

AWS MADE SIMPLE

A Beginner's Guide To Cloud Foundations



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Welcome

Welcome to the start of your cloud journey. If you're holding this guide, you've decided to invest in yourself and learn a skill that is fundamentally reshaping the technology landscape—and you've come to the right place.



My name is **Joel Masiaga**, an **AWS Certified Cloud Practitioner and Solutions Architect – Associate**. I've walked the same path you're beginning now—starting with curiosity about how the cloud works and growing into a deep appreciation for its power to shape modern innovation.

In this guide, I'll take you through the foundational concepts of **Amazon Web Services (AWS)** in a clear and practical way, helping you build a strong, confident understanding of the cloud. Together, we'll move step by step—from the core principles of cloud computing to the specifics of AWS infrastructure, security, networking, and beyond.

Whether your goal is certification, career advancement, or simply expanding your knowledge, you're in the right place.

Chapter 0: Your Cloud Roadmap



Again, welcome to the beginning of your cloud learning adventure.

Think of this introductory Chapter as your roadmap — a clear view of where we're going and how we'll get there. Before we explore the technical depths of AWS, it's important to understand the big picture: what AWS is, why it's one of the most valuable skills in today's world, and how this course will guide you step by step toward certification and new career opportunities.

This chapter sets the stage — helping you understand not just what you'll learn, but **why it matters**.

This guide is meticulously designed to align with the **AWS Certified Cloud Practitioner (CLF-C02)** exam domains. By the end, you'll be able to confidently demonstrate a strong understanding of AWS and cloud fundamentals and how they apply to real world scenarios.

Learning Objectives

By working through this guide, you will learn how to:

- ✓ Explain the value of the AWS Cloud—its economic impact, business agility, and innovation potential.
- ✓ Understand the AWS Shared Responsibility Model and clearly distinguish what AWS manages versus what customers manage.
- ✓ Apply security best practices and leverage AWS Identity and Access Management (IAM) for secure operations.
- ✓ Understand AWS Cloud costs, economics, and billing practices to effectively manage your cloud spend.
- ✓ Describe and position the core AWS services, including compute, network, database, and storage services.
- ✓ Identify the right AWS services for specific technical or business challenges.

Mastering these principles will not only prepare you for certification—it will empower you to speak the language of cloud computing with confidence and clarity.

The Roadmap

Here's a quick overview of what's ahead:

Chapter 1 – Cloud Fundamentals:

We'll start with the core concepts: What is cloud computing? What are its advantages? We'll explore the service models (IaaS, PaaS, SaaS) and deployment models (Public, Private, Hybrid) that form the foundation of everything.

Chapter 2 – AWS Global Infrastructure:

Here, we will learn how AWS's global network is organized through Regions, Availability Zones, and Edge Locations, and learn the difference between global and regional services.

Chapter 3 – Security & Identity:

We will dive into the AWS Shared Responsibility Model, Identity and Access Management (IAM), key security services, and foundational encryption concepts that keep AWS environments secure.

Chapter 4 – Networking & Content Delivery:

We'll explore the building blocks of your own private network in the cloud with Amazon VPC, Route 53, CloudFront, and how they enable global connectivity.

Chapter 5 – Storage Services:

Discover AWS storage solutions such as S3, EBS, and EFS, and explore hybrid storage options for on-premises integration.

Chapter 6 – Database Services:

Examine AWS database offerings like RDS and DynamoDB, and explore how AWS supports data management and analytics workloads.

Chapter 7 – Monitoring & Management:

Learn how to monitor, audit, and automate cloud operations using services such as CloudWatch, CloudTrail, and AWS Systems Manager.

Chapter 8 – Billing & Cost Management:

We'll master AWS pricing models and explore the tools you must know to optimize costs, like AWS Budgets and Cost Explorer.

Chapter 9 – Advanced and Emerging Services:

Get acquainted with AWS innovations in artificial intelligence, machine learning, analytics, Internet of Things (IoT), and developer tools shaping the future of cloud computing.

Chapter 10 – Cloud Adoption Framework & Careers:

Discover the AWS Cloud Adoption Framework, key migration strategies, and how to translate your cloud knowledge into meaningful career opportunities.

Our Capstone Project

Throughout this guide, you'll encounter hands-on activities, real-world examples, and reflection questions designed to deepen your understanding.

The journey concludes with a capstone project—where you'll design and deploy a simple three-tier web application using multiple AWS services, tying together everything you've learned.

Prerequisites and Setup

To get the most out of this guide, you'll need:

- ✓ Basic IT knowledge (e.g., a general understanding of what servers, networks, and databases are).
- ✓ An AWS Free Tier account. If you haven't already, sign up at aws.amazon.com.

Chapter 1: Cloud Fundamentals



Alright, let's get started.

To master AWS, you must first master the language and principles of the cloud itself. This chapter introduces the essential concepts upon which the cloud is built.

What is Cloud Computing?

At its core, cloud computing is the **on-demand delivery of IT resources** over the internet with **pay-as-you-go pricing**.

Instead of buying, owning, and maintaining your own physical data centres and servers, you can access technology services, such as computing power, storage, and databases, on an as-needed basis from a cloud provider like AWS.

The Old Way vs. The Cloud Way

The easiest way to understand this is to contrast it with traditional IT.



The Old Way (Capital Expenditure - CapEx):

You had to buy your own powerful servers, find a place to store them (a data center), power them, and cool them. This meant a massive upfront investment before you even served a single customer. This is a **Capital Expenditure (CapEx)**. You had to guess your peak capacity and buy hardware for it, even if you only needed that power for one day a month.



The Cloud Way (Operational Expenditure - OpEx):

You "rent" the exact resources you need from AWS. When you're done, you give them back and stop paying. This is an **Operational Expenditure (OpEx)**.

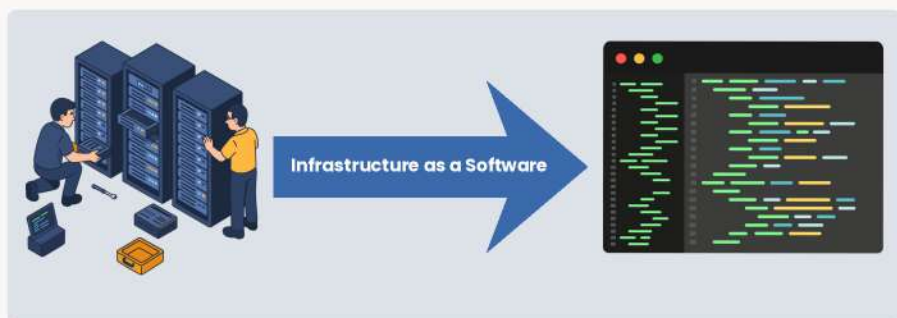
Think of it like electricity — you don't have to build your own power plant. You just connect to the grid, pay for the energy you consume, and scale usage up or down as needed. Cloud computing applies this same utility model to technology.

From Hardware to Software

Traditionally, infrastructure was all about physical hardware.

For instance, if you wanted to launch a website, you had to buy servers, rack them in a data center, and manually configure them. It was slow, expensive, and rigid.

Cloud computing transforms this. Instead of treating infrastructure as heavy, physical equipment, we treat it like software: flexible, automated, and disposable.



So, where are these cloud resources?

They run on powerful servers housed in the cloud provider's secure, global network of data centers — such as **Amazon Web Services (AWS)**. The provider owns and maintains all the underlying hardware and infrastructure.

You access these resources as virtual services. Each service — like a virtual server, a storage bucket, or a database — acts as a flexible building block. Your role is to combine these blocks to build powerful, scalable solutions that meet your specific needs, all without ever touching a physical server.



Characteristics of Cloud Computing

What makes the cloud "the cloud"?

The [National Institute of Standards and Technology \(NIST\)](#) defined five essential characteristics. You'll see these ideas reflected in every cloud service we study.

✓ **On-Demand Self-Service**

Instantly create and manage resources whenever you need them, without waiting for manual setup.

✓ **Broad Network Access**

Access cloud resources securely from anywhere, on any device connected to the internet.

✓ **Resource Pooling**

The provider, e.g. AWS, combines vast computing resources to serve multiple users efficiently and reliably.

✓ **Rapid Elasticity**

Scale your resources up or down automatically to match demand — growing or shrinking within seconds.

✓ **Measured Service**

Pay only for what you use, with usage tracked and billed just like utilities.

Cloud Service Models (IaaS, PaaS, SaaS)

Cloud computing is built on three main service models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS).



*Infrastructure
as a Service
(IaaS)*



*Platform as a
Service
(PaaS)*



*Software as
a Service
(SaaS)*

Each model offers a different level of control, flexibility, and management responsibility.

Infrastructure as a Service (IaaS)

IaaS provides the basic building blocks of cloud IT — virtual machines, storage, and networking. You manage the operating system, applications, and configurations, while the provider handles the physical hardware.

Think of it as renting an empty apartment: the space is yours to design and furnish as you like.

A good example is Amazon EC2, which lets you launch and manage virtual servers on demand.

Platform as a Service (PaaS)

Here, the cloud provider takes care of the underlying servers, operating systems, and much of the runtime environment. Your focus shifts from managing infrastructure to building and deploying applications.

It's like moving into a fully furnished apartment: everything you need is ready, and you can immediately start living (or in this case, coding).

Software as a Service (SaaS)

This is the most user-friendly model, where the end product is delivered as a complete application over the internet.

You don't manage infrastructure, and you don't build the application – you simply use the software.

This is like checking into a hotel: everything is prepared and maintained for you.

Examples include Gmail, Slack, and Salesforce – services you access through your browser or an app without dealing with any infrastructure behind the scenes.

Together, these three models form a spectrum – from maximum control (IaaS) to maximum convenience (SaaS). The best choice depends on your goals and how much management you want to handle yourself.

Cloud Deployment Models



While service models describe *what* you use in the cloud, deployment models describe *where* your applications and data live.

Public Cloud/Cloud Deployment

In a cloud-based deployment, all parts of your application run in the cloud.

These applications may be built directly in the cloud or migrated from existing on-premises infrastructure to take advantage of cloud benefits.

You share the provider's infrastructure with other users, but your data remains secure and isolated.

You can choose to build your solution on lower-level services like Amazon EC2 or use higher-level managed services like Lambda that handle much of the infrastructure management for you.

Private Cloud/On-premises

A private cloud is a cloud environment created exclusively for one organization.

It can be set up on-site in the company's own data center — using virtualization and management tools — or hosted off-site by a trusted third-party provider.

In this model, computing resources are dedicated to a single organization rather than shared with others.

You can choose to build your solution on lower-level services like Amazon EC2 or use higher-level managed services like Lambda that handle much of the infrastructure management for you.

Hybrid Cloud

A hybrid cloud combines both public and private environments, allowing data and applications to move seamlessly between them.

For example, a company might keep sensitive customer data on-premises while running its customer-facing applications on AWS to take advantage of its scalability and global infrastructure.

Advantages of Cloud Computing



So, why is everyone moving to the cloud? It's not just a trend. It offers fundamental business advantages. AWS defines six key advantages that you should know by heart.

✓ **Shift from Capital Expenses to Pay-As-You-Go**

Instead of making huge upfront investments in servers and data centers, companies can pay only for the resources they actually use. This pay-as-you-go approach makes technology more affordable and accessible.

✓ **Massive Economies of Scale**

Cloud providers operate at an enormous scale, serving millions of customers worldwide. This scale allows them to lower costs in ways that individual organizations never could, passing those savings back to users.



High Elasticity and Scalability

Cloud computing removes the guesswork from capacity planning. Rather than buying hardware based on rough estimates, businesses can scale resources up when demand spikes and scale them down again when demand falls.



Increased Speed and Agility

In a traditional company, getting a new server could take weeks (approvals, purchasing, setup). In the cloud, you can spin up thousands of servers in minutes. This agility means your development teams can experiment, innovate, and get new features to customers faster than the competition.



Reduced maintenance burden

You no longer need to worry about maintaining physical infrastructure — no racks of servers, no cooling systems, no endless hardware upgrades. The cloud lets you focus your time and money on what actually makes your business special.



Go global in minutes

Cloud computing makes global expansion far easier. With just a few clicks, an application can be deployed in multiple regions around the world, reducing latency and giving users a smoother experience no matter where they are.