Cloud Concepts Overview

CLOUD DEFINED · IAAS/PAAS/SAAS · DEPLOYMENT MODELS · SIX ADVANTAGES · AWS SERVICES · AWS CAF STUDY & REVIEW

01 MUST KNOW

if you remember five things, remember these

01 **The definition:** cloud computing is the **on-demand delivery** of compute power, database, storage, applications, and other IT resources **via the internet** with **pay-as-you-go** pricing. The resources run on servers in large data centers around the world and combine like building blocks.

02 **Service models = a control gradient: IaaS** (networking, compute, storage building blocks — most control, closest to traditional IT) → **PaaS** (provider manages hardware + OS; you deploy and manage apps) → **SaaS** (completed product; you only decide how to use it). Control decreases as the provider manages more.

03 **Deployment models: cloud** (application fully deployed in the cloud) · **hybrid** (cloud resources connected to existing on-premises infrastructure) · **on-premises**, a.k.a. *private cloud* (virtualization in your own data center — few real cloud benefits).

04 **Six advantages:** trade **capital expense for variable expense** · **massive economies of scale** · **stop guessing capacity** · **increase speed and agility** · **stop spending money running data centers** · **go global in minutes**.

05 **AWS CAF:** cloud-adoption guidance organized into **six perspectives**, each a set of **capabilities** owned by related stakeholders — **Business, People, Governance** (business focus) + **Platform, Security, Operations** (technical focus).

02 KEY TERMS

TERM	DEFINITION
Cloud computing	On-demand delivery of IT resources via the internet with pay-as-you-go pricing
IaaS	Infrastructure as a service — basic building blocks (networking, compute, storage); maximum flexibility and management control
PaaS	Platform as a service — provider manages the underlying hardware and OS; you deploy and manage applications
SaaS	Software as a service — a completed product the provider runs and manages (e.g., web-based email)
Hybrid deployment	Cloud-based resources connected to existing resources not in the cloud — most commonly on-premises infrastructure
On-premises (private cloud)	Virtualization and resource-management tools in your own data center; essentially legacy IT with dedicated resources
Web service	Software available over the internet or intranet via an API, using standardized XML or JSON; OS- and language-independent
Capital expense (capex)	Funds used to acquire, upgrade, and maintain physical assets — the traditional data-center cost model
Variable expense	An expense the payer can easily alter or avoid — the cloud's pay-only-for-what-you-consume model
Undifferentiated heavy lifting	Procurement, maintenance, and capacity planning — work the cloud takes off your plate
AWS CAF	AWS Cloud Adoption Framework — guidance and best practices, in six perspectives, to accelerate successful cloud adoption
CAF perspective	One of six areas of focus; each consists of a set of capabilities owned by functionally related stakeholders

03 THE MENTAL SHIFT: HARDWARE → SOFTWARE

TRADITIONAL — INFRASTRUCTURE AS HARDWARE	CLOUD — INFRASTRUCTURE AS SOFTWARE
physical, slow, and guessed	*flexible, elastic, disposable*
— Requires space, staff, physical security, planning, capital expenditure	— Provision and terminate on demand; pay for what you use
— Long procurement cycle: acquire, provision, maintain	— Scale elastically up and down, in an automated fashion
— Capacity provisioned by guessing the theoretical maximum peak	— Resources treated as temporary and disposable
— Guess high → expensive idle resources · guess low → capacity shortfall	— Eliminates undifferentiated heavy lifting: procurement, maintenance, capacity planning

04 SERVICE & DEPLOYMENT MODELS

service = who manages the stack · deployment = where the app lives

MODEL	KIND	WHAT IT MEANS
IaaS	Service	Basic building blocks: networking features, computers (virtual or dedicated hardware), data storage. Most control; most similar to existing IT
PaaS	Service	No managing the underlying infrastructure (hardware, OS) — focus on deploying and managing your applications
SaaS	Service	Completed product that the provider runs and manages — you think only about how you'll use it (web-based email)
Cloud	Deployment	Application fully deployed in the cloud — born there or migrated; built on low-level pieces or higher-level abstracted services
Hybrid	Deployment	Connects cloud resources to existing on-premises infrastructure — extend into the cloud while linked to internal systems
On-premises	Deployment	"Private cloud" — virtualization + resource management in your own data center; largely the same as legacy IT

05 THE SIX ADVANTAGES OF CLOUD COMPUTING

know them by name — the exam quotes them verbatim

ADVANTAGE	WHAT IT MEANS
1 · Capital expense → variable expense	Don't invest in data centers before knowing demand — pay only when you consume, and only for the amount consumed
2 · Massive economies of scale	Aggregated usage of hundreds of thousands of customers → lower pay-as-you-go prices than you can get on your own
3 · Stop guessing capacity	Access as much or as little as needed; scale up and down with a few minutes' notice — no idle excess, no shortfall
4 · Increase speed and agility	New IT resources are a click away: weeks → minutes; experimentation gets dramatically cheaper and faster
5 · Stop running data centers	No racking, stacking, and powering servers — focus on your own customers and differentiating projects
6 · Go global in minutes	Deploy to multiple AWS Regions in a few clicks → lower latency and better experience at minimal cost

06 AWS SERVICES COVERED IN THIS COURSE

reach them all via Console · CLI · SDKs — one common REST-like API

CATEGORY	CORE SERVICES
Compute	EC2 · Lambda · Elastic Beanstalk · EC2 Auto Scaling · ECS · EKS · ECR · Fargate

CATEGORY	CORE SERVICES
Security, Identity & Compliance	IAM · Cognito · Shield · Artifact · KMS
Storage	S3 · S3 Glacier · EFS · EBS
Database	RDS · DynamoDB · Redshift · Aurora
Networking & Content Delivery	VPC · Route 53 · CloudFront · Elastic Load Balancing
Management & Governance	Trusted Advisor · CloudWatch · CloudTrail · Well-Architected Tool · AWS Auto Scaling · CLI · Config · Management Console · Organizations
Cost Management	Cost & Usage Report · Budgets · Cost Explorer

07 AWS CAF — SIX PERSPECTIVES

BUSINESS CAPABILITIES

the people-and-money side

- **Business** — IT aligned with business needs; IT investments traceable to business results (business/ finance managers, budget owners, strategy stakeholders)
- **People** — training, staffing, and organizational change for an agile organization (HR, staffing, people managers)
- **Governance** — align IT strategy and goals with business strategy and goals; maximize value, minimize risk (CIO, program managers, enterprise architects, analysts)

TECHNICAL CAPABILITIES

the build-and-run side

- **Platform** — describe IT systems, their relationships, and the target-state architecture in detail (CTO, IT managers, solutions architects)
- **Security** — meet objectives for visibility, auditability, control, and agility (CISO, IT security managers and analysts)
- **Operations** — define day-to-day, quarter-to-quarter, year-to-year business conduct (IT operations and support managers)

08 EXAM TRAPS

where the knowledge check gets you

- × “A private cloud gives you the main benefits of cloud computing.” — **False.** On-premises “private cloud” is essentially legacy IT with virtualization; it's chosen for dedicated resources, not cloud benefits.
- × “SaaS offers the most control over IT resources.” — Backwards. Control is highest with **IaaS** and decreases toward SaaS as the provider manages more of the stack.
- × “With PaaS you still patch the operating system.” — PaaS removes management of the underlying infrastructure — **hardware and OS** — so you can focus on deploying and managing applications.
- × “Cloud spending is a capital expense.” — AWS billing is a **variable, operational expense**: you pay only when you consume resources and only for the amount consumed.
- × “In the cloud you still provision for the theoretical maximum peak.” — That's the hardware model. Cloud capacity scales up and down **on demand with minutes' notice** — no idle overprovisioning, no shortfall.
- × “Hybrid means running across two cloud providers.” — In this course, hybrid connects **cloud-based resources to existing on-premises infrastructure**.
- × “A web service is tied to an operating system or language.” — No. Web services use standardized **XML or JSON over an API**, are OS- and language-independent, and can also run on private intranets.
- × “Governance is one of the CAF's technical perspectives.” — Governance is a **business** perspective (with Business and People); the technical three are **Platform, Security, and Operations**.

09 SELF-QUIZ

answers are upside-down below

Q1 Complete the definition: cloud computing is the ___ delivery of compute power, database, storage, applications, and other IT resources via the internet with ___ pricing.

Q2 Which cloud service model gives you the highest level of flexibility and management control over IT resources?

Q3 In which service model does the provider run and manage a completed product — web-based email being the classic example?

Q4 Name the three cloud deployment models.

Q5 Name the six advantages of cloud computing.

Q6 Why can AWS offer lower pay-as-you-go prices than a company could achieve on its own?

Q7 What are the three ways to create and manage resources on the AWS Cloud, and what common foundation do they share?

Q8 In the AWS-to-traditional-IT analogy, what do AMIs and Amazon EC2 instances correspond to?

Q9 Which three AWS CAF perspectives focus on business capabilities?

Q10 Sample CCP exam: why is AWS more economical than traditional data centers for applications with varying compute workloads — monthly EC2 billing, full administrative access, launching instances on demand, or permanently running enough instances for peak?

ANSWER KEY (rotate the page)

Q1 on-demand; pay-as-you-go **Q2** IaaS **Q3** SaaS **Q4** cloud, hybrid, on-premises (private cloud) **Q5** capex → variable expense · economies of scale · stop guessing capacity · speed & agility · stop running data centers · go global in minutes **Q6** aggregated usage of hundreds of thousands of customers → massive economies of scale **Q7** Management Console, AWS CLI, SDKs — a common REST-like API **Q8** on-premises servers **Q9** Business, People, Governance **Q10** launching EC2 instances on-demand when needed