Cloud Computing (AWS, Azure, GCP) Track

Comprehensive Training & Real-World Application

Agnes

Phase 1: Cloud Foundations & Essential Services (Month 1)

A 4-week journey into the core principles of modern cloud computing.

Week 1 | Week 2 | Week 3 | Week 4

Week 1: Cloud Fundamentals

Grasp core concepts like IaaS, PaaS, SaaS and explore the global infrastructure of AWS, Azure, and GCP, including Regions and Availability Zones.

CONCEPTS INFRASTRUCTURE

Week 2: Core Compute

Master virtual machines (EC2, Azure VMs, Compute Engine) and understand how to automatically scale resources and balance loads for high availability.

VMS SCALING

Week 3: Core Storage

Dive into storage solutions: Object (S3, Blob), Block (EBS, Azure Disks), and File. Get an overview of managed relational and NoSQL databases.

DATA DATABASES

Week 4: Core Networking

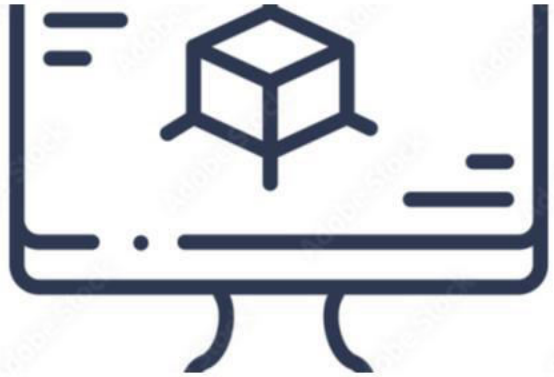
Learn to build isolated cloud networks using VPCs and VNets. Configure DNS for custom domains and understand how CDNs accelerate content delivery.

VPC CONNECTIVITY

Hands-on Labs

Deep Dive into Core Compute Services

Virtual Machines (IaaS): Foundation of Cloud Compute



Core Concept: VMs are the cornerstone of IaaS, providing on-demand, scalable compute capacity without managing physical hardware. Key attributes include provisioning virtual servers, selecting instance types, and managing network security.

AWS EC2: Industry-leading virtual servers with a wide range of instance types.

Azure VMs: Microsoft's offering for scalable and secure virtualized computing.

GCP Compute Engine: Google's powerful and highly customizable virtual machines.

Reference: "Managing Google Compute Engine" (Codecademy)

Dynamic Workloads: Scaling & Load Balancing

Ensure applications handle fluctuating demand, maintain performance, and achieve high availability through:

- **Auto Scaling:** Automatically adjusting compute capacity to meet traffic.
- **Load Balancing:** Distributing traffic across multiple servers to prevent overload.

Key Services:
AWS (ELB, Auto Scaling), Azure (Load Balancer, VMSS), GCP (Cloud LB, MIGs).

Scalability | Resilience | Efficiency

Hands-on: Launch, Manage & Connect

Practical exercises focus on the end-to-end lifecycle of VMs, including launching, managing, and securely connecting across all three major platforms.

Emphasis on "hands-on experience" through "real, guided labs."

Experiential | Cross-Cloud | Operational

Essential Cloud Storage Solutions

Cloud Storage Solutions

Object Storage: Scalable & Durable

Designed for unstructured data like images, videos, and backups. It's highly scalable, durable, and cost-effective, with data accessed via APIs.

- **AWS S3:** Industry-leading object storage for virtually unlimited data.
- **Azure Blob Storage:** Microsoft's solution for massive unstructured data.
- **GCP Cloud Storage:** Google's unified object storage for all data types.

Unstructured | Scalable | Cost-Effective | API-Driven | Durable

Block & File Storage: Performance & Access

Block Storage: Provides raw block-level storage for VMs, ideal for high-performance workloads like databases. (AWS EBS, Azure Disks, GCP Persistent Disks).

File Storage: Offers shared file system access for traditional applications and content management. (AWS EFS, Azure Files).

Structured | High-Performance | Persistent | Shared | OS-Level

Cloud Database Solutions

Managed Relational Databases

Fully managed services for traditional databases, handling patching, backups, and scaling. Ideal for applications requiring ACID compliance.

NoSQL Databases: Flexibility & Scale

Non-relational databases for large volumes of unstructured data. Offers flexible schema and horizontal scalability for modern applications.

Cloud Networking & Connectivity

Foundations for Building Secure and Scalable Cloud Environments

Virtual Private Cloud (VPC)

A logically isolated section of the cloud to launch resources in a virtual network you define, giving you full control over IP ranges, subnets, and routing.

Key Components:

- **Subnets:** Segments for organizing resources.
- **Route Tables:** Rules to direct network traffic.
- **Gateways:** Connect your VPC to the internet or other networks.

Provider Offerings:

DNS Services

Translates human-readable domain names into machine-readable IP addresses. Cloud DNS services manage routing for your applications, both publicly and within your private networks.

Key Capabilities:

- **Domain Registration:** Manage your domain names.
- **Traffic Routing:** Direct users based on latency, health, etc.
- **Private DNS Zones:** Resolve names within a VPC/VNet.

Provider Offerings:

Content Delivery Networks

A globally distributed network of servers that cache content closer to users. This reduces latency, improves performance, and increases application resilience.

Key Benefits:

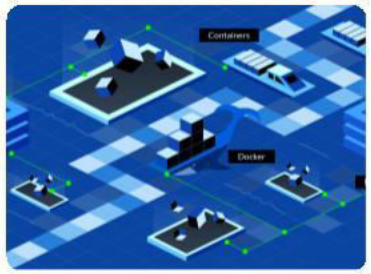
- **Improved Performance:** Faster content delivery for users.
- **Reduced Origin Load:** Offloads traffic from your servers.
- **Enhanced Security:** Helps mitigate DDoS attacks.

Provider Offerings:

AWS CloudFront, Azure CDN, GCP Cloud

Phase 1: Advanced Cloud Concepts & Security (Month 2)

Week 5: Containers & Orchestration



Containerization (Docker): Package applications into portable, lightweight containers for consistency and efficiency.

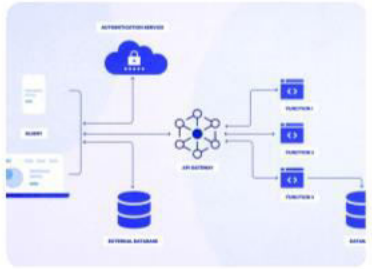
Orchestration (Kubernetes): Automate deployment, scaling, and management of containerized workloads. (Source)

Portable | Scalable | Microservices

Week 6: Serverless Computing

Functions as a Service (FaaS): Execute code without managing servers, focusing on event-driven execution.

Event-driven Architecture: Design systems that react to state changes, integrating functions with cloud services. (Source)



Cost-Efficient | Auto-Scaling | Event-Driven

Week 7: Cloud Security Basics

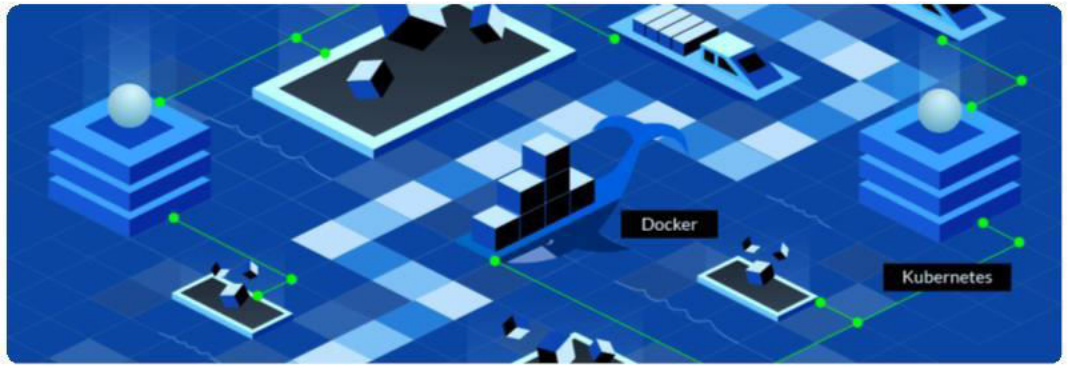
Shared Responsibility: Demarcate security duties between cloud providers and customers.

Identity & Access Management (IAM): Implement least privilege and role-based access control (RBAC). (Source)

Compliance | Access Control | Data Protection

Modern Application Deployment: Containers & Serverless

Containerization: Portable & Consistent Environments

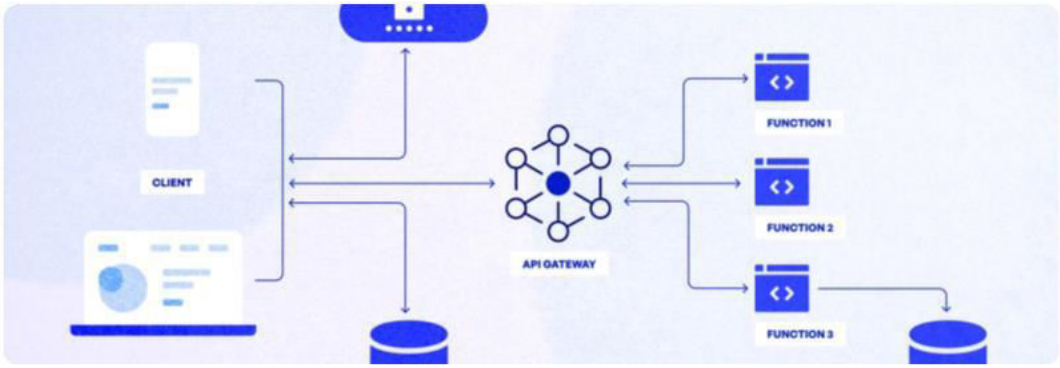


Docker Fundamentals: Package applications and dependencies into isolated, lightweight units called containers, ensuring consistent execution across all environments.

Key Cloud Services:

- **AWS ECS:** A fully managed container orchestration service for running and scaling Docker applications on AWS.
- **Azure Container Instances (ACI):** A serverless service to run containers without managing VMs, offering fast startup.
- **GCP Cloud Run:** A managed platform to run stateless containers, featuring serverless auto-scaling.

Serverless Architecture: Event-Driven & Zero Ops



Functions as a Service (FaaS): Write and deploy code (functions) that executes in response to events, while the cloud provider manages all underlying infrastructure.

Event-driven Models: Design highly reactive and decoupled applications where serverless functions are triggered by events like file uploads or API calls.

Key Cloud Services:

- **AWS Lambda:** Run code without provisioning servers, triggered by various AWS services.
- **Azure Functions:** Event-driven compute for a wide range of

Securing & Managing Your Cloud Environment

Cloud Security Fundamentals

Shared Responsibility Model: Delineates security duties between the
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Network & Perimeter Defense

Virtual Firewalls: Use Security Groups (AWS), NSGs (Azure), or Firewall Rules
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Data Encryption & Resilience

Encryption at Rest: Protects stored data in services like S3, EBS, and RDS.

Encryption in Transit: Secures data in motion across networks using SSL/TLS protocols.

Confidentiality
Integrity
Compliance

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Operational Visibility & Alerts

Centralized Logging: Aggregate logs with AWS CloudWatch, Azure Monitor, or GCP Cloud Logging.

Performance Monitoring: Track metrics and set alarms for proactive issue resolution.

Observability
Auditing
Diagnostics

rightsizing, and leveraging savings plans.

Efficiency
Budget
ROI
Reporting

Phase 2: Industry Immersion & Multi-Cloud Project (Month 3)

Week 9 — Week 10 — Week 11 — Week 12

Week 9: Project Kick-off & Design

Project Initiation: Formation of project teams, defining scope and objectives for the multi-cloud solution.
Architecture Blueprint: Collaborative design sessions to architect a solution across two major cloud providers.

Teamwork | Strategy | Blueprint

Week 10: Sprint - Cloud 1

Deployment

Core Deployment: Full implementation of solution components on the first cloud provider (e.g., AWS), including compute, networking, and storage.
Hands-on Expertise: Deep dive into the first platform's ecosystem for robust deployment.

Deployment | Execution | Practical

Week 11: Sprint - Cloud 2 & Opt.

Cross-Cloud Replication: Replicating key components on a second provider (e.g., Azure/GCP), focusing on integration.
Performance & Cost: Rigorous testing and tuning for performance and cost efficiency across both clouds.

Multi-Cloud | Optimization | Comparison

Week 12: Showcase & Launchpad

Project Presentation: Teams present their multi-cloud solutions and learnings to a panel of experts.
Career Workshops: Focused sessions on resume building, interview prep, and networking.

Presentation | Networking | Readiness

Offline Campus Experience

Collaborative Learning Environment: Immersive, peer-to-peer learning, group problem-solving, and direct mentorship in a dynamic community.

Networking & Community Building: Engage with industry professionals, guest speakers, and alumni to build a strong professional network.

Immersive | Collaborative | Networking | Mentorship

Real-World Multi-Cloud Web Application Project

Project Goal

Deploy a full-stack web app across two major cloud platforms for high availability.

Objective | Foundation

Architectural Design

Strategic selection of services for front-end, back-end, and database solutions.

Blueprint | Scalability

Implementation Sprints

Iterative deployment of compute, database, storage, and networking components.

Deployment | Infra

Optimization

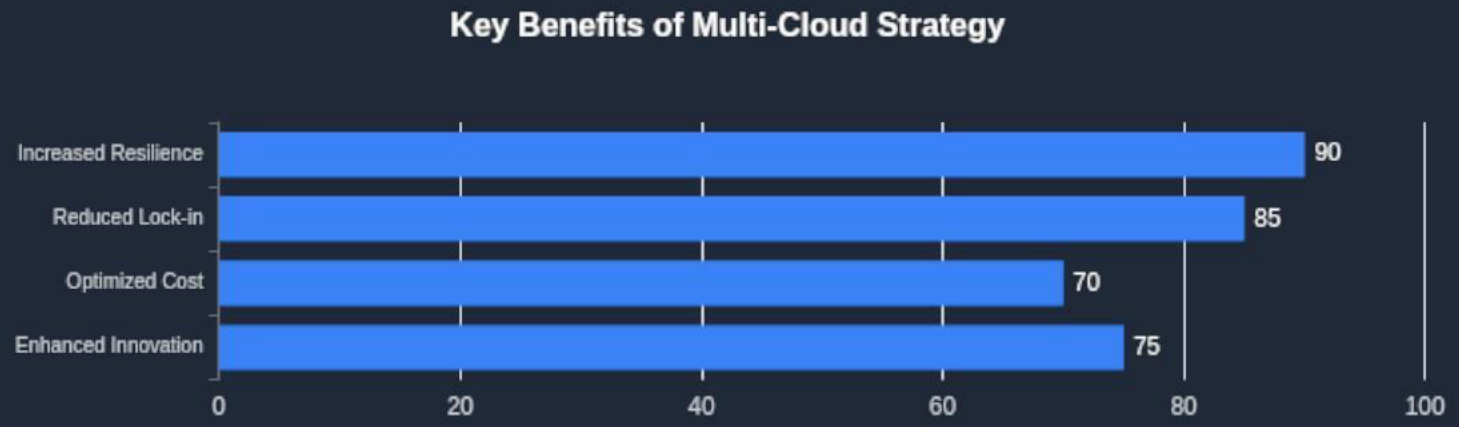
Performance tuning, cost efficiency analysis, and service capability comparison.

Performance | Analysis

Final Showcase

Demonstrate the multi-cloud app, design choices, and strategic advantages.

Outcome | Strategy



The Strategic Advantage of Multi-Cloud

A multi-cloud strategy mitigates risks, provides greater flexibility in service selection, and fosters competitive pricing, leading to a more robust and adaptable cloud infrastructure.

Sources: ThinkCloudly, Codecademy, NareshIT, Image Source

Accelerate Your Cloud Engineering Career

Skill Enhancement & Personal Branding

Workshops: Resume & Portfolio

Tailored guidance on crafting compelling resumes and building dynamic portfolios that showcase your cloud projects.

Professional | Document | Showcase

LinkedIn Optimization & Networking

Strategies to optimize your LinkedIn profile and techniques for building your professional network in the cloud space.

Visibility | Connection | Influence

Interview Readiness & Industry Connection

Mock Technical & Behavioral Interviews

Simulated interviews with cloud-specific questions (AWS, Azure, GCP) and personalized feedback to boost confidence.

Practice | Confidence | Preparation

Networking with Industry Professionals

Exclusive opportunities to connect with cloud architects, engineers, and hiring managers from leading tech companies.

Connect | Insights | Opportunities

Program Culmination: Recognition &