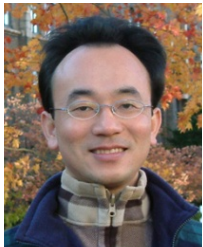


雲端服務架構實務

(Cloud Services Architecting Practices)

Course orientation on Cloud Services Architecting Practices

雲端服務架構實務 (Cloud Services Architecting Practices) (MI4) (Fall 2019)
(AWS Academy Cloud Foundations; ACF) (AWS Cloud Practitioner, AWS Solutions Architect)
(MI4, TKU) (2 Credits, Elective)
(1081) (資管四 MI4) (選修2學分) (2019.09 - 2020.01)
(週四 Thu, 9, 10, 16:10-18:00) (B113)



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2019-09-12





**Tamkang
University**
淡江大學



academy





淡江大學108學年度第1學期 課程教學計畫表

Fall 2019 (2019.09.12 - 2020.01.09)

- 課程名稱：雲端服務架構實務
(Cloud Services Architecting Practices)
- 授課教師：戴敏育 (Min-Yuh Day)
- 開課系級：資管四P (TLMXB4P) (M2436) (2790)
- 開課資料：選修 單學期 2 學分
(2 Credits, Elective)
- 上課時間地點：週四 Thu 9, 10 (16:10-18:00) B113



課程簡介



- 雲端服務架構實務課程主要介紹：
AWS 技術基礎和在 AWS 上建立架構。
- **AWS 技術基礎**介紹 AWS 產品、服務和常見解決方案。
- **在 AWS 上建立架構**內容涵蓋在 AWS 上建置 IT 基礎架構的基礎。
- **解決方案架構師**如何透過了解 AWS 服務來優化對 AWS 雲端的使用，及如何讓這些服務符合雲端解決方案。
- AWS 雲端最佳實務與建議的設計模式，協助學員思考在 AWS 上架構最佳 IT 解決方案的程序。



Course Introduction

- This course, **Cloud Services Architecting Practices**, introduces **AWS Technical Essentials** and **Architecting on AWS**.
- In **AWS Technical Essentials**, students will learn about AWS products, services, and common solutions.
- **Architecting on AWS** covers fundamentals of building IT infrastructure on the AWS platform.
- Students will learn how to optimize the AWS Cloud by understanding how AWS services fit into cloud-based solutions.
- In addition, students explore AWS Cloud best practices and design patterns for architecting optimal IT solutions on AWS.



課程目標



- 與 AWS 平台有關的術語和概念
- 瀏覽 AWS 管理主控台的方法
- AWS 安全措施和 AWS Identity and Access Management (IAM) 的關鍵概念
- 根據 AWS 架構原則和最佳實務做出架構決策
- 利用 AWS 服務，讓您的基礎設施可擴展、可靠且高度可用



Course Objective

- Terminology and concepts related to the AWS platform
- How to navigate the AWS Management Console
- Key concepts of AWS security measures and AWS Identity and Access Management (IAM)
- Make architectural decisions based on AWS architectural principles and best practices
- Leverage AWS services to make your infrastructure scalable, reliable, and highly available

課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
1	2019/09/12	Course orientation on Cloud Services Architecting Practices
2	2019/09/19	Introduction to Cloud Computing
3	2019/09/26	Getting Started with AWS: AWS Compute, Storage, and Networking
4	2019/10/03	Creating Amazon EC2 instances with Microsoft Windows
5	2019/10/10	國慶日放假
6	2019/10/17	Build Your Virtual Private Cloud (VPC) and Launch a Web Server, Working with Amazon Elastic Block Store (EBS)

課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
7	2019/10/24	AWS Security, Identity, and Access Management: Introduction to AWS Identity and Access Management (IAM)
8	2019/10/31	AWS Database Options: Build Your Database Server and Interact with Your Database using an Application
9	2019/11/07	AWS Elasticity and Management Tools: Scale and Load Balance Your Architecture
10	2019/11/14	期中考試週
11	2019/11/21	Architecting on AWS: Introduction to System Design
12	2019/11/28	Cloud Billing and Support Services

課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
13	2019/12/05	Designing Your Environment and Deploy a Web Application on AWS
14	2019/12/12	Group discussion: Forklift an Existing Application onto AWS
15	2019/12/19	System Design for High Availability (Part I)
16	2019/12/26	Making Your Environment Highly Available
17	2020/01/02	System Design for High Availability (Part II)
18	2020/01/09	期末考試週



教學目標之教學方法與評量方法

- 教學方法

- 講述、討論、發表、實作、體驗、模擬

- 評量方法

- 測驗、討論、實作、報告



學期成績計算方式

- 期中評量：30.0 %
- 期末評量：30.0 %
- 平時評量：40.0 % (課堂參與及報告討論表現)



教材課本與參考書籍

- **教材課本 (Textbook)**
 - **Slides**
 - **AWS Academy Cloud Foundations (AWS ACF)**, AWS Academy
 - **AWS Academy Cloud Architecting (AWS ACA)**, AWS Academy



教材課本與參考書籍

• 參考書籍 (References)

- Ben Piper and David Clinton (2019),
AWS Certified Solutions Architect Study Guide: Associate SAA-C01 Exam, 2 edition, Sybex, 2019
- **AWS Technical Essentials**
 - <https://aws.amazon.com/training/course-descriptions/essentials/>
- **Architecting on AWS**
 - <https://aws.amazon.com/training/course-descriptions/architect/>
- **AWS Cloud Practitioner Essentials (Second Edition)**
 - <https://aws.amazon.com/training/course-descriptions/cloud-practitioner-essentials/>
- **AWS Certified Cloud Practitioner**
 - <https://aws.amazon.com/certification/certified-cloud-practitioner/>
- **AWS Certified Solutions Architect – Associate**
 - <https://aws.amazon.com/certification/certified-solutions-architect-associate/>

Available AWS Certifications

Professional

Two years of comprehensive experience designing, operating, and troubleshooting solutions using the AWS Cloud



Associate

One year of experience solving problems and implementing solutions using the AWS Cloud

SAA



Architect

Operations

Developer

Foundational

Six months of fundamental AWS Cloud and industry knowledge

CLF



Cloud Practitioner

Specialty

Technical AWS Cloud experience in the Specialty domain as specified in the exam guide





AWS Certified Cloud Practitioner

- This certification provides individuals in a larger variety of cloud and technology roles with a way to validate their AWS Cloud knowledge and enhance their professional credibility.
- This exam covers four domains, including cloud concepts, security, technology, and billing and pricing.





AWS Certified Solutions Architect – Associate

- This certification validates your ability to effectively demonstrate knowledge of how to architect and deploy secure and robust applications on AWS technologies.
- This exam is for anyone with at least one year of hands-on experience designing available, cost-efficient, fault-tolerant, and scalable and distributed systems on AWS.



AWS Academy and Certifications

- **AWS Academy Cloud Foundations (ACF)**

- **AWS Certified Cloud Practitioner**
(CLF-C01) (2020/01/02)

- <https://aws.amazon.com/certification/certified-cloud-practitioner/>



- **AWS Academy Cloud Architecting (ACA)**

- **AWS Certified Solutions Architect – Associate**
(SAA-C01) (2020/05/15)

- <https://aws.amazon.com/certification/certified-solutions-architect-associate/>



<https://aws.amazon.com/training/awsacademy/>

AWS Academy and Certifications

- **AWS Academy Cloud Foundations (ACF)**

- **AWS Certified Cloud Practitioner (CLF-C01)** (2020/01/02)

- <https://aws.amazon.com/certification/certified-cloud-practitioner/>

- **AWS Cloud Practitioner Essentials (Second Edition)**

- <https://aws.amazon.com/training/course-descriptions/cloud-practitioner-essentials/>

- **AWS Technical Essentials**

- <https://aws.amazon.com/training/course-descriptions/essentials/>



- **AWS Academy Cloud Architecting (ACA)**

- **AWS Certified Solutions Architect – Associate (SAA-C01)** (2020/05/15)

- <https://aws.amazon.com/certification/certified-solutions-architect-associate/>

- **Architecting on AWS**

- <https://aws.amazon.com/training/course-descriptions/architect/>



<https://aws.amazon.com/training/awsacademy/>



AWS Certified Cloud Practitioner (CLF-C01)

Domain	% of Examination
Domain 1: Cloud Concepts	26%
Domain 2: Security and Compliance	25%
Domain 3: Technology	33%
Domain 4: Billing and Pricing	16%
TOTAL	100%



AWS Certified Solutions Architect – Associate (SAA-C01)

Domain	% of Examination
Domain 1: Design Resilient Architectures	34%
Domain 2: Define Performant Architectures	24%
Domain 3: Specify Secure Applications and Architectures	26%
Domain 4: Design Cost-Optimized Architectures	10%
Domain 5: Define Operationally Excellent Architectures	6%
TOTAL	100%



AWS Certified Cloud Practitioner (CLF-C01)

- **Domain 1: Cloud Concepts**
 - 1.1 Define the AWS Cloud and its value proposition
 - 1.2 Identify aspects of AWS Cloud economics
 - 1.3 List the different cloud architecture design principles



AWS Certified Cloud Practitioner (CLF-C01)

- **Domain 2: Security and Compliance**
 - 2.1 Define the AWS shared responsibility model
 - 2.2 Define AWS Cloud security and compliance concepts
 - 2.3 Identify AWS access management capabilities
 - 2.4 Identify resources for security support



AWS Certified Cloud Practitioner (CLF-C01)

- **Domain 3: Technology**
 - 3.1 Define methods of deploying and operating in the AWS Cloud
 - 3.2 Define the AWS global infrastructure
 - 3.3 Identify the core AWS services
 - 3.4 Identify resources for technology support



AWS Certified Cloud Practitioner (CLF-C01)

- **Domain 4: Billing and Pricing**
 - 4.1 Compare and contrast the various pricing models for AWS
 - 4.2 Recognize the various account structures in relation to AWS billing and pricing
 - 4.3 Identify resources available for billing support



AWS Certified Solutions Architect – Associate (SAA-C01)

- **Domain 1: Design Resilient Architectures**
 - 1.1 Choose reliable/resilient storage.
 - 1.2 Determine how to design decoupling mechanisms using AWS services.
 - 1.3 Determine how to design a multi-tier architecture solution.
 - 1.4 Determine how to design high availability and/or fault tolerant architectures.



AWS Certified Solutions Architect – Associate (SAA-C01)

- **Domain 2: Define **Performant** Architectures**
 - 2.1 Choose performant storage and databases.
 - 2.2 Apply caching to improve performance.
 - 2.3 Design solutions for elasticity and scalability.



AWS Certified Solutions Architect – Associate (SAA-C01)

- **Domain 3: Specify **Secure** Applications and Architectures**
 - 3.1 Determine how to secure application tiers.
 - 3.2 Determine how to secure data.
 - 3.3 Define the networking infrastructure for a single VPC application.



AWS Certified Solutions Architect – Associate (SAA-C01)

- **Domain 4: Design **Cost-Optimized** Architectures**
 - 4.1 Determine how to design cost-optimized storage.
 - 4.2 Determine how to design cost-optimized compute.
- **Domain 5: Define **Operationally-Excellent** Architectures**
 - 5.1 Choose design features in solutions that enable operational excellence.



AWS Products and Services



Analytics



Application Integration



AR & VR



AWS Cost Management



Blockchain



Business Applications



Compute



Customer Engagement



Database



Developer Tools



End User Computing



Game Tech



Internet of Things



Machine Learning



Management & Governance



Media Services



Migration & Transfer



Mobile



Networking & Content Delivery



Quantum Technologies



Robotics



Satellite



Security, Identity & Compliance



Storage



AWS Compute



Compute

Amazon EC2

Virtual servers in the cloud

Amazon EC2 Auto Scaling

Scale compute capacity to meet demand

Amazon Elastic Container Registry

Store and retrieve docker images

Amazon Elastic Container Service

Run and manage docker containers

Amazon Elastic Kubernetes Service

Run managed Kubernetes on AWS

Amazon Lightsail

Launch and manage virtual private servers

AWS Batch

Run batch jobs at any scale

AWS Elastic Beanstalk

Run and manage web apps

AWS Fargate

Run containers without managing servers or clusters

AWS Lambda

Run code without thinking about servers

AWS Outposts

Run AWS infrastructure on-premises

AWS Serverless Application Repository

Discover, deploy, and publish serverless applications

AWS Wavelength

Deliver ultra-low latency applications for 5G devices

VMware Cloud on AWS

Build a hybrid cloud without custom hardware



AWS Database



Amazon Aurora
High Performance Managed Relational Database

Amazon DynamoDB
Managed NoSQL Database

Amazon DocumentDB (with MongoDB compatibility)
Fully managed document database

Amazon ElastiCache
In-memory Caching System

Amazon Managed Apache Cassandra Service
Managed Cassandra-compatible database

Amazon Neptune
Fully Managed Graph Database Service

Amazon Quantum Ledger Database (QLDB)
Fully managed ledger database

Amazon RDS
Managed Relational Database Service for MySQL, PostgreSQL, Oracle, SQL Server, and MariaDB

Amazon RDS on VMware
Automate on-premises database management

Amazon Redshift
Fast, Simple, Cost-effective Data Warehousing

Amazon Timestream
Fully managed time series database

AWS Database Migration Service
Migrate Databases with Minimal Downtime



AWS Storage



Amazon Simple Storage Service (S3)
Scalable Storage in the Cloud

Amazon FSx for Lustre
High-performance file system integrated with S3

AWS Backup
Centralized backup across AWS services

CloudEndure Disaster Recovery
Highly automated disaster recovery

Amazon Elastic Block Store (EBS)
EC2 block storage volumes

Amazon FSx for Windows File Server
Fully managed Windows native file system

AWS Snow Family
Physical devices to migrate data into and out of AWS

Amazon Elastic File System (EFS)
Fully managed file system for EC2

Amazon S3 Glacier
Low-cost Archive Storage in the Cloud

AWS Storage Gateway
Hybrid Storage Integration



AWS Networking & Content Delivery



Networking & Content
Delivery

Amazon VPC

Isolated Cloud Resources

Amazon API Gateway

Build, Deploy, and Manage APIs

Amazon CloudFront

Global Content Delivery Network

Amazon Route 53

Scalable Domain Name System

AWS PrivateLink

Securely Access Services Hosted on AWS

AWS App Mesh

Monitor and control microservices

AWS Cloud Map

Application resource registry for microservices

AWS Direct Connect

Dedicated Network Connection to AWS

AWS Global Accelerator

Improve application availability and performance

AWS Transit Gateway

Easily scale VPC and account connections

Elastic Load Balancing

Distribute incoming traffic across multiple targets



AWS Security, Identity & Compliance



Security, Identity &
Compliance

AWS Identity & Access Management
Manage User Access and Encryption Keys

Amazon Cognito
Identity Management for your Apps

Amazon Detective
Investigate potential security issues

Amazon GuardDuty
Managed Threat Detection Service

Amazon Inspector
Analyze Application Security

Amazon Macie
Discover, Classify, and Protect your Data

AWS Artifact
On-demand access to AWS compliance reports

AWS Certificate Manager
Provision, Manage, and Deploy SSL/TLS Certificates

AWS CloudHSM
Hardware-based Key Storage for Regulatory Compliance

AWS Directory Service
Host and Manage Active Directory

AWS Firewall Manager
Central Management of Firewall Rules

AWS Key Management Service
Managed Creation and Control of Encryption Keys

AWS Resource Access Manager
Simple, secure service to share AWS resources

AWS Secrets Manager
Rotate, Manage, and Retrieve Secrets

AWS Security Hub
Unified security and compliance center

AWS Shield
DDoS Protection

AWS Single Sign-On
Cloud Single Sign-On (SSO) Service

AWS WAF
Filter Malicious Web Traffic



AWS Cost Management



AWS Cost Management

AWS Cost Explorer

Analyze Your AWS Cost and Usage

AWS Budgets

Set Custom Cost and Usage Budgets

AWS Cost and Usage Report

Access Comprehensive Cost and Usage Information

Reserved Instance Reporting

Dive Deeper into Your Reserved Instances (RIs)

Savings Plans

Save up to 72% on compute usage with flexible pricing



AWS Services

- Amazon **EC2**
 - Virtual servers in the cloud
- Amazon **Simple Storage Service (S3)**
 - Scalable storage in the cloud
- Amazon **Aurora**
 - High performance managed relational database
- Amazon **DynamoDB**
 - Managed NoSQL database
- Amazon **RDS**
 - Managed relational database service for MySQL, PostgreSQL, Oracle, SQL Server, and MariaDB



AWS Services

- **AWS Lambda**
 - Run code without thinking about servers
- **AWS Elastic Beanstalk**
 - Run and manage web apps
- **Amazon VPC**
 - Isolated cloud resources
- **Amazon Lightsail**
 - Launch and manage virtual private servers
- **Amazon SageMaker**
 - Build, train, and deploy machine learning models at scale



Summary



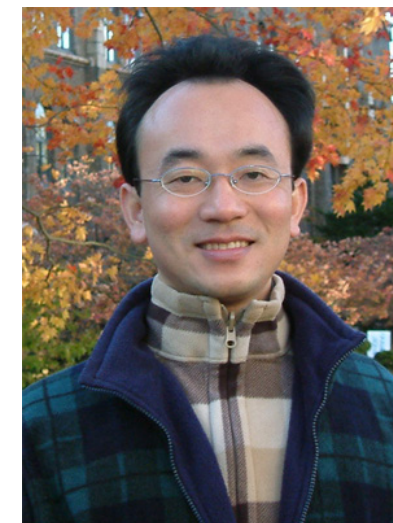
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- AWS 雲端最佳實務與建議的設計模式，協助學員思考在 AWS 上架構最佳 IT 解決方案的程序。

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