

Lecture 1



What Is The Cloud And How Can I Use It ?

Andrew Crossan
Marc Cohen



- 1. Welcome/Logistics
- 2. What is the Cloud?
- 3. AWS Orientation
- 4. GCP Orientation

Andrew Crossan

Module Lead

- Senior Lecturer at Surrey
- Email: a.crossan@surrey.ac.uk
- Room number 08 BB 02
- Office Hours: TBC
 - however happy to meet up throughout the week
- Best way to ask a question
 - Send me a Teams message

Marc Cohen

- Associate lecturer
- Email: m.cohen@surrey.ac.uk
- Office Hours:
 - happy to meetup on demand
- Best way to ask a question
 - email me at address above

Logistics

- Lectures (2 hours / week)
 - Weeks 1 - 11
 - Thursdays (2 - 4) in AP1
 - Covers theory with some practical demos
- Labs (2 hours / week)
 - Weeks 1 - 11
 - Thursday (4 - 6) Ada Lovelace Lab (IFH)
 - Build practical skills with Cloud Technologies
- Industry Guest Lectures
 - 2 planned industry speakers (details to be confirmed)

Assessment

- 100% Coursework
- Handout: Monday 3rd March (Week 5)
- Due: Monday 12th May (Week 12)
- Lectures and labs will teach what you need to pass the coursework

Learning Outcomes

- 1** Articulate an understanding of the need for and evolution of Cloud Computing and the various challenges involved
- 2** Critically evaluate technologies such as Amazon EC2, Google App Engine and Apache Hadoop in specific industrial and academic contexts
- 3** Demonstrate a critical appreciation of related approaches, technologies and systems
- 4** Contrast and evaluate architectures, key characteristics, and requirements of Cloud infrastructures
- 5** Specify, design, implement and critically evaluate solutions to data or computationally intensive problems by applying relevant knowledge of architectures, systems and software

What We Need From You

- Attend the lectures and the labs
- Try to finish the labs each week
- Ask questions when necessary
- You will need some Python knowledge
 - We will provide additional support here if you need to get up to speed

What is “the cloud”?



Things I don't want to think about...

1. Provisioning hardware
2. Installing software
3. Upgrading operating systems
4. Security patching
5. System and network admin
6. Scaling up/down
7. Paying for stuff I don't use
8. Dealing with failures
9. Managing clusters

Things I want to think about...

1. Solving my problem

Dictionary

cloud



cloud

/klaʊd/ 🔍

noun

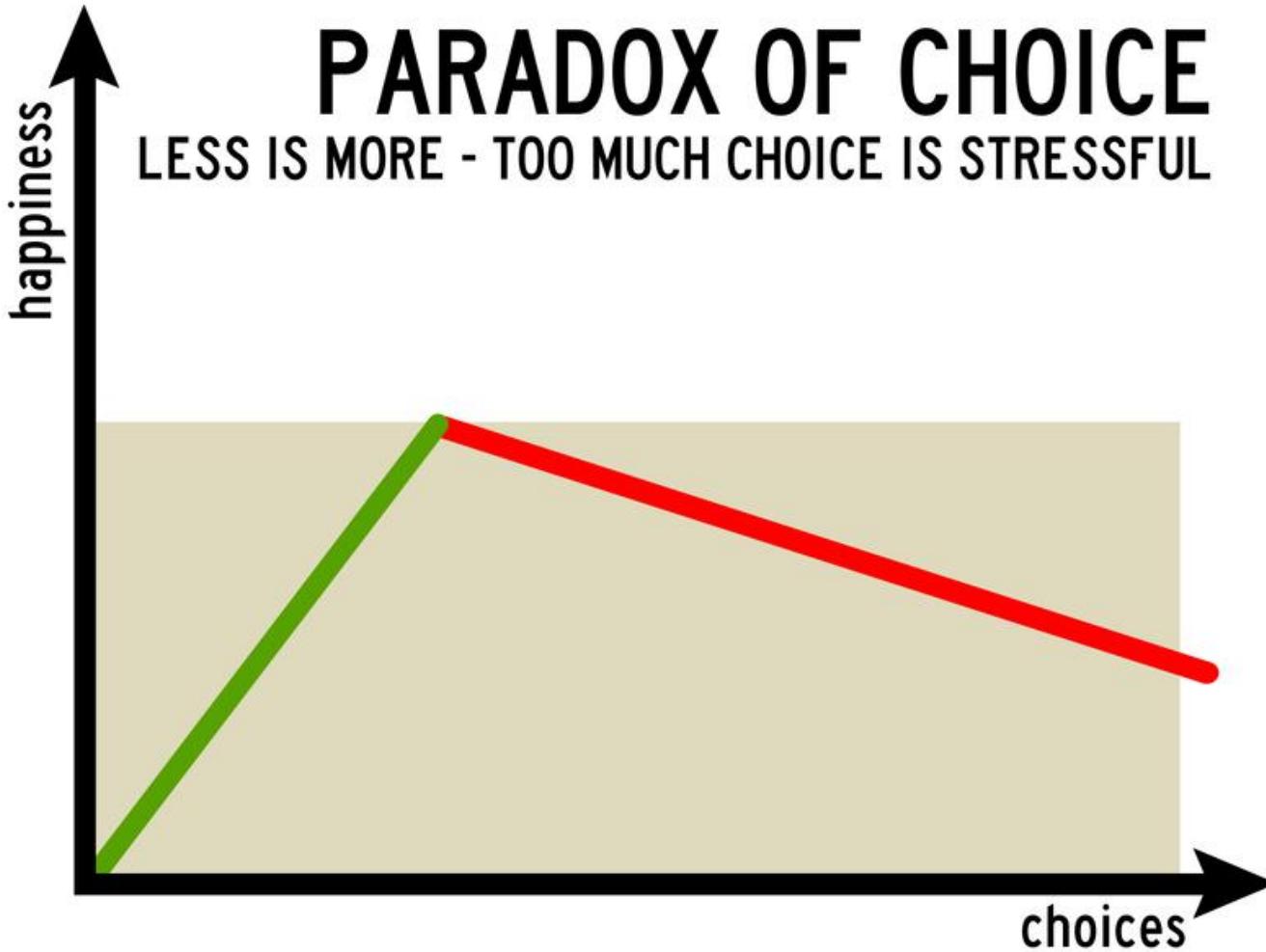
1. **Getting things done using someone else's computers**, especially *where someone else worries about maintenance, provisioning, system administration, security, networking, failure recover, etc.*

The good old days (2012)...

The screenshot shows the Google Cloud Platform homepage. At the top, the "Google Cloud Platform" logo is displayed. Below it is a navigation bar with links for Home, Products (which is highlighted in red), Pricing, Customers, and Partners. To the right of the navigation bar is a button that says "Contact sales for enterprise level support? - or - Try it now". Below the navigation bar, there is a horizontal menu with links for Google App Engine, Google Compute Engine, Google Cloud Storage, Google BigQuery, and More Products. The main content area features five large icons with corresponding labels: App Engine (a stylized airplane icon), Compute Engine (a stack of three hexagonal icons in blue, red, and yellow), Cloud Storage (a blue cloud icon), BigQuery (a magnifying glass over a database icon), and More Products (a plus sign icon). The background of the page is white, and the overall design is clean and modern for its time.

PARADOX OF CHOICE

LESS IS MORE - TOO MUCH CHOICE IS STRESSFUL



Divide and Conquer



Learn by Doing



IBM Cloud



Azure



DigitalOcean



Alibaba Cloud

 **rackspace**
the open cloud company

 Tencent Cloud



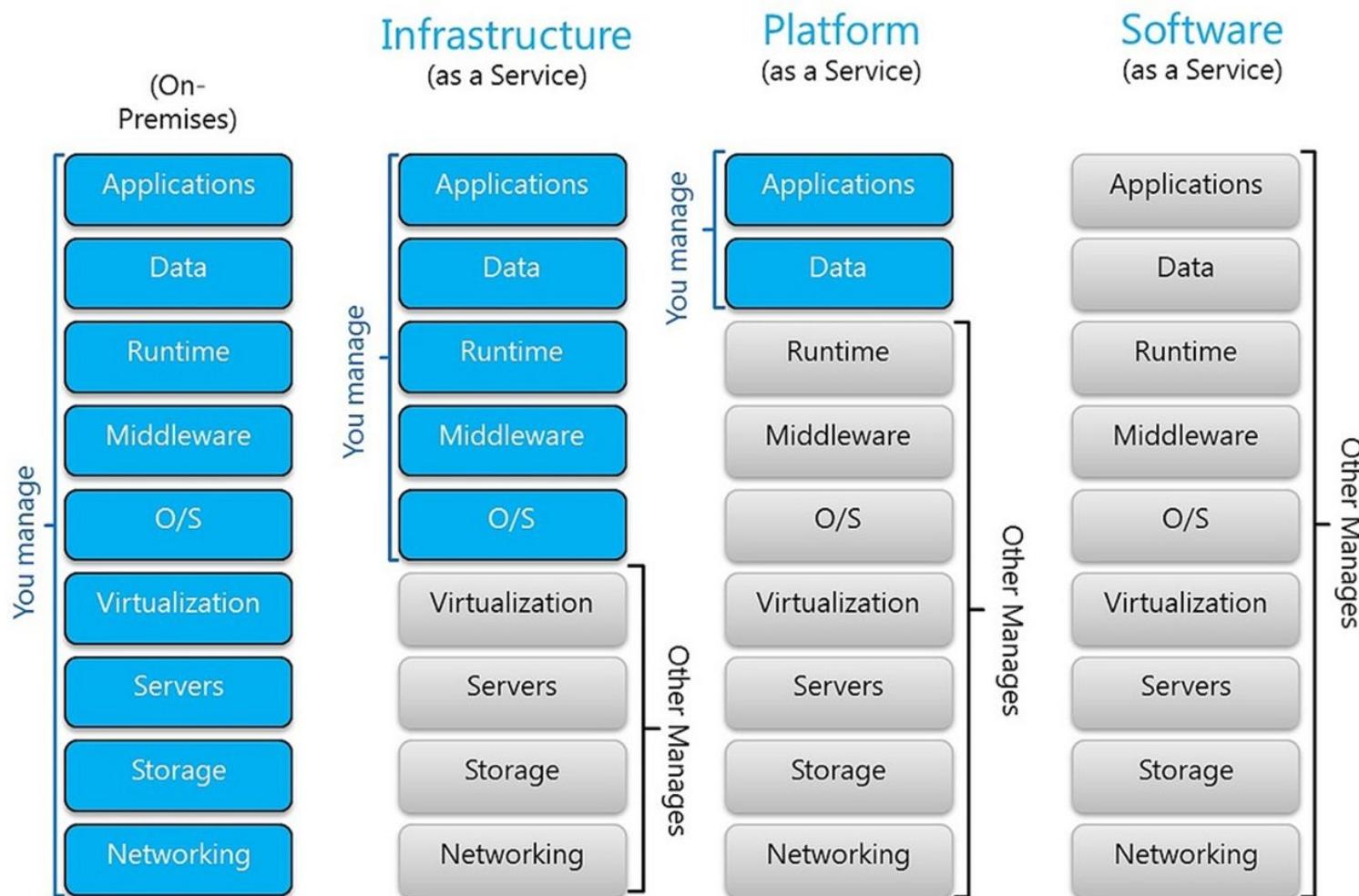
Google Cloud

 HUAWEI CLOUD
EVERYTHING AS A SERVICE

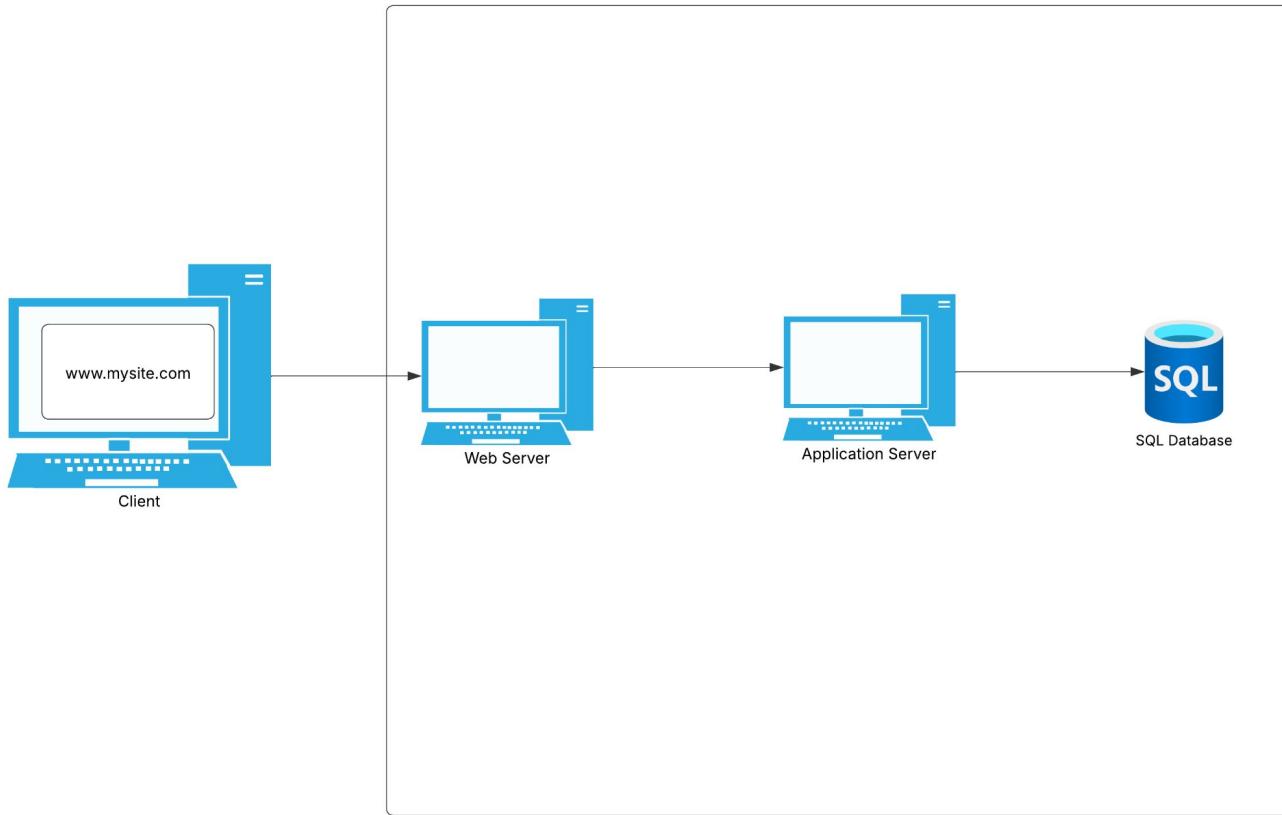


Imagine you're hosting
a big dinner party...

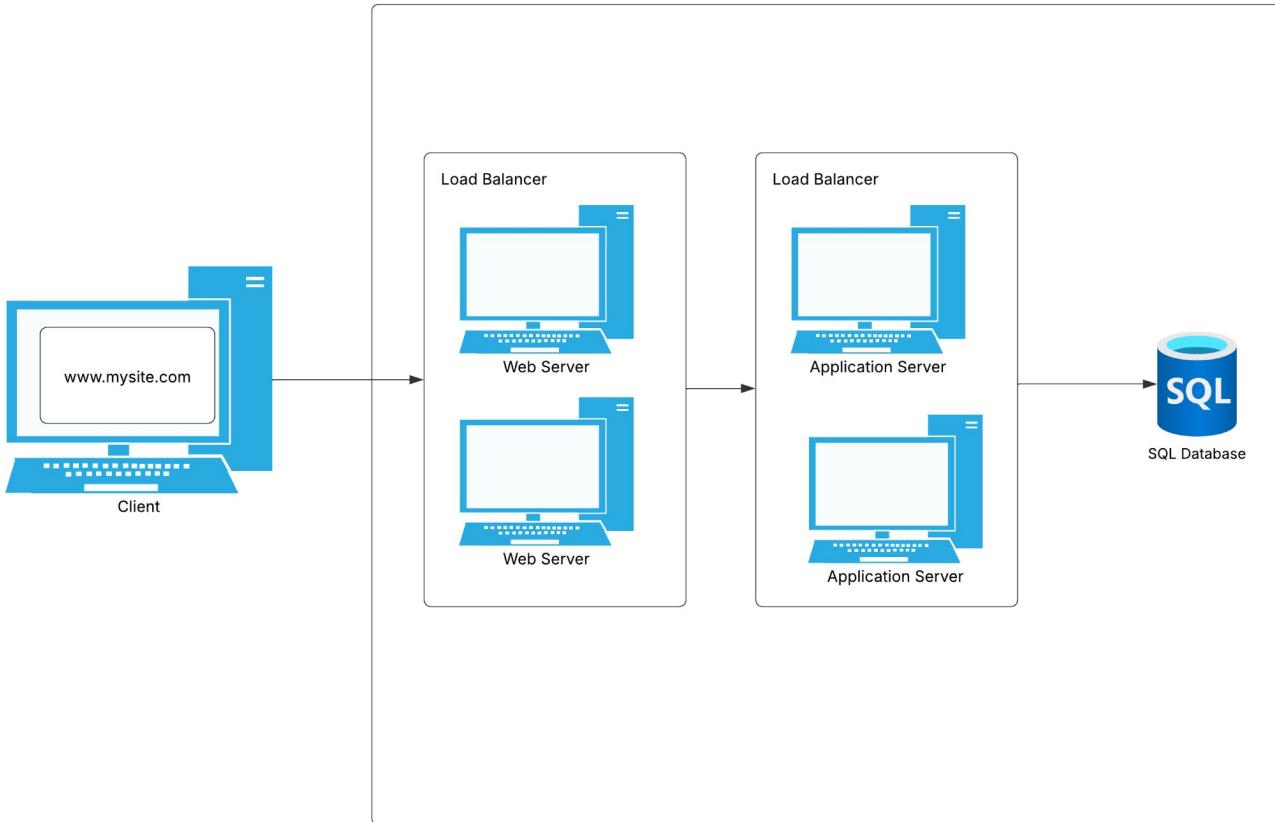
On-Prem (DIY)	IaaS (Compute Engine)	IaaS++ (Cloud Launcher)	PaaS (GKE)	SaaS (Cloud Run)
Find space	Rent hall	Rent hall	Rent hall	Rent hall
Cook	Cook	Hire Caterer	Hire Caterer	Hire caterer
On call	On call	On call	Hire manager	Hire manager
Plan party	Plan party	Plan party	Plan party	Hire planner



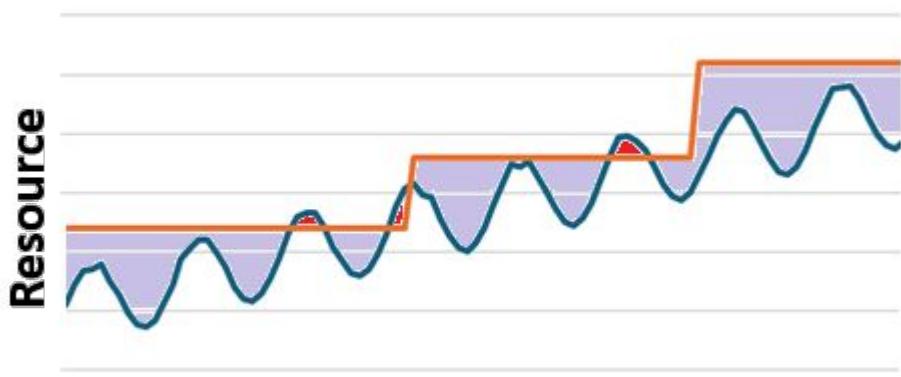
An Example: Anatomy of a Web Application



An Example: Anatomy of a Web Application



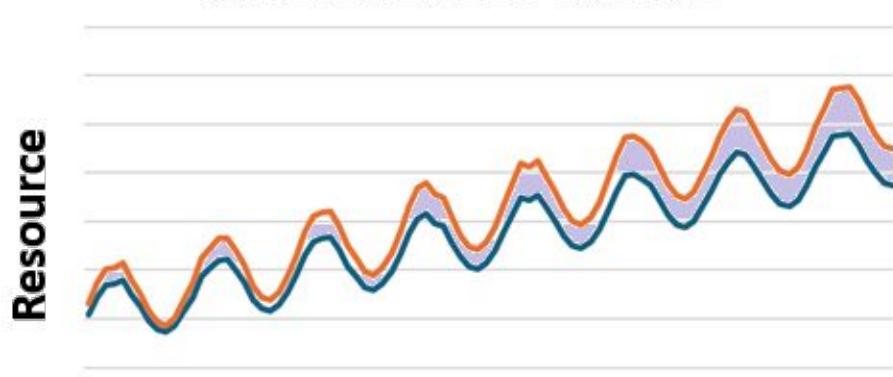
On Premises Provision



— Provision — Demand

Over-Provision

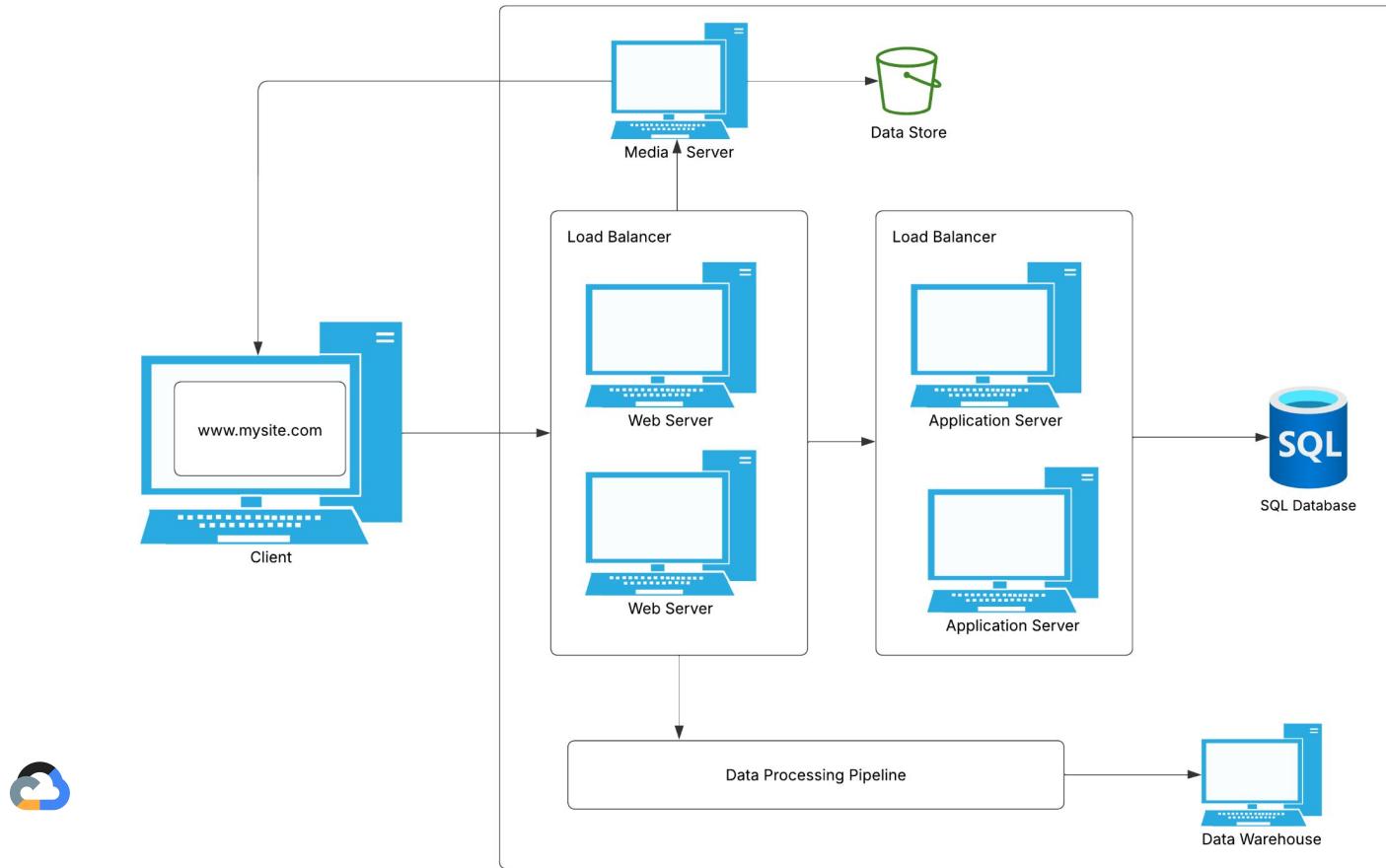
Scalable Cloud Provision



— Provision — Demand

Lost Customers

An Example: Anatomy of a Web Application



Guided Tour of AWS (Andrew)



Our First Cloud Application



Search

[Alt+S]



United States (N. Virginia) ▾

voclabs/user3805287=Test_Student @ 5

Console Home Info[Reset to default layout](#)[+ Add widgets](#)Recently visited Info

EC2

[View all services](#)

Welcome to AWS

[Getting started with AWS](#)

Learn the fundamentals and find valuable information to

AWS Health Info

Open issues

0

Past 7 days

[View details](#)Applications (0) Info[Create application](#)

Region: US East (N. Virginia)

us-east-1 (Current Region) ▾

 Find applications

Name ▾ | Description ▾ | Region ▾ | Originati...

No applications

Get started by creating an application.

[Create application](#)[Go to myApplications](#)Cost and usage Info

Current month costs

\$0.00

Cost (\$)

40

30

Forecasted month end costs

20

10



Amazon Q

Products Solutions Pricing Documentation Learn

Partner Network

AWS Marketplace

Customer Enablement

Events

Explore More



About AWS Contact Us Support ▾

English ▾

My Account ▾

Sign In

Create an AWS Account



Amazon API Gateway

Overview

Features

Pricing

Getting Started

Resources

FAQs

Partners

1 million API calls received free per month for 12 months with the AWS Free Tier →

Amazon API Gateway

Create, maintain, and secure APIs at any scale

[Get started with API Gateway](#)

Why API Gateway?

Amazon API Gateway is a fully managed service that makes it easy for developers to create, publish, maintain, monitor, and secure APIs at any scale. APIs act as the "front door" for applications to access data, business logic, or functionality from your backend services. Using API Gateway, you can create RESTful APIs and WebSocket APIs that enable real-time two-way communication applications. API Gateway supports containerized and serverless workloads, as well as web applications.

API Gateway handles all the tasks involved in accepting and processing up to hundreds of thousands of concurrent API calls, including traffic management, CORS support, authorization and access control, throttling, monitoring, and API version management. API Gateway has no minimum fees or startup costs. You pay for the API calls you receive and the amount of data transferred out and, with the API Gateway tiered pricing model, you can reduce your cost as your API



Guided Tour of GCP (Marc)





DASHBOARD

ACTIVITY

RECOMMENDATIONS

CUSTOMIZE

Project info

Project name
AutoML Demo

Project ID
automl-demo-240614

Project number
133968060750

→ Go to project settings

Resources

Compute Engine
6 instances

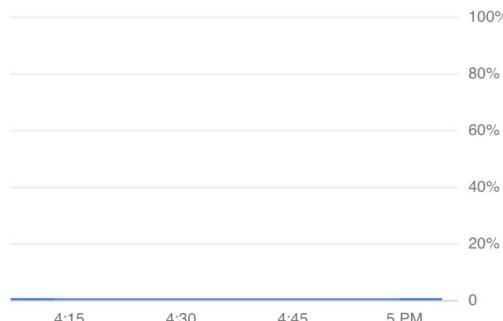
Storage
13 buckets

Trace

No trace data from the past 7 days

Compute Engine

CPU (%)



→ Go to Compute Engine

Google Cloud Platform status

All services normal

→ Go to Cloud status dashboard

Billing

Estimated charges USD \$12,613.24
For the billing period Sep 1 – 26, 2020

→ View detailed charges

Monitoring

ing policies

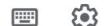
me checks

View all dashboards

1. Cloud Console



Cloud Shell



cloudshell

**NAME**

gcloud - manage Google Cloud Platform resources and developer workflow

SYNOPSIS

```
gcloud GROUP | COMMAND [--account=ACCOUNT]
    [--billing-project=BILLING_PROJECT] [--configuration=CONFIGURATION]
    [--flags-file=YAML_FILE] [--flatten=[KEY,...]] [--format=FORMAT]
    [--help] [--project=PROJECT_ID] [--quiet, -q]
    [--verbosity=VERBOSITY; default="warning"] [--version, -v] [-h]
    [--impersonate-service-account=SERVICE_ACCOUNT_EMAIL] [--log-http]
    [--trace-token=TRACE_TOKEN] [--no-user-output-enabled]
```

DESCRIPTION

The **gcloud** CLI manages authentication, local configuration, developer workflow, and interactions with the Google Cloud Platform APIs.

For a quick introduction to the gcloud command-line tool, a list of commonly used commands, and a look at how these commands are structured, refer to the gcloud command-line reference documentation sheet.
<https://cloud.google.com/sdk/gcloud/reference>.

2. Command Line

GLOBAL FLAGS

--account=ACCOUNT



```
31     def __init__(self, path=None, debug=False):
32         self.file = None
33         self.fingerprints = set()
34         self.logduplicates = True
35         self.debug = debug
36         self.logger = logging.getLogger(__name__)
37         if path:
38             self.file = open(os.path.join(path, 'fingerprint.log'), 'w')
39             self.file.seek(0)
40             self.fingerprints.update(line.strip() for line in self.file)
41
42     @classmethod
43     def from_settings(cls, settings):
44         debug = settings.getbool('OPERATOR_DEBUG')
45         return cls(job_dir(settings), debug)
46
47     def request_seen(self, request):
48         fp = self.request_fingerprint(request)
49         if fp in self.fingerprints:
50             return True
51         self.fingerprints.add(fp)
52         self._log_file(fp)
```

3. APIs

The Google Cloud Platform (GCP) zones in the UK are europe-west2-a, europe-west2-b, and europe-west2-c.

Google Cloud Credits

Redeem your coupon at mco.fyi/coupon.

- You will be asked for a name and email address, which needs to match your school domain. A confirmation email will be sent to you with a coupon code.
- Coupons are valid through: 3 Feb 2026
- ONE code per unique email address

The background of the slide features a wide-angle photograph of a massive industrial facility, likely a data center, with numerous white buildings and cooling towers. The sky above is a dramatic mix of orange, blue, and purple hues, suggesting either sunset or sunrise. In the far distance, dark mountain ranges are visible against the horizon.

Main page cloud.google.com

Resources

Codelabs codelabs.developers.google.com

Console console.cloud.google.com

Pricing cloud.google.com/pricing

Training cloud.google.com/training

cloud.google.com/free

Get free hands-on experience with Google Cloud

[Get started for free](#)

[Contact sales](#)

Three ways to get started for free

\$300 in free credit for new customers

New customers get [\\$300 in free credit](#) to try Google Cloud products and build a proof of concept. You won't be charged until you activate your full paid account.

Start deploying pre-built solutions free

Apply your \$300 free credit toward deploying Google-recommended [pre-built solutions](#), such as a [dynamic website](#), [load-balanced VM](#), [three tier web app](#), and [more](#).

20+ products with free tier

Get free usage of [AI APIs](#), [Compute Engine](#), [BigQuery](#), and other popular products [up to monthly limits](#)—not charged against your \$300 free credit.

Questions?