week 13

I/ Labs:
Weekly labs and practical deployments can be submitted and marked by:
Live demonstration during your lab session. Your lab instructor would observe your deployment and may ask simple questions.
OR
Lab report submission via Canvas. Lab reports must be written in **IEEE standard format**, including relevant screenshots and explanations for each step.

I. **Multiple Choice Questions Test 1 (MCQ Test 1):**
No resit for this assessment if failed. Answer keys will not be published to students.

II. **Multiple Choice Questions Test 2 (MCQ Test 2):**
Resit for this assessment is available only to students with an average mark less than 50. Answer keys will not be published to students.

b) Minimum requirements to pass this Unit

To pass this unit, you must:

- achieve an **overall mark for the unit of 50%** or more

c) Examinations

If the unit you are enrolled in has an official examination, you will be expected to be available for the entire examination period including any Special Exam period.

d) Submission Requirements

Assignments and other assessments are generally submitted online through the Canvas assessment submission system which integrates with the Turnitin plagiarism checking service. Please ensure you keep a copy of all assessments that are submitted.

In cases where a hard copy submission is required an Assessment Cover Sheet must be submitted with your assignment. The standard Assessment Cover Sheet is available from the Current Students web site (see Part C).

e) Extensions and Late Submission

- **Late Submissions** - Unless an extension has been approved from the Unit Convenor, late submissions will result in a penalty. You will be penalised 10% of your achieved mark for each working day the task is late, up to a maximum of 5 working days. After 5 working days, a zero result will be recorded. For example, if a student achieves 90/100 on an assessment task but the task was submitted two days late. A late penalty of 20% (of that 90/100 mark) will be applied and the student's final mark will be recorded as 72/100 (being 90 less 09marks/1st day and another 09 mark/2nd day).
- **Extension** – please check the university policy for obtaining an extension.

f) Referencing

To avoid plagiarism, you are required to provide a reference whenever you include information from other sources in your work. Further details regarding plagiarism are available in Section C of this document.

Referencing conventions required for this unit are: Referencing conventions required for this unit are: APA Style of Referencing

Helpful information on referencing can be found at http://www.swinburne.edu.au/library/referencing/

g) Groupwork Guidelines

A group assignment is the collective responsibility of the entire group, and if one member is temporarily unable to contribute, the group should be able to reallocate responsibilities to keep to schedule. In the event of longer-term illness or other serious problems involving a member of group, it is the responsibility of the other members to notify immediately the Unit Convenor or relevant tutor.

All group members must be satisfied that the work has been correctly submitted. Any penalties for late submission will generally apply to all group members, not just the person who submitted.

Required Textbook(s)

NA

Recommended Reading Materials

The Library has a large collection of resource materials, both texts and current journals. Listed below are some references that will provide valuable supplementary information to this unit. It is also recommended that you explore other sources to broaden your understanding.

Implementing AWS: Leverage AWS Features to Build Highly Secure, Fault-Tolerant, and Scalable Cloud Environments

Wadia, Yohan ; Udell, Rowan ; Chan, Lúcás ; Gupta, Udita
Birmingham: Packt Publishing, Limited; 2019

PART C: FURTHER INFORMATION

For further information on any of these topics, refer to Swinburne's Current Students web page http://www.swinburne.edu.au/student/.

Student behaviour and wellbeing

All students are expected to: act with integrity, honesty and fairness; be inclusive, ethical and respectful of others; and appropriately use University resources, information, equipment and facilities. All students are expected to contribute to creating a work and study environment that is safe and free from bullying, violence, discrimination, sexual harassment, vilification and other forms of unacceptable behaviour.

The Student Charter describes what students can reasonably expect from Swinburne in order to enjoy a quality learning experience. The Charter also sets out what is expected of students with regards to your studies and the way you conduct yourself towards other people and property.

You are expected to familiarise yourself with University regulations and policies and are obliged to abide by these, including the Student Academic Misconduct Regulations, Student General Misconduct Regulations and the People, Culture and Integrity Policy. Any student found to be in breach of these may be subject to disciplinary processes.

Examples of expected behaviours are:

- conducting yourself in teaching areas in a manner that is professional and not disruptive to others
- following specific safety procedures in Swinburne laboratories, such as wearing appropriate footwear and safety equipment, not acting in a manner which is dangerous or disruptive (e.g. playing computer games), and not bringing in food or drink
- following emergency and evacuation procedures and following instructions given by staff/wardens in an emergency response

Canvas

You should regularly access the Swinburne learning management system, Canvas, which is available via the Current Students webpage or https://swinburne.instructure.com/ Canvas is updated regularly with important unit information and communications.

Communication

All communication will be via your Swinburne email address. If you access your email through a provider other than Swinburne, then it is your responsibility to ensure that your Swinburne email is redirected to your private email address.

Academic Integrity

Academic integrity is about taking responsibility for your learning and submitting work that is honestly your own. It means acknowledging the ideas, contributions and work of others; referencing your sources; contributing fairly to group work; and completing tasks, tests and exams without cheating. Swinburne University uses the Turnitin system, which helps to identify inadequate citations, poor paraphrasing and unoriginal work in assignments that are submitted via Canvas. Your Unit Convenor will provide further details.

Plagiarising, cheating and seeking an unfair advantage with regards to an exam or assessment are all breaches of academic integrity and treated as academic misconduct.

Plagiarism is submitting or presenting someone else's work as though it is your own without full and appropriate acknowledgement of their ideas and work. Examples include:

- using the whole or part of computer program written by another person as your own

- using the whole or part of somebody else's written work in an essay or other assessable work, including material from a book, journal, newspaper article, a website or database, a set of lecture notes, current or past student's work, or any other person's work
- poorly paraphrasing somebody else's work
- using a musical composition or audio, visual, graphic and photographic work created by another
- using realia created by another person, such as objects, artefacts, costumes, models
- submitting assessments that have been developed by another person or service (paid or unpaid), often referred to as contract cheating
- presenting or submitting assignments or other work in conjunction with another person or group of people when that work should be your own independent work. This is regardless of whether or not it is with the knowledge or consent of the other person(s). Swinburne encourages students to talk to staff, fellow students and other people who may be able to contribute to a student's academic work but where an independent assignment is required, the work must be the student's own
- enabling others to plagiarise or cheat, including letting another student copy your work or by giving access to a draft or completed assignment

The penalties for academic misconduct can be severe, ranging from a zero grade for an assessment task through to expulsion from the unit and, in the extreme, exclusion from Swinburne.

Student support

Swinburne offers a range of services and resources to help you complete your studies successfully. Your Unit Convenor or studentHQ can provide information about the study support and other services available for Swinburne students.

Special consideration

If your studies have been adversely affected due to serious and unavoidable circumstances outside of your control (e.g. severe illness or unavoidable obligation), you may be able to apply for special consideration (SPC).

Applications for Special Consideration will be submitted via the SPC online tool normally no later than 5.00pm on the third working day after the submission/sitting date for the relevant assessment component.

Accessibility needs

Sometimes students with a disability, a mental health or medical condition or significant carer responsibilities require reasonable adjustments to enable full access to and participation in education. Your needs can be addressed by Swinburne's AccessAbility Services by negotiating and distributing an 'Education Access Plan'. The plan makes recommendations to university teaching and examination staff. You must notify AccessAbility Services of your disability or condition within one week after the commencement of your unit to allow the University to make reasonable adjustments.

Review of marks

An independent marker reviews all fail grades for major assessment tasks. In addition, a review of assessment is undertaken if your final result is between 45 and 49 or within 2 marks of any grade threshold.

If you are not satisfied with the result of an assessment, you can ask the Unit Convenor to review the result. Your request must be made in writing within 10 working days of receiving the result. The Unit Convenor will review your result to determine if your result is appropriate.

If you are dissatisfied with the outcomes of the review, you can lodge a formal complaint.

Feedback, complaints and suggestions

In the first instance, discuss any issues with your Unit Convenor. If you are dissatisfied with the outcome of the discussion or would prefer not to deal with your Unit Convenor, then you can complete a feedback form. See https://www.swinburne.edu.au/corporate/feedback/

Advocacy

Should you require assistance with any academic issues, University statutes, regulations, policies and procedures, you are advised to seek advice from Academic Department and Student HQ.