Radical TECHNOLOGIES

# AWS
# SOLUTION ARCHITECT

**Basic to Advanced AWS Solution Architect training**
**Duration - 60hrs**

Designed to make you a Job-Ready Advanced Cloud Engineer.
This is much deeper than the AWS SAA-C03 exam syllabus — it includes real-time enterprise scenarios, architectures, troubleshooting, DevOps + Cloud integrations, and hands-on labs used in top MNCs.

IDEAL FOR:
- CLOUD ENGINEER
- AWS SOLUTIONS ARCHITECT
- DEVOPS + CLOUD ENGINEER
- CLOUD INFRASTRUCTURE ENGINEER
- SRE / PLATFORM ENGINEER

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# MODULES

**Module 1:** Cloud Basics & AWS Foundation (4–5 Hours)

Topics

Cloud Computing fundamentals

IaaS, PaaS, SaaS models

AWS Global Infrastructure

Regions, AZs, Edge Locations

Shared Responsibility Model

AWS Well-Architected Framework (all 6 pillars)

Billing & Cost fundamentals

IAM basics — Users, Groups, Policies

Labs Create AWS account Configure Billing Alerts

IAM Users + MFA setup

**Module 2:** Identity & Access Management (IAM) – Deep Dive (3–4 Hours)

Topics

IAM Policies & Policy Evaluation Logic

Roles, STS, Access Keys

Permission Boundaries

Resource Policies, Trust Policies

Cross-Account Access Organizations &

SCP (Service Control Policies)

Identity Center (SSO) Integration

IAM Analyzer

Labs Create IAM roles with cross-account access

Create SCPs to restrict admin users

IAM Access Analyzer to detect over-permissioned roles

**Module 3**: VPC & Networking (Advanced Level) – 8–10 Hours

Topics

VPC Core Concepts

Subnets, Route Tables, IGW, NAT, NACL vs SG

VPC Endpoints (Gateway + Interface)

DHCP Options Set

Public vs Private Subnet Design

Advanced VPC

Transit Gateway

VPC Peering (Inter-region, Intra-region)

Hybrid Networking

VPN Site-to-Site

Direct Connect

Multi-VPC Hub & Spoke architectures

IPv6 end-to-end networking

DNS: Route53 deep dive

Private Hosted Zones Failover Routing

Geolocation Routing

Labs

Build multi-AZ VPC

Create PrivateLink endpoint for internal apps

Connect 2 VPCs using peering

Configure Transit Gateway multi-VPC communication

Job-Oriented Scenarios

“Intermittent packet loss from private subnet” troubleshooting

“Application reachable via IGW but not via internal LB”

“Hybrid network outage RCA”

**Module 4:** EC2 & Compute Mastery (5–7 Hours)

Topics

EC2 instance families, Nitro architecture

Launch Templates, Auto Scaling Groups (ASG)

Placement Groups (Cluster, Spread, Partition)

Spot Instances — diversification, capacity handling

EBS types, performance tuning (PIOPS)

Instance Store vs EBS vs EFS

EC2 metadata IMDSv2 Elastic Load Balancing (ALB, NLB, GLB)

Autoscaling advanced Step scaling Predictive scaling Target tracking

Labs

Create Auto-Scaling group with ALB Configure NLB + PrivateLink

EC2 rescue for failed boot AMI building & automation

Job Scenarios

EC2 instance CPU spikes troubleshooting

ASG not scaling during high load

Root volume corruption recovery

**Module 5:** Storage & Databases (5–6 Hours)

Topics

Storage

EBS (GP3, IO2) optimization EFS (performance modes, concurrency)

FSx (Windows, Lustre, OpenZFS)

S3 internals & Security

Object Lock

Lifecycle & Intelligent Tiering

**S**3 Access Points
Replication (CRR/SSR)
Databases
RDS (Multi-AZ, Read Replicas)
Aurora (Serverless v2, Global DB)
DynamoDB (streams, DAX, on-demand)
ElasticCache (Redis & Memcached)
Redshift architecture
Labs
S3 bucket policy & encryption
Deploy Aurora with automatic failover
EFS for web servers in ASG
DynamoDB with Autoscaling
Job Scenarios
RDS failover troubleshooting
S3 public access blocker bypass recovery
DynamoDB throttling issues

**Module 6:** Containers, Serverless & Modern Architecture (5–7 Hours)
Topics
Containers
ECS architecture
EC2 vs Fargate launch types
ECR Lifecycle Policies
Service Mesh with App Mesh
Serverless
AWS Lambda: versions, aliases, layers

Step Functions (Standard vs Express)
EventBridge advanced patterns
API Gateway (REST vs HTTP vs WebSocket)
SQS/SNS patterns
Kinesis Data Streams + Firehose
Labs
Deploy a serverless API (API GW → Lambda → DynamoDB)
Deploy ECS service with ALB
Build CI/CD for ECR + ECS
Job Scenarios
Lambda timeout debugging
ECS task stuck in PENDING

**Module 7:** Infrastructure as Code – Terraform & CloudFormation (4–6 Hours)
Topics
CloudFormation templates Nested stacks Drift detection
Terraform: Modules Workspaces State management
Remote state backends
Terraform + AWS integration patterns
Labs
Build VPC using Terraform
Automate ALB + ASG infra using IaC
Migrate manual resources to Terraform
Job Scenarios
Terraform state corruption fix
Drift between manual & IaC deployment

**Module 8**: Monitoring & Logging (3–4 Hours)

Topics

CloudWatch Metrics, Logs, Alarms

Container Insights

CloudTrail advanced logging

OpenSearch for log analytics

X-Ray tracing for distributed apps

Labs

Create metric alarms for ASG & RDS

Centralized logging using CloudWatch + OpenSearch

Trace application latency using X-Ray

Scenarios

Disk burst on EC2 leading to slow website

Lambda cold-start monitoring

**Module 9:** Security, Compliance & Governance (5–6 Hours)

Topics

KMS CMKs, Auto-Key Rotation Secrets Manager & Parameter Store

Inspector, GuardDuty, Macie WAF + Shield Advanced

S3 bucket hardening Zero Trust in AWS IAM Access

Analyzer Config + Security Hub CloudTrail

multi-region setup AWS Organizations &

Governance

Labs

Encrypt EC2, RDS, and S3 with KMS WAF rules for

OWASP Top 10 Enable GuardDuty and detect threats

Scenarios Breached IAM keys rotation & containment

S3 accidental public exposure fix

**Module 10:** High Availability, DR & Migration Strategies (6–8 Hours)
Topics
Multi-AZ vs Multi-Region design Pilot Light, Warm Standby, Multi-Site DR RPO/RTO calculations AWS Backup strategies Migration tools: SMS, DMS, Application Migration Service
Blue/Green & Canary deployments Hybrid Cloud architectures
Global Accelerator Failover Testing methodologies
Labs
Multi-Region failover using Route53
DMS for database migration
Lift & Shift migration of on-prem application
Scenarios
Application outage in one region – failover to another
Database migration with zero downtime

## Outputs (What You'll Gain)

- Real-world Solution Architect skills
- Enterprise Architecture Design capability
- Advanced VPC / Networking mastery
- Serverless + Containers production-level skills
- IaC automation (Terraform + CloudFormation)
- DR, Migration, HA expertise
- Troubleshooting experience (L1 → L3)
- Job-oriented tasks performed in MNCs

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# LINUX FUNDAMENTALS FOR CLOUD ENGINEERS

Duration: 12–15 Hours
Level: Beginner to Early-Intermediate
Pre-requisites: Basic IT knowledge


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## 1. Linux & Cloud Overview

- Why Linux dominates Cloud platforms
- Linux distributions in Cloud
  - Amazon Linux, RHEL, Ubuntu
- Linux vs Windows in cloud workloads
- SSH & key-based access concept

## 2. Linux Installation & Access (Cloud Context)

- Cloud VM concepts (EC2 / VM / Compute Engine)
- Connecting to Linux Cloud VMs
  - SSH
  - Key pairs (.pem / .ppk)
- Terminal basics

Hands-On

- SSH to cloud Linux VM
- Understand directory structure

## 3. Linux File System & Commands (Must-Know)

- Linux directory structure
- File & directory commands
  - ls, cd, pwd
  - cp, mv, rm
  - touch, mkdir
- Viewing files
  - cat, less, more, head, tail
- Search & filters
  - grep, find
- File permissions
  - chmod, chown

## 4. Users, Groups & Permissions

- Users & groups
- /etc/passwd, /etc/shadow, /etc/group
- Sudo access
- Secure permission practices in cloud

Hands-On

- Create cloud admin user
- Configure sudo access

## 5. Package Management

- Package managers
  - yum, dnf, apt
- Installing, updating & removing packages
- Repositories concept

Hands-On

- Install Apache / Nginx
- Verify running services

## 6. Process & Service Management

- Linux processes
  - ps, top, htop
- Service management
  - systemctl
- Enable services at boot
- Troubleshooting crashed services

## 7. Networking Basics (Cloud-Relevant)

- IP addressing basics
- Check network info
  - ip, ss, netstat
- DNS resolution
- Ports & firewall basics
  - firewalld, iptables (intro)
- Security Groups vs Linux firewall

## 8. Storage & Disk Management

- Linux disk concepts
- Mounting file systems
- Cloud disks (EBS / Persistent Disk)
- Resize disks & file systems

Hands-On

- Attach new disk & mount
- Extend file system

## 9. Logs & Troubleshooting

- Log locations
  - /var/log
- Important logs
  - messages, secure, syslog
- Journal logs
  - journalctl
- Basic troubleshooting approach

## 10. Automation Basics for Cloud

- Shell scripting fundamentals
- Environment variables
- Cron jobs
- Startup scripts (cloud bootstrapping)

## 11. Security Basics for Cloud Linux

- SSH hardening
- Disable root login
- Key-based authentication
- File permission best practices

## 12. Linux for DevOps & Cloud Tools

- Linux + Git basics
- Linux + Docker (intro)
- Linux + Cloud CLI tools
    - AWS CLI / Azure CLI (concept)

# Real-World Cloud Scenarios

- VM not reachable via SSH
- Disk full on cloud VM
- Service not starting after reboot
- High CPU usage troubleshooting
- Securing production Linux VM

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# DEVOPS FUNDAMENTALS FOR CLOUD ENGINEERS

Duration: 10–12 Hours
Level: Beginner → Early-Intermediate
Pre-requisites:

- Basic Linux
- Basic Cloud (AWS/Azure/GCP fundamentals)

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## 1. DevOps for Cloud Engineers (Mindset + Reality)

- Why DevOps is critical in Cloud
- Traditional Ops vs Cloud Ops vs DevOps
- DevOps Culture (CALMS)
- Cloud Engineer vs DevOps Engineer vs SRE
- Real DevOps responsibilities in cloud teams

## 2. Cloud-Native DevOps Lifecycle

- CI/CD in Cloud environments
- Infrastructure lifecycle in cloud
- Immutable vs mutable infrastructure
- Blue-Green & Canary deployments (concept)
- DevOps lifecycle mapped to AWS/Azure/GCP

## 3. Version Control (Mandatory Skill)

- Git fundamentals (Ops-focused)
  - Repos, commits, branches, tags
- Git workflow for Cloud Engineers
- GitHub / GitLab / Bitbucket overview

Hands-On

- Create repo
- Push infra/config files
- Rollback using Git

## 4. CI/CD Fundamentals (Cloud Perspective)

- Continuous Integration vs Continuous Delivery vs Deployment
- Pipeline stages

- Jenkins / GitHub Actions / GitLab CI (overview)
- Cloud-native CI/CD tools
    - AWS CodePipeline
    - Azure DevOps

Demo

- CI pipeline flow walkthrough

**5. Containers for Cloud Engineers**

- Why containers dominate cloud
- Docker architecture
- Image vs Container
- Container registry (ECR / ACR / Docker Hub)

Hands-On

- Run containerized application
- Push image to registry (demo)

**6. Kubernetes Fundamentals (Cloud-Native Ops)**

- Why Kubernetes in cloud
- Cluster architecture
- Nodes, Pods, Services
- Managed Kubernetes
    - EKS / AKS / GKE
- Kubernetes vs VM-based deployments

## 7. Infrastructure as Code (IaC)

- Why IaC is mandatory for cloud
- Terraform overview
- CloudFormation / ARM templates (concept)
- State management
- IaC best practices
- Use Case
- Provision cloud infra using IaC (concept flow)

## 8. Monitoring, Logging & Reliability

- Observability basics
- Metrics, Logs, Traces
- Cloud monitoring tools
- CloudWatch / Azure Monitor
- Prometheus & Grafana overview
- Incident response basics
- SRE principles (intro)

## 9. Security in Cloud DevOps (DevSecOps)

- Shared Responsibility Model
- Secrets management
- IAM & RBAC in pipelines
- Shift-Left Security
- Vulnerability scanning (concept)

## 10. Cost, Governance & Automation

- Cost optimization mindset
- Auto-scaling & right-sizing
- Policy as Code (concept)
- Automation with cloud CLIs & scripts

## 11. Real-World Cloud DevOps Scenarios

- CI/CD pipeline failure troubleshooting
- Application not reachable after deployment
- Kubernetes pod crash loop
- Infrastructure drift detection
- Rollback strategies in production

## Tools Covered (Concept + Demo)

• Git
• Jenkins / GitHub Actions
• Docker
• Kubernetes
• Terraform
Cloud Monitoring Tools

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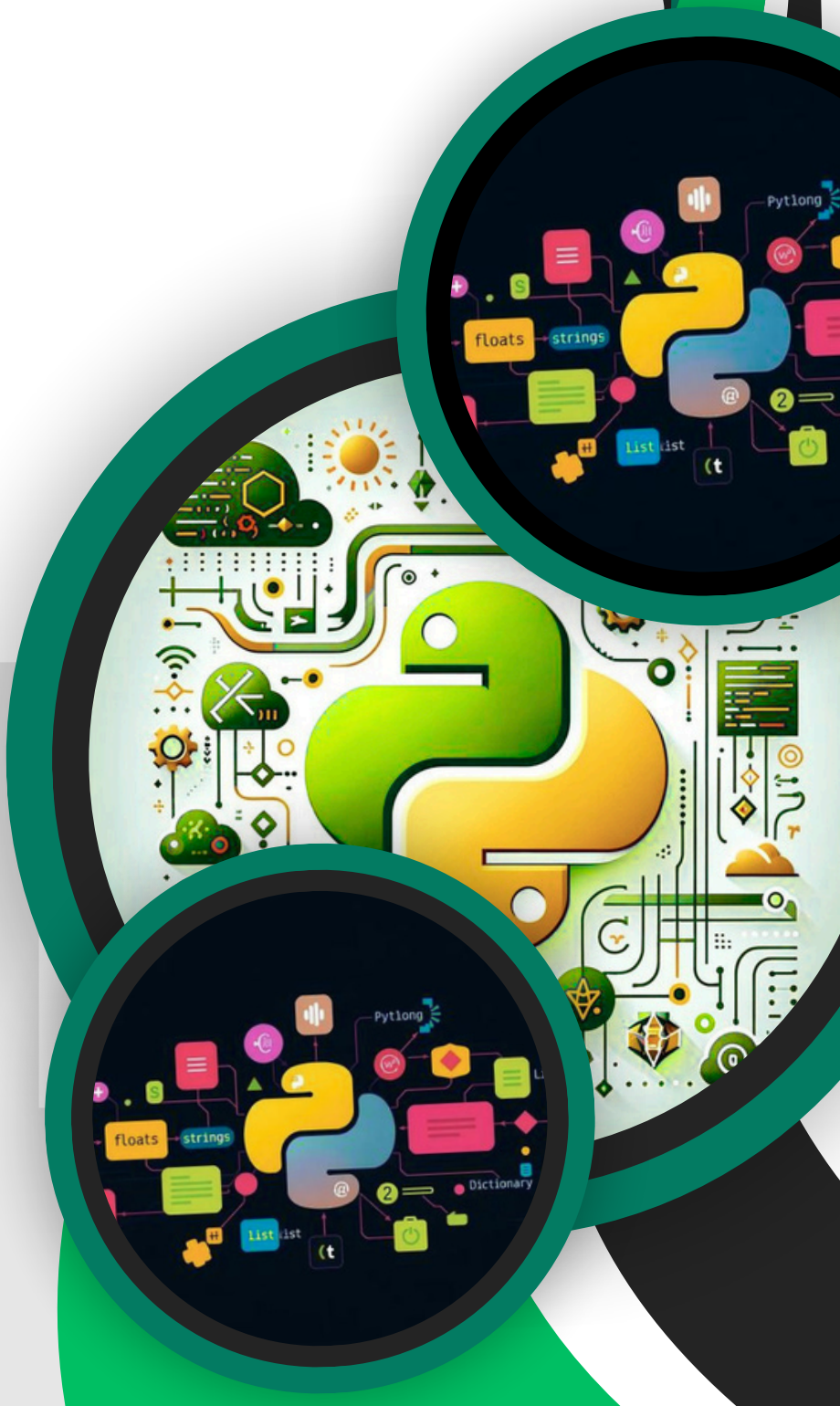
# PYTHON
# FOR SYSTEM ADMINISTRATORS

Duration: 7 Hours

Objective

Enable Linux admins to automate system administration tasks using Python scripts.

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**Module 1:** Introduction to Python (1 Hour)
Topics
Introduction to Python
Why Python is popular for DevOps and system administration
Installing Python on Linux
Python interpreter and script execution
Writing first Python program
Lab
Write a script to print:
Hostname Current date System uptime Assignment
Create a Python script that displays:
CPU usage
Memory usage
Disk usage.

**Module 2:** Python Basics for Automation (2 Hours)
Topics
Variables and data types Lists, tuples, dictionaries
Conditional statements (if/else)
Loops (for / while) Functions
Lab
Write scripts to:
Check disk spacem List running processes
Assignment
Create a script that monitors disk space and alerts when usage exceeds 80%.

**Module 3:** File Handling and System Interaction (2 Hours)

Topics

Reading and writing files

Log file analysis

Using OS module

Running Linux commands from Python

Working with environment variables

Lab

Create script to analyze Linux system logs.

Assignment

Write Python script to:

Check log files

Detect error messages

Generate report.

**Module 4:** Automation Scripts for Linux Admins (2 Hours)

Topics

Automating user creation

Backup automation

Monitoring scripts

Scheduling scripts using cron

Mini Project

Create server health monitoring script.

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## CONTACT US


+91 8055223360

PUNE | BANGALORE | KERALA | UK

www.radicaltechnologies.co.in

training@radicaltechnologies.co.in