AWS Educate 2021 Q2 Online Educator Meetup

AWS Academy 教學經驗分享

國立臺北大學企管系選修課程 (企業雲端運算入門)

(Teaching Experiences Sharing of Introducing AWS Academy at NTPU: Foundation of Business Cloud Computing)

Time: 2021/7/5 (Mon) 10:50-11:20 am
Host: AWS Educate

戴敏育 副教授

Min-Yuh Day, Ph.D, Associate Professor

國立臺北大學 資訊管理研究所

Institute of Information Management, National Taipei University

https://web.ntpu.edu.tw/~myday

2021-07-05

NTPU
國立臺北大學
National Taipei University

戴敏育 博士
(Min-Yuh Day, Ph.D.)

aws educate | Cloud Ambassador
2020 Cohort

aws academy
Accredited Educator

aws certified
Solutions Architect
Associate

aws certified
Cloud Practitioner

國立臺北大學 資訊管理研究所 副教授
中央研究院 資訊科學研究所 訪問學人
國立臺灣大學 資訊管理 博士

Publications Co-Chairs, IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2013-)

Program Co-Chair, IEEE International Workshop on Empirical Methods for Recognizing Inference in TExt (IEEE EM-RITE 2012-)

Publications Chair, The IEEE International Conference on Information Reuse and Integration (IEEE IRI)

NTPU
國立臺北大學
National Taipei University

中央研究院 ACADEMIA SINICA 1928

Outline

- AWS雲端應用導入教學
- 課程理論中融入AWS概念
- 帶領學生進行雲端實作

國立臺北大學 AWS 雲創學院

- Amazon Web Services (AWS)
  - 全球廣泛採納的雲端平台，透過全球資料中心提供超過175項功能完整的服務，包含資料庫、運算分析、網路、開發人員工具、資訊安全和企業應用等，不但能在AWS上運行 R, Python, C++ 等程式語言，也可延伸至AI與機器學習、區塊鏈、物聯網、資料湖 (Data Lake)、大數據分析、遊戲開發及電子商務等多樣化的應用情境中。
- 國立臺北大學推動AWS雲創學院發展
  - 期望鼓勵全校各院系相關課程教師，於教學中導入雲端概念與AWS應用，透過帶領學生實作練習，增進學生學習成效以及和產業接軌的機會。

AWS雲端應用導入教學

- **企業雲端運算入門 (Foundation of Business Cloud Computing)**
  - (BA4, NTPU) (Spring 2021)
- **大數據分析 (Big Data Analytics)**
  - (MBA, IM, NTPU) (Fall 2020)
- **軟體工程 (Software Engineering)**
  - (MBA, IM, NTPU) (Fall 2020)
- **雲端服務架構實務 (Cloud Services Architecting Practices)**
  - (MI4, TKU) (Spring 2021, Fall 2020, Spring 2020, Fall 2019)

https://web.ntpu.edu.tw/~myday/teaching.htm

企業雲端運算入門
(Foundation of Business Cloud Computing)
雲端概念概述
(Cloud Concepts Overview)

企業雲端運算入門 (Foundation of Business Cloud Computing) (BA4, NTPU) (Spring 2021)
(AWS Academy Cloud Foundations; ACF) (AWS Certified Cloud Practitioner)
(BA4, NTPU) (3 Credits, Elective) (U4010) (自主學習課程)(商業智慧與大數據分析學士學分學程)
(1092) (國立台北大學企管系4A, 4B) (選修3學分) (授課教師：謝榮桂，戴敏育) (2021.02 - 2021.06)
(週三 Wed, 6, 7, 8, 14:10-17:00) (台北大學三峽校區 文3F10_L)

謝榮桂 (Jung-Kuei Hsieh), 戴敏育 (Min-Yuh Day)

National Taipei University

國立臺北大學

2021-02-24

NTPU

國立臺北大學

National Taipei University

+ aws academy

國立臺北大學
109學年度第2學期 課程大綱
Spring 2021 (2021.02 - 2021.06)

- 課程名稱 ：企業雲端運算入門
  (Foundation of Business Cloud Computing)
- 應修系級 Major：企業管理學系4A , 4B,
  商業智慧與大數據分析學士學分學程
- 授課教師 Instructor：謝榮桂　戴敏育
- 選修類別 Required/Elective：選 (Elective)
- 學　　分 Credit(s) ：3 學分
- 週三 Wed, 6, 7, 8, 14:10-17:00
- (台北大學三峽校區 文3F10_L)

（自主學習課程）

教學目標

- 本課程主要介紹亞馬遜公司的雲端運算服務 Amazon Web Services (AWS)，
  對於想要全面瞭解企業雲端運算概念的同學，
  本課程將詳細介紹
  雲概念、
  AWS 核心服務、
  安全性、
  架構、
  定價和相關支援等服務，
  並以通過認證 AWS Certified Cloud Practitioner為目標。

Course Objectives

- This course introduces Amazon Web Services (AWS), the cloud computing service of Amazon.
- For students who want to fully understand the concept of enterprise cloud computing, this course will introduce the AWS Academy Cloud Foundations.
- Topics include Cloud Concepts Overview, Cloud Economics and Billing, AWS Global Infrastructure Overview, AWS Cloud Security, Networking and Content Delivery, Cloud Compute, Cloud Storage, Cloud Databases, Cloud Architecture, Cloud Automatic Scaling and Monitoring.
- The course objective is training students to pass the certification of AWS Certified Cloud Practitioner.

Course Outline

1. Cloud Concepts Overview
2. Cloud Economics and Billing
3. AWS Global Infrastructure Overview
4. AWS Cloud Security
5. Networking and Content Delivery
6. Cloud Compute
7. Cloud Storage
8. Cloud Databases
9. Cloud Architecture
10. Cloud Automatic Scaling and Monitoring

課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
1	2021/02/24	雲端概念概述 (Cloud Concepts Overview)
2	2021/03/03	雲端經濟與計費 (Cloud Economics and Billing)
3	2021/03/10	AWS全球基礎設施概述 (AWS Global Infrastructure Overview)
4	2021/03/17	AWS雲端安全 (AWS Cloud Security)
5	2021/03/24	網路和內容交付 (Networking and Content Delivery)
6	2021/03/31	雲端計算 (Cloud Compute)

課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
7	2021/04/07	雲端儲存 (Cloud Storage)
8	2021/04/14	雲端數據庫 (Cloud Databases)
9	2021/04/21	雲端架構 (Cloud Architecture)
10	2021/04/28	雲端自動擴展和監控 (Cloud Automatic Scaling and Monitoring)
11	2021/05/05	學生自主學習 (Self-learning)
12	2021/05/12	學生自主學習 (Self-learning)

課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
13	2021/05/19	學生自主學習 (Self-learning)
14	2021/05/26	雲端專案成果報告與討論 (Cloud Project Presentation and Discussion)
15	2021/06/02	學生自主學習 (Self-learning)
16	2021/06/09	學生自主學習 (Self-learning)
17	2021/06/16	學生自主學習 (Self-learning)
18	2021/06/23	期末專案成果報告 (Final Project Presentation)

AWS Certification

Professional

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

- aws certified Solutions Architect Professional
- aws certified DevOps Engineer Professional

2

Associate

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

SAA

- aws certified Solutions Architect Associate — **Architect**
- aws certified SysOps Administrator Associate — **Operations**
- aws certified Developer Associate — **Developer**

1

Foundational

Six months of fundamental AWS Cloud and industry knowledge

CLF

- **Cloud Practitioner**
- aws certified Cloud Practitioner

Specialty

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

- aws certified Advanced Networking Specialty
- aws certified Security Specialty
- aws certified Machine Learning Specialty
- aws certified Alexa Skill Builder Specialty
- aws certified Data Analytics Specialty
- aws certified Database Specialty

https://aws.amazon.com/certification/

AWS Certified Cloud Practitioner (CLF-C01)

1

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

AWS Certified Solutions Architect – Associate (SAA-C02)

2

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

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.

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

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.

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

AWS Academy and Certifications

- **AWS Academy Cloud Foundations (ACF)**
  - **AWS Certified Cloud Practitioner (CLF-C01)** (2021/05)
  - https://aws.amazon.com/certification/certified-cloud-practitioner/

1

- **AWS Academy Cloud Architecting (ACA)**
  - **AWS Certified Solutions Architect – Associate (SAA-C02)**
  - https://aws.amazon.com/certification/certified-solutions-architect-associate/

2

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

AWS Academy and Certifications

- **AWS Academy Cloud Foundations (ACF)**
  - **AWS Certified Cloud Practitioner (CLF-C01)** (2021/05)
  - 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/

1

- **AWS Academy Cloud Architecting (ACA)**
  - **AWS Certified Solutions Architect – Associate (SAA-C02)**
  - https://aws.amazon.com/certification/certified-solutions-architect-associate/
  - **Architecting on AWS**
    - https://aws.amazon.com/training/course-descriptions/architect/

2

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%

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

AWS Certified Solutions Architect – Associate (SAA-C02)

Domain	% of Examination
Domain 1: Design Resilient Architectures	30%
Domain 2: Design High-Performing Architectures	28%
Domain 3: Specify Secure Applications and Architectures	24%
Domain 4: Design Cost-Optimized Architectures	18%
TOTAL	100%

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

企業雲端運算入門
國立臺北大學企管系選修課程修課人數統計

SID	科系	人數	百分比
1	企業管理學系	15	63%
2	金融與合作經營學系	3	13%
3	經濟學系	3	13%
4	應用外語學系	1	4%
5	會計學系	1	4%
6	休閒運動管理學系	1	4%
	合計	24	100%

AWS Educate Taiwan Cloud Ambassador Seeding Program (學生大使種子計畫)

- **Joyce Tseng (曾珈宜)**
  - Department of Finance and Cooperative Management, National Taipei University
    (國立臺北大學金融與合作經營學系)

- **Cheng-Xun Zhou (周呈勳)**
  - Department of Foreign Languages and Applied Linguistics, National Taipei University
    (國立臺北大學應用外語學系)

軟體工程
(Software Engineering)
雲端運算與雲軟體架構
(Cloud Computing and Cloud Software Architecture)

1091SE07
MBA, IM, NTPU (M5118) (Fall 2020)
Tue 2, 3, 4 (9:10-12:00) (B8F40)

Min-Yuh Day
戴敏育
Associate Professor
副教授
Institute of Information Management, National Taipei University
國立臺北大學 資訊管理研究所
https://web.ntpu.edu.tw/~myday

2020-11-03

課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
1	2020/09/15	軟體工程概論 (Introduction to Software Engineering)
2	2020/09/22	軟體產品與專案管理：軟體產品管理，原型設計 (Software Products and Project Management: Software product management and prototyping)
3	2020/09/29	敏捷軟體工程：敏捷方法、Scrum、極限程式設計 (Agile Software Engineering: Agile methods, Scrum, and Extreme Programming)
4	2020/10/06	功能、場景和故事 (Features, Scenarios, and Stories)
5	2020/10/13	軟體架構：架構設計、系統分解、分散式架構 (Software Architecture: Architectural design, System decomposition, and Distribution architecture)
6	2020/10/20	軟體工程個案研究 I (Case Study on Software Engineering I)

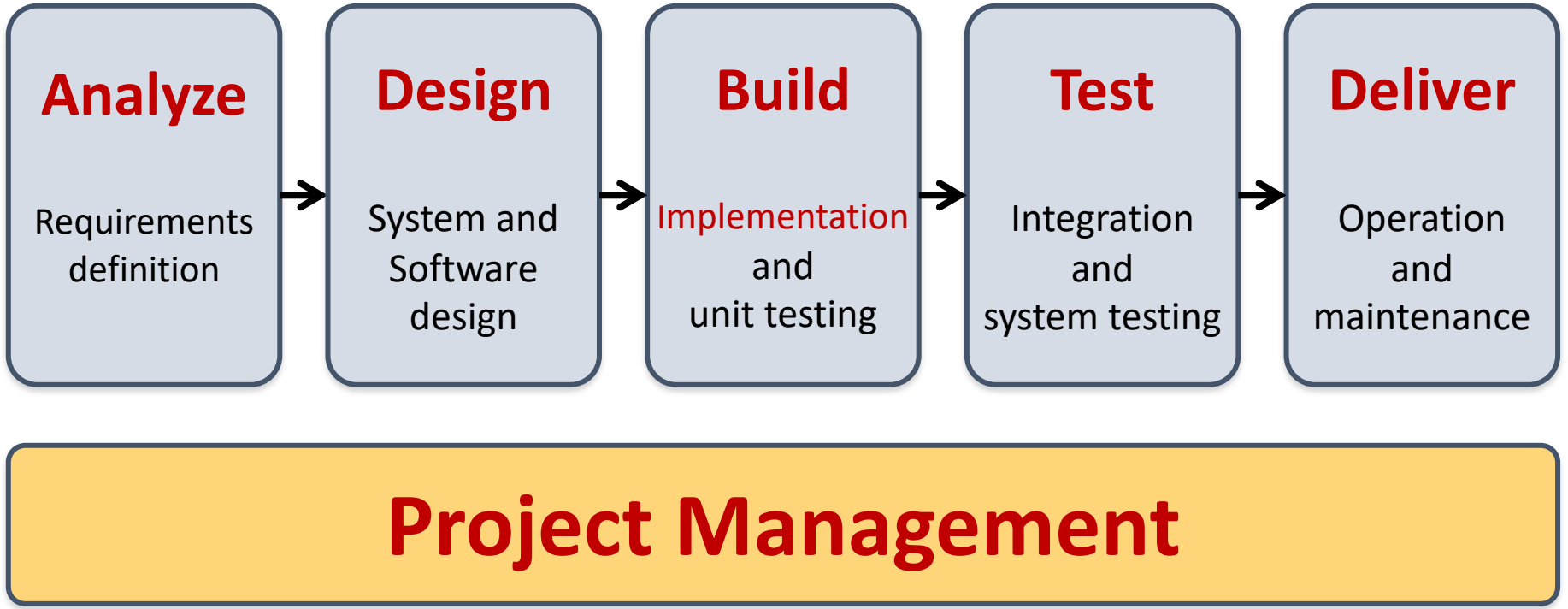
課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
7	2020/10/27	基於雲的軟體：虛擬化和容器、軟體即服務 (Cloud-Based Software: Virtualization and containers, Everything as a service, Software as a service)
8	2020/11/03	雲端運算與雲軟體架構 (Cloud Computing and Cloud Software Architecture)
9	2020/11/10	期中報告 (Midterm Project Report)
10	2020/11/17	微服務架構：RESTful服務、服務部署 (Microservices Architecture, RESTful services, Service deployment)
11	2020/11/24	軟體工程產業實務 (Industry Practices of Software Engineering)
12	2020/12/01	安全和隱私 (Security and Privacy)

課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
13	2020/12/08	軟體工程個案研究 II (Case Study on Software Engineering II)
14	2020/12/15	可靠的程式設計 (Reliable Programming)
15	2020/12/22	測試：功能測試、測試自動化、測試驅動的開發、程式碼審查 (Testing: Functional testing, Test automation, Test-driven development, and Code reviews)
16	2020/12/29	DevOps和程式碼管理：程式碼管理和DevOps自動化 (DevOps and Code Management: Code management and DevOps automation)
17	2021/01/05	期末報告 I (Final Project Report I)
18	2021/01/12	期末報告 II (Final Project Report I)

Software Engineering and Project Management



Outline

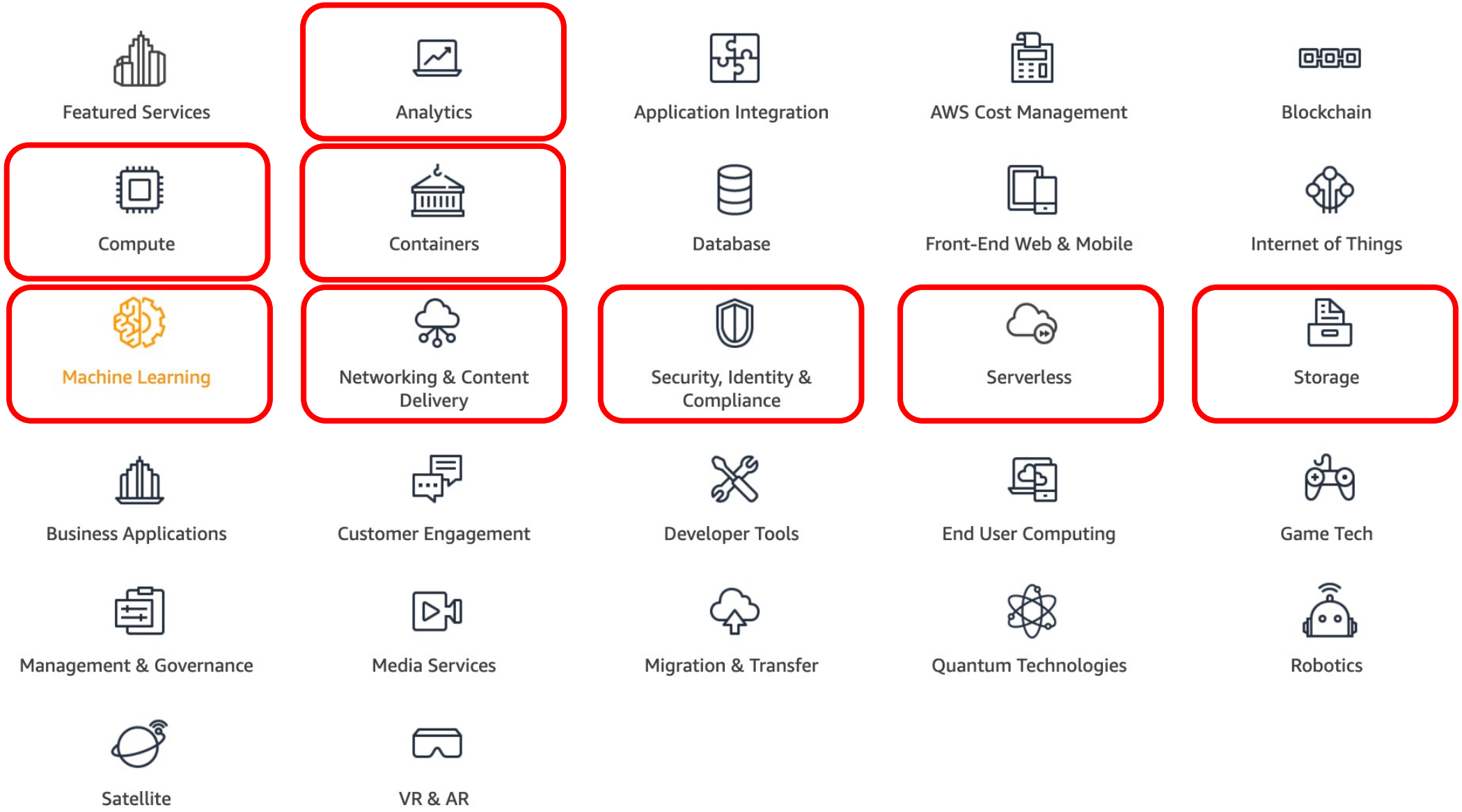
- AWS雲端應用導入教學
- 課程理論中融入AWS概念
- 帶領學生進行雲端實作

課程理論中融入AWS概念

- 智慧金融量化分析 (Artificial Intelligence in Finance and Quantitative)
  - 國立台北大學資管所碩士班 (Fall 2021)
- 人工智慧文本分析 (Artificial Intelligence for Text Analytics)
  - 國立台北大學資管所碩士班 (Spring 2022)
- 人工智慧 (Artificial Intelligence)
  - 國立台北大學資管所碩士班 (Spring 2021)
- 資料探勘 (Data Mining)
  - 國立台北大學資管所碩士班 (Spring 2021)
    (電子商務碩士學分學程)

https://web.ntpu.edu.tw/~myday/teaching.htm

AWS Products and Services



Source: https://aws.amazon.com/

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

Source: https://aws.amazon.com/

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

Source: https://aws.amazon.com/

Outline

- AWS雲端應用導入教學
- 課程理論中融入AWS概念
- 帶領學生進行雲端實作

帶領學生進行雲端實作

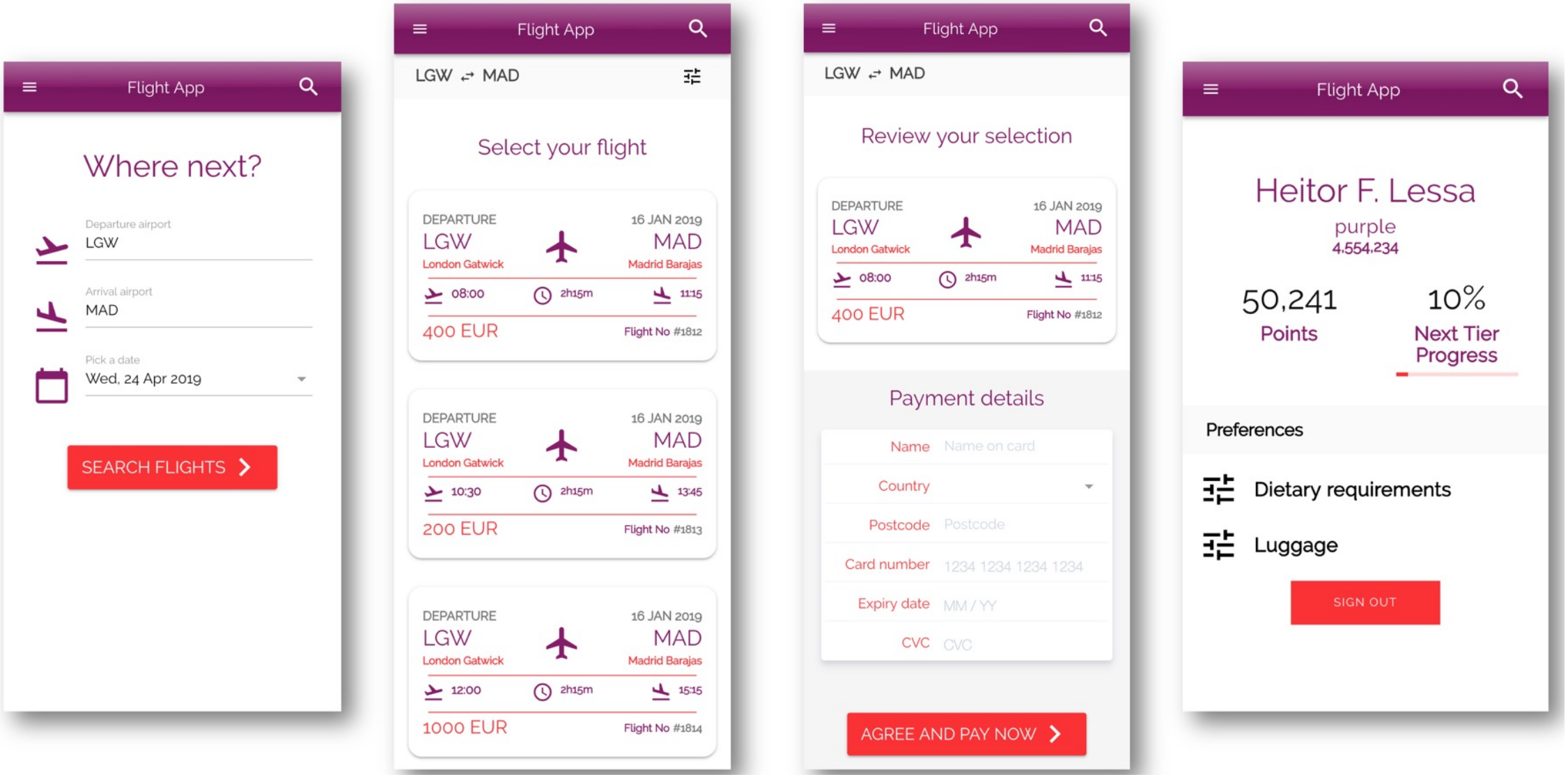
1. AWS Academy (Application: ntpu aws app)

   (https://awsacademy.instructure.com/ , Vocareum Labs)
2. AWS Educate
3. AWS Free Tier
4. AWS Training
5. AWS Cloud Practitioner Essentials (Second Edition)
6. AWS Certified Cloud Practitioner
7. AWS Educate User Guide for Students
8. AWS Academy Cloud Foundations (ACF)
   - AWS_ACF_M01 ~ AWS_ACF_M10

     https://web.ntpu.edu.tw/~myday/teaching.htm

AWS Serverless Architecture

AWS Serverless Airline Booking



Source: https://github.com/aws-samples/aws-serverless-airline-booking

AWS Serverless Airline Booking Stack

UI/UX


Quasar framework


Vue.js


AWS Amplify

Stripe Elements

Data/Lang


Amazon DynamoDB


Python

Typescript

JavaScript

API/Auth


AWS AppSync


Amazon API Gateway


Amazon Cognito

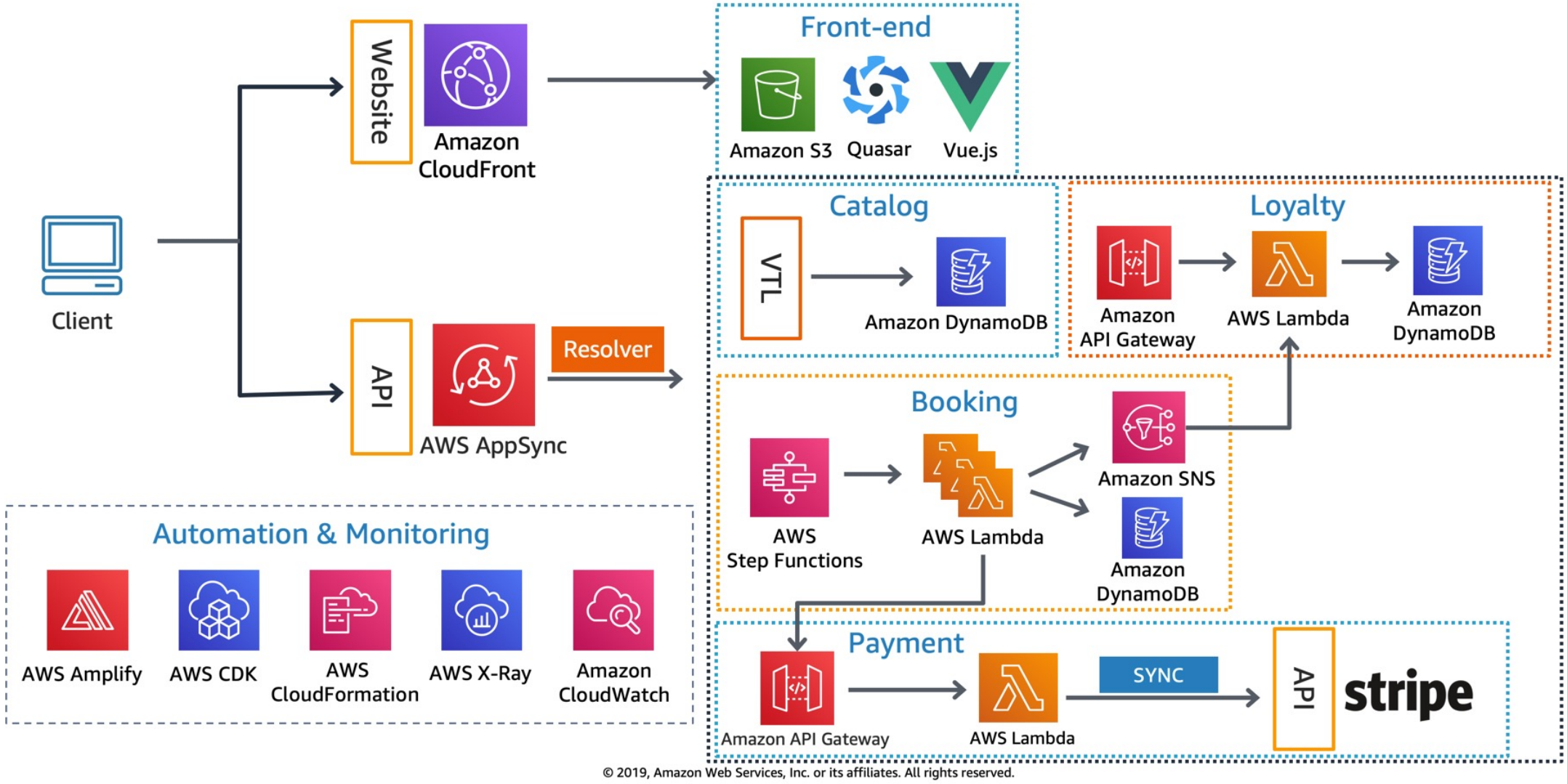
Messaging


Amazon SNS


AWS Step Functions

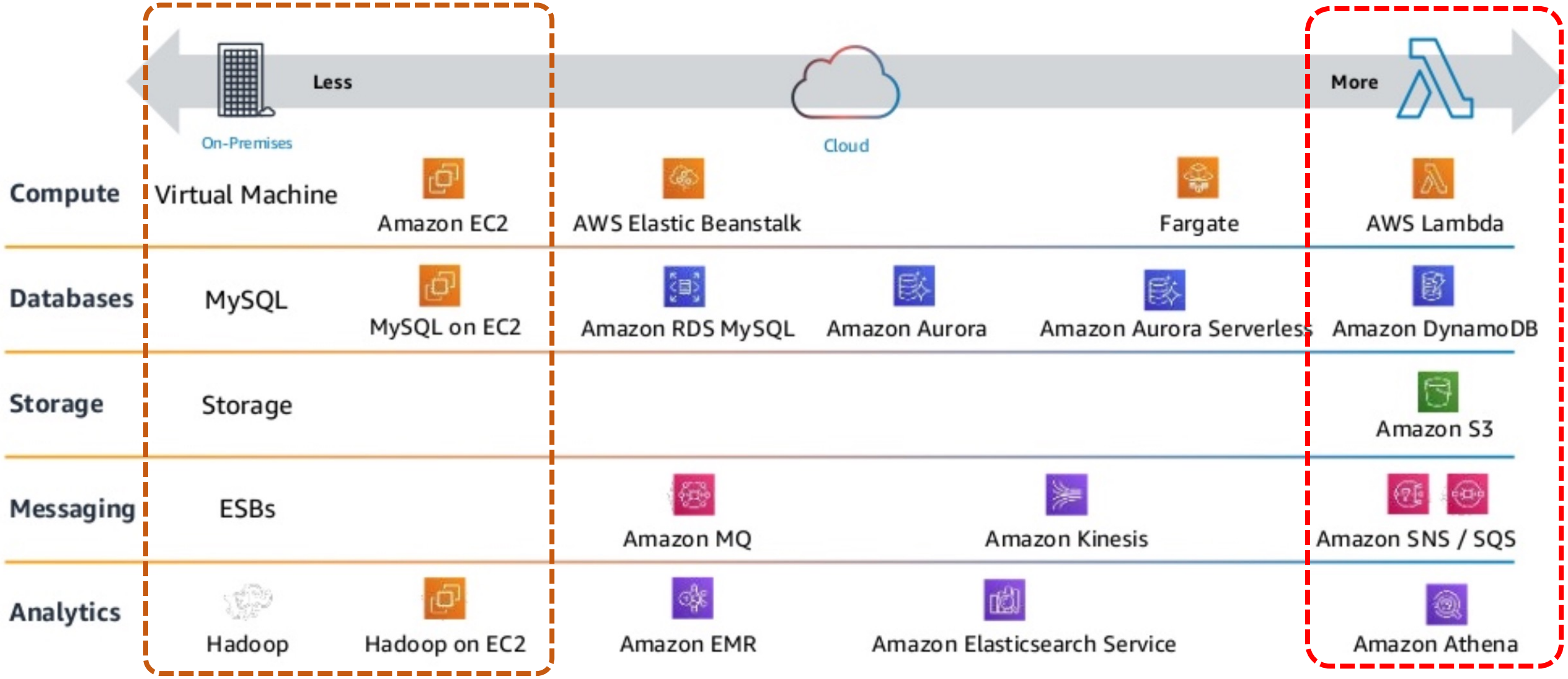
Source: https://github.com/aws-samples/aws-serverless-airline-booking

AWS Serverless Airline Booking
High level infrastructure architecture



Source: https://github.com/aws-samples/aws-serverless-airline-booking

AWS Serverless Architecture
AWS Operational Responsibility Models



Source: Heitor Lessa (2019), How to build a full stack serverless airline ticketing web app, https://www.youtube.com/watch?v=MyoOeHTp2pg

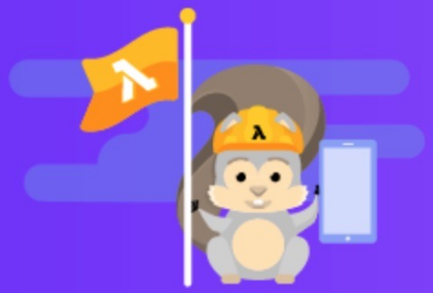
Build a Serverless Web Application

Build a Serverless Web Application

Projects on AWS:

Build a Serverless Web Application

with AWS Lambda, Amazon API Gateway, Amazon S3, Amazon DynamoDB, and Amazon Cognito



Introduction | 1 Host a static website | 2 Manage users | 3 Build a serverless backend | 4 Deploy a RESTful API | 5 Terminate resources

Overview

In this tutorial, you'll create a simple serverless web application that enables users to request unicorn rides from the Wild Rydes fleet. The application will present users with an HTML based user interface for indicating the location where they would like to be picked up and will interface on the backend with a RESTful web service to submit the request and dispatch a nearby unicorn. The application will also provide facilities for users to register with the service and log in before requesting rides.

AWS Experience: Beginner

Time to complete: 2 hours

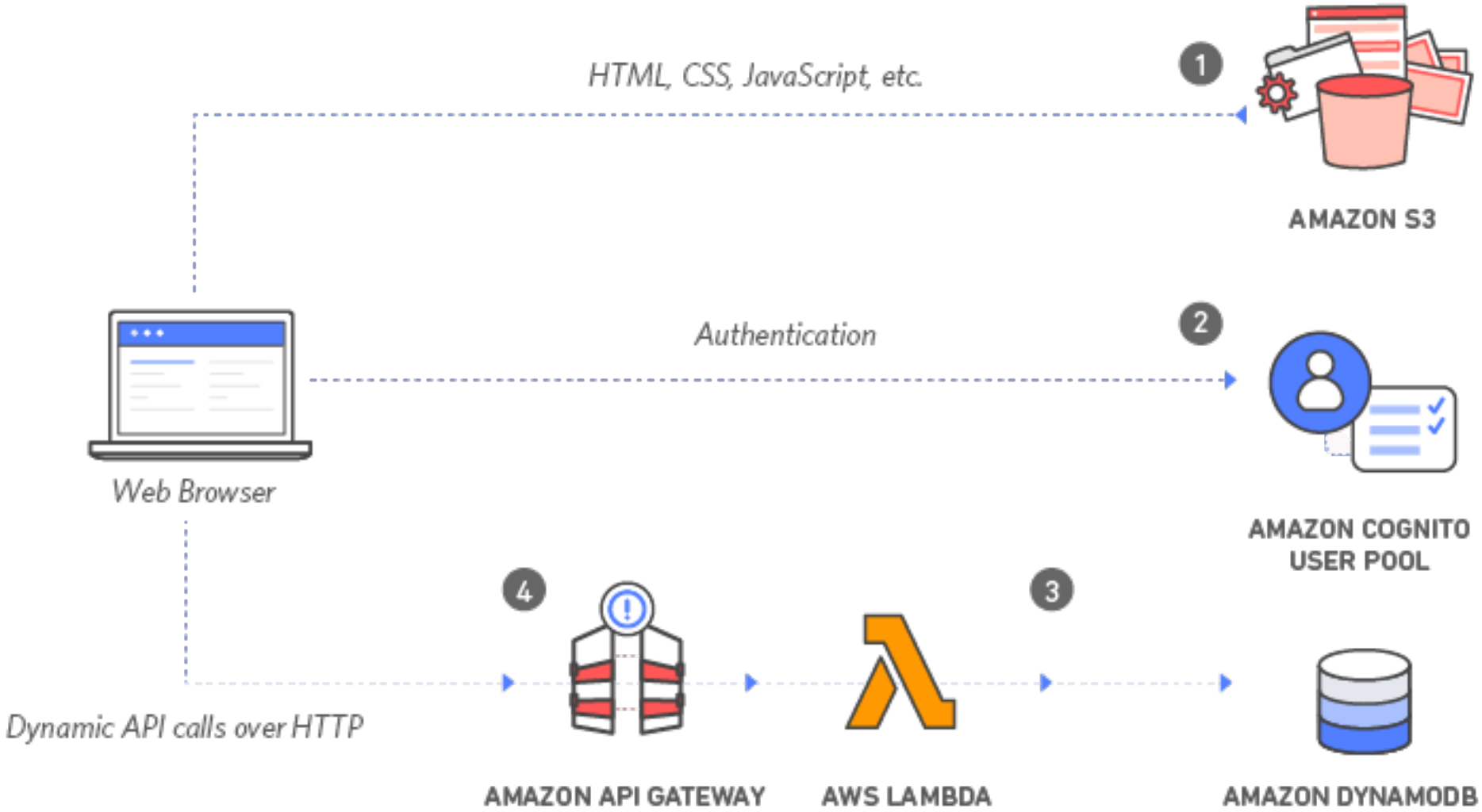
Cost to complete: Each service used in this architecture is eligible for the AWS Free Tier. If you are outside the usage limits of the Free Tier, completing this tutorial will cost you less than $0.25*.

Application Architecture

Source: https://aws.amazon.com/getting-started/projects/build-serverless-web-app-lambda-apigateway-s3-dynamodb-cognito/

Build a Serverless Web Application

with Amazon S3, AWS Lambda, Amazon API Gateway, Amazon DynamoDB, and Amazon Cognito

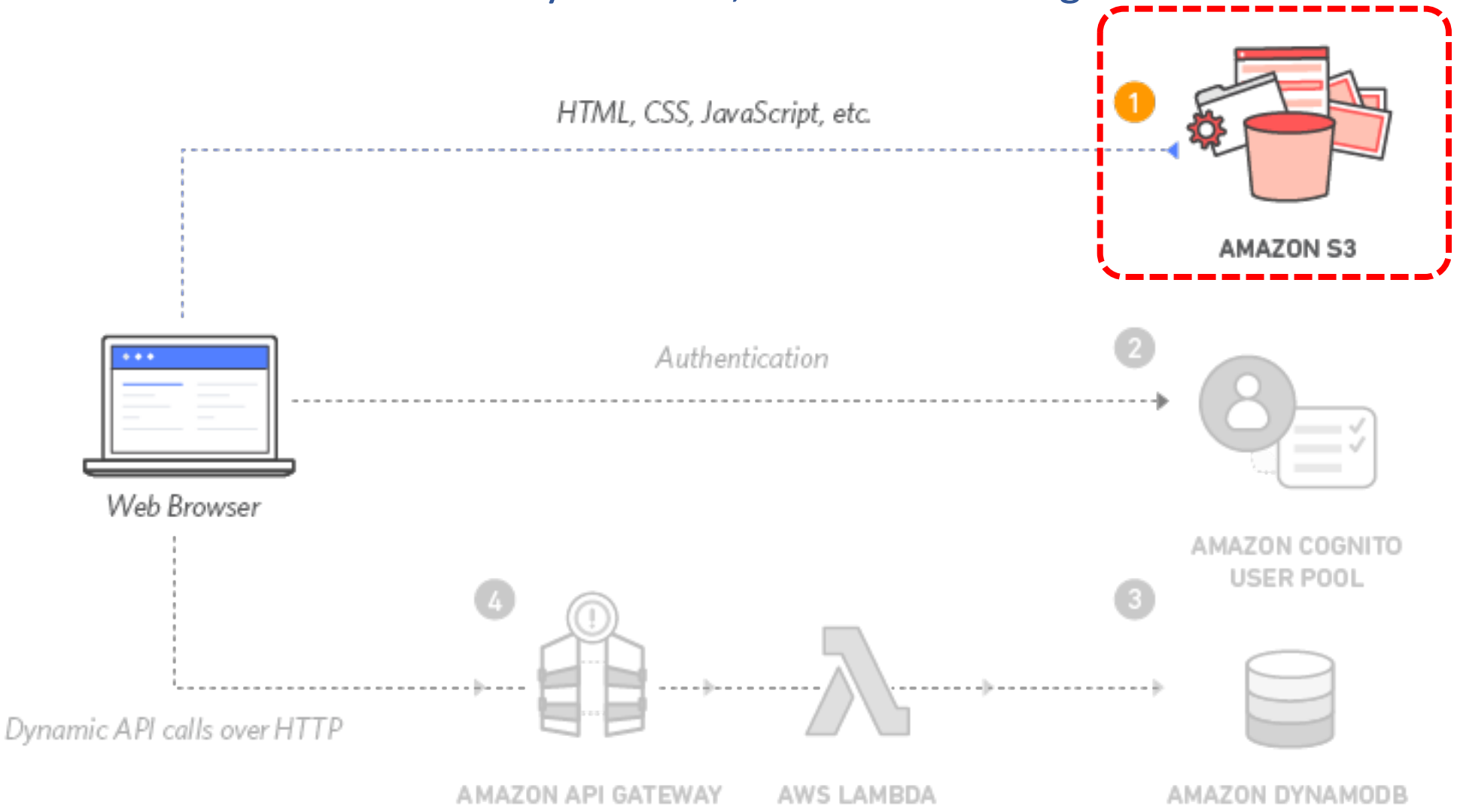


Source: https://aws.amazon.com/getting-started/projects/build-serverless-web-app-lambda-apigateway-s3-dynamodb-cognito/

Build a Serverless Web Application

with Amazon S3, AWS Lambda, Amazon API Gateway, Amazon DynamoDB, and Amazon Cognito

1



Source: https://aws.amazon.com/getting-started/projects/build-serverless-web-app-lambda-apigateway-s3-dynamodb-cognito/

Build a Serverless Web Application

with Amazon S3, AWS Lambda, Amazon API Gateway, Amazon DynamoDB, and Amazon Cognito

1

Static Web Hosting

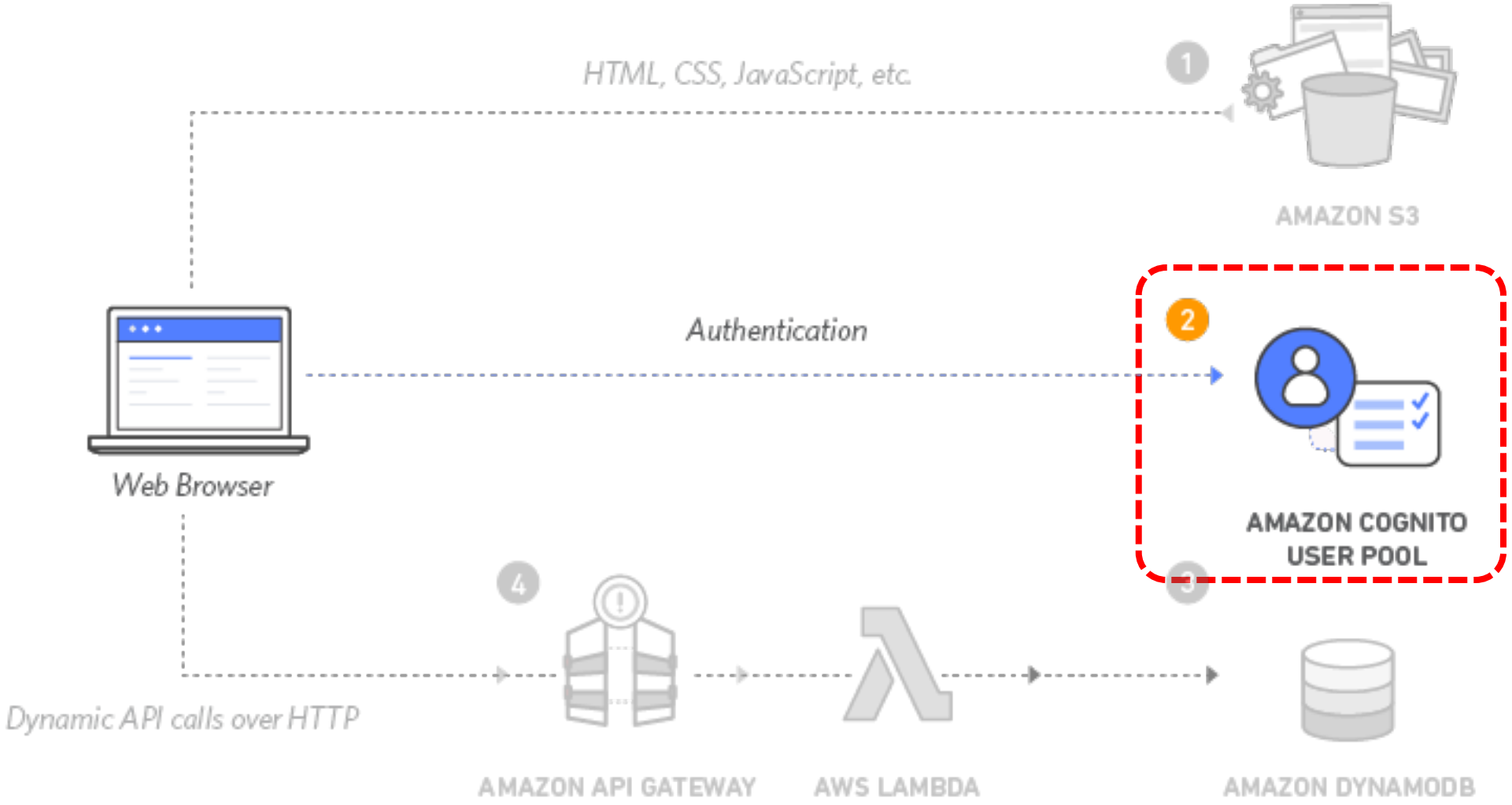
Amazon S3 hosts static web resources including HTML, CSS, JavaScript, and image files which are loaded in the user's browser.

Source: https://aws.amazon.com/getting-started/projects/build-serverless-web-app-lambda-apigateway-s3-dynamodb-cognito/

Build a Serverless Web Application

with Amazon S3, AWS Lambda, Amazon API Gateway, Amazon DynamoDB, and Amazon Cognito

2



Source: https://aws.amazon.com/getting-started/projects/build-serverless-web-app-lambda-apigateway-s3-dynamodb-cognito/

Build a Serverless Web Application

with Amazon S3, AWS Lambda, Amazon API Gateway, Amazon DynamoDB, and Amazon Cognito

2

User Management

Amazon Cognito provides user management and authentication functions to secure the backend API.

Source: https://aws.amazon.com/getting-started/projects/build-serverless-web-app-lambda-apigateway-s3-dynamodb-cognito/

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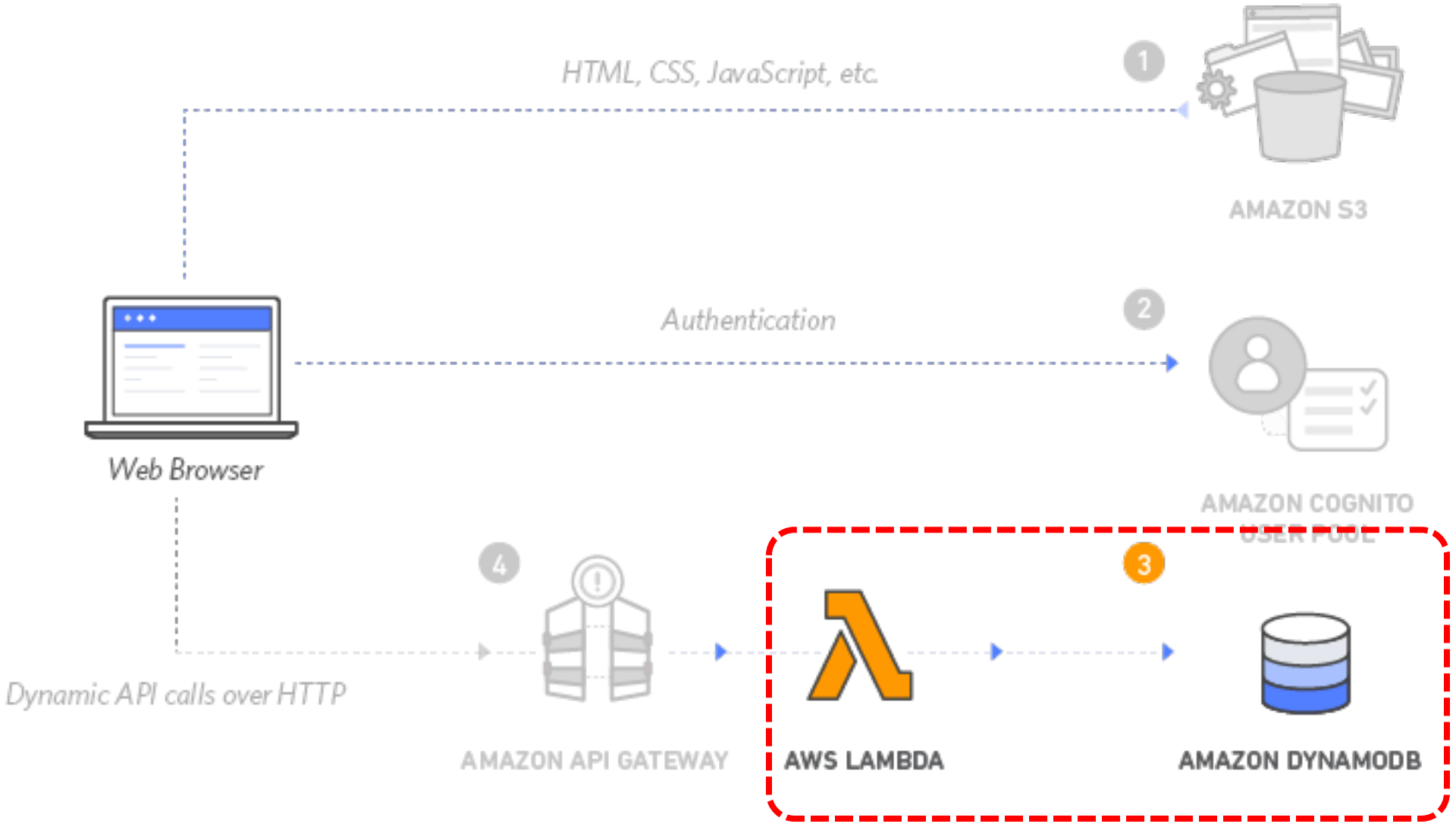
3



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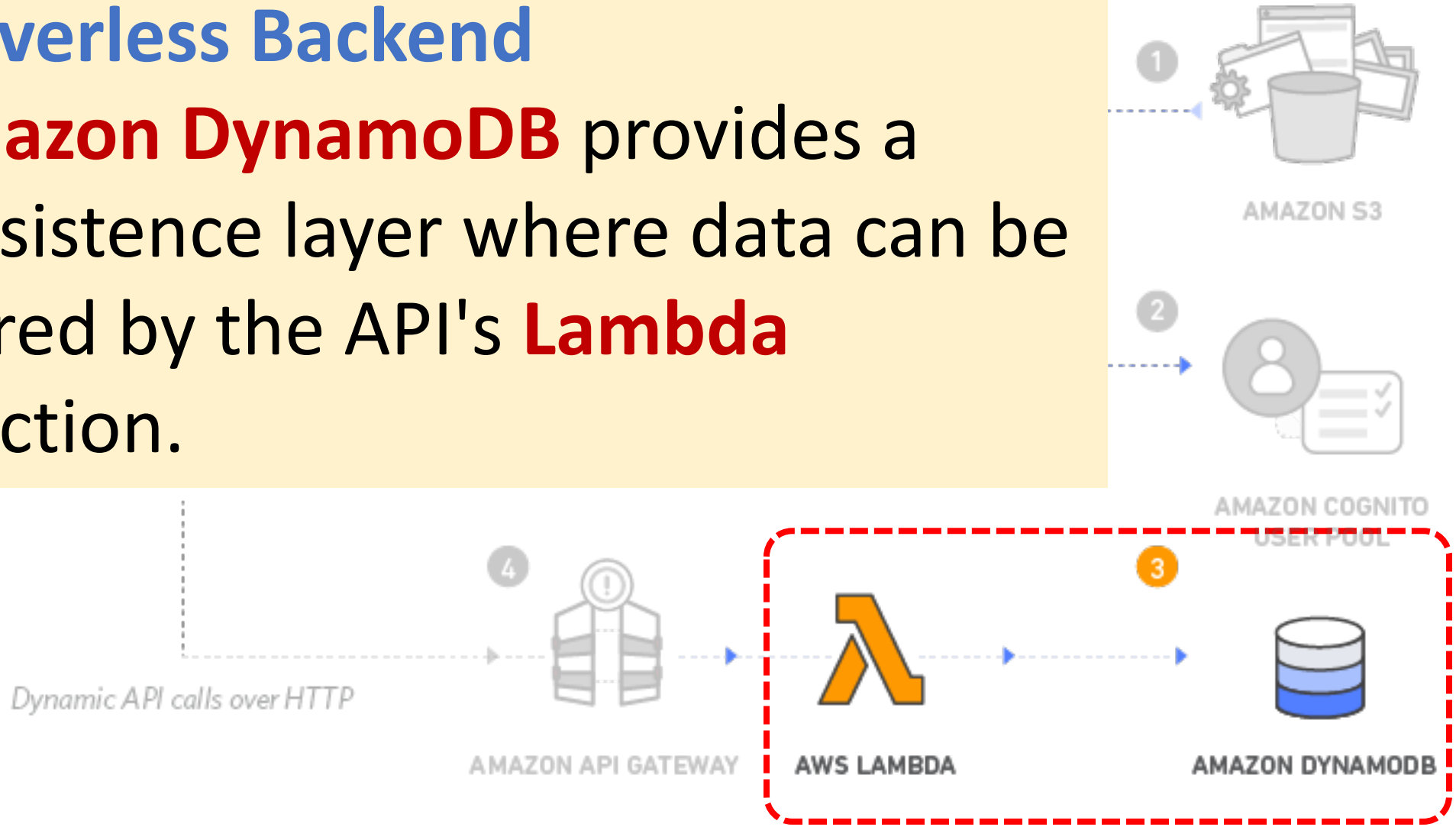
3 Serverless Backend

Amazon DynamoDB provides a persistence layer where data can be stored by the API's **Lambda** function.



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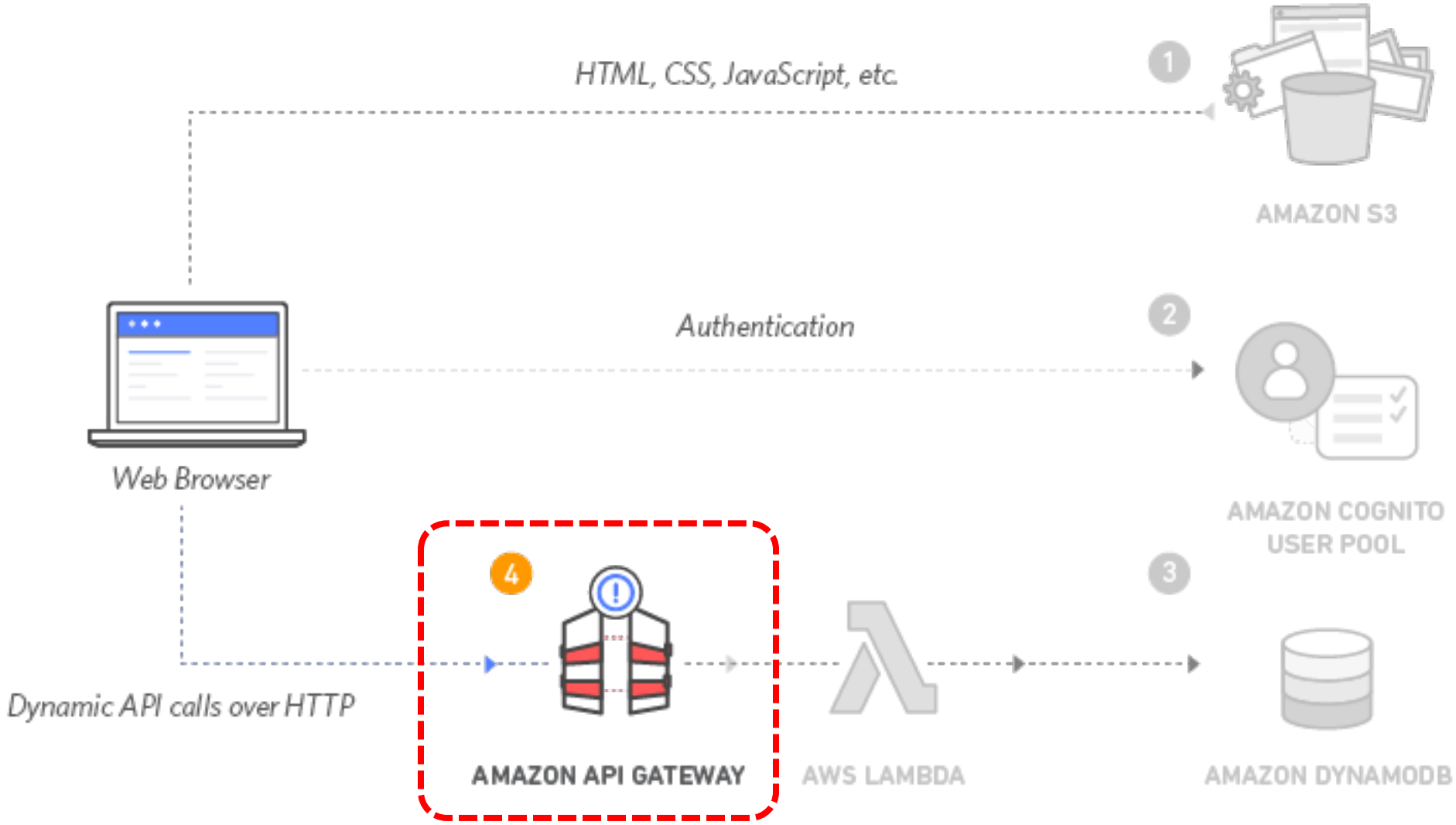

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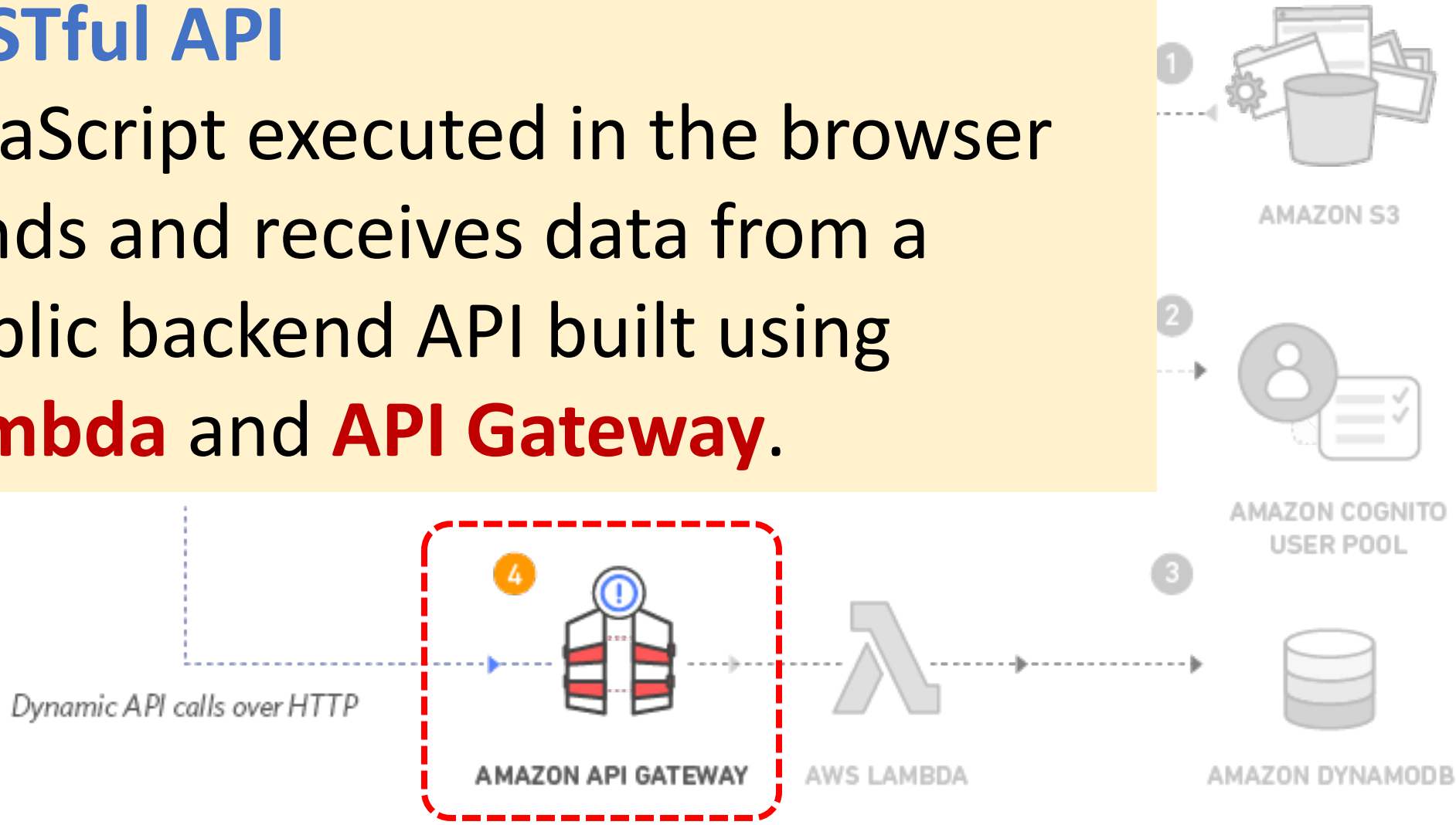
4 RESTful API

JavaScript executed in the browser sends and receives data from a public backend API built using **Lambda** and **API Gateway**.



Source: https://aws.amazon.com/getting-started/projects/build-serverless-web-app-lambda-apigateway-s3-dynamodb-cognito/

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5 Terminate resources

Resource Cleanup

You will terminate an **Amazon S3** bucket, an **Amazon Cognito** User Pool, an **AWS Lambda** function, an **IAM** role, a **DynamoDB** table, a **REST API**, and a **CloudWatch** Log.

It is a best practice to delete resources you are no longer using to avoid unwanted charges.

Source: https://aws.amazon.com/getting-started/projects/build-serverless-web-app-lambda-apigateway-s3-dynamodb-cognito/

Summary

- AWS雲端應用導入教學
- 課程理論中融入AWS概念
- 帶領學生進行雲端實作

AWS Educate 2021 Q2 Online Educator Meetup

Q & A

AWS Academy 教學經驗分享

國立臺北大學企管系選修課程 (企業雲端運算入門)

(Teaching Experiences Sharing of Introducing AWS Academy at NTPU: Foundation of Business Cloud Computing)

Time: 2021/7/5 (Mon) 10:50-11:20 am
Host: AWS Educate

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Min-Yuh Day, Ph.D, Associate Professor

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