

# پک حرفه‌ای مهندسی دواپس

فهرست سرفصل‌های دوره‌های آموزشی

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# Prometheus

## Overview

- What is DevOps?
- What is Monitoring?
- What Is Prometheus?
- Prometheus Architecture

## Getting Started with Prometheus

- Running Prometheus
- Using the Expression Browser
- Running the Node Exporter
- Alerting

## Instrumentation

- A Simple Program
- The Counter
- Counting Size
- The Gauge
- The Summary
- The Histogram
- Unit Testing Instrumentation
- Approaching Instrumentation

## Exposition

- Python
- Go
- Java
- Pushgateway
- Bridges
- Parsers
- Exposition Format

## Labels

- Instrumentation and Target Labels
- Aggregating
- Label Patterns

## Dashboarding with Grafana

- Grafana Installation
- Data Source
- Dashboards and Panels
- Graph Panel
- Singlestat Panel
- Table Panel
- Template Variables

## Node Exporter

- CPU Collector
- Filesystem Collector
- Diskstats Collector
- Netdev Collector
- Meminfo Collector
- Hwmon Collector
- Stat Collector
- Uname Collector
- Loadavg Collector
- Textfile Collector

## Service Discovery

- Service Discovery Mechanisms
- Relabelling
- How to Scrape

## Containers and Kubernetes

- cAdvisor
- Kubernetes
- Common Exporters:
  - Consul
  - HAProxy
  - Grok Exporter
  - Blackbox

## Working with Other Monitoring Systems

- Other Monitoring Systems
- InfluxDB (TICK Stack)
- Zabbix

## Writing Exporters

- Consul Telemetry
- Custom Collectors
- Guidelines

## Introduction to PromQL

- Aggregation Basics
- Selectors
- HTTP API

## Aggregation Operators

- Grouping
- Operators
- Binary Operators
- Working with Scalars
- Vector Matching
- One-to-One
- Many-to-One and `group_left`
- Many-to-Many and Logical Operators
- Operator Precedence

## Functions

- Changing Type
- Math
- Time and Date
- Labels
- Missing Series and absent
- Sorting with sort and sort\_desc
- Histograms with histogram\_quantile
- Counters
- Changing Gauges
- Aggregation over Time

## Recording Rules

- Using Recording Rules
- When to Use Recording Rules
- Naming of Recording Rules
- Alerting:
- Alerting Rules
- Configuring Alertmanagers

## Alertmanager

- Notification Pipeline
- Configuration File
- Alertmanager Web Interface

## Putting It All Together

- Planning a Rollout
- Going Global with Federation
- Long-Term Storage
- Running Prometheus
- Hardware
- Configuration Management
- Networks and Authentication
- Planning for Failure
- Managing Performance
- Managing Change
- Getting Help

# AWS

## Getting Organized and Platform Introduction

- Welcome to the Course!
- Quick Platform Introduction
- Understanding Content Flow
- Suggested Study Plan For Best Outcomes

## Introduction to Cloud Computing

- Comparing On-premises Data Centers vs. Cloud
- Private, Public, and Hybrid Cloud
- Cloud Services (Offering) - IaaS , PaaS, SaaS, XaaS

## AWS Services Part I

- AWS Global Infrastructure
- Creating an AWS Account
- AWS Management Console Walkthrough
- Exploring the AWS Free Tier - Services you can use for free in AWS
- AWS Identity and Access Management (IAM) 101
- AWS VPC Components - Internet Gateway and Virtual Private Gateway
- Introduction to AWS Virtual Private Cloud (VPC) Part I
- AWS VPC - Public vs. Private Subnets & Hybrid Connectivity 101



## **AWS Services Part II**

- Introduction to Elastic Compute Cloud (EC2) - The AWS Compute Service
- Private, Public, and Elastic IP Addresses
- Understanding Security Groups
- Understanding Network Access Control Lists (Network ACLs)
- Encryption 101
- AWS Key Management Service (KMS) 101
- AWS Simple Storage Service 101
- AWS IAM Access Keys and AWS CLI
- AWS IAM Elements, IAM Policies and IAM Roles.
- Amazon Simple Queue Service (SQS) & Simple Notification Service (SNS)
- Amazon CloudFront 101
- Amazon Route 53 - The DNS Service 101
- Amazon Relational Database Service (RDS) 101

## **Key Architecture Pillars and AWS Management and Governance 101**

- Understanding Monolithic vs. Microservices Application Architecture
- High Availability, Fault Tolerance, and Elastic Load Balancing (ELB)
- Amazon CloudWatch 101
- Amazon CloudTrail
- Disaster Recovery (DR) & DR Approaches in AWS

## **AWS Virtual Private Cloud (VPC) & Hybrid Cloud Networking**

- NAT Instance and NAT Gateway
- Bastion Hosts
- VPC Peering & Transit Gateway
- VPC Endpoints
- IPV6 Egress-Only Internet Gateway
- VPC FlowLogs
- AWS Managed Virtual Private Networks (VPNs)
- Amazon Direct Connect & Direct Connect Gateway

## **Elastic Compute Cloud (EC2) & Elastic Block Store (EBS)**

- EC2 Instance Types and Instance Lifecycle
- EC2 instance Metadata and User Data
- EC2 Instance Launch Type (Purchase Options)
- EC2 Instance Placement Groups
- EC2 Instance Monitoring
- Elastic Block Store Types
- EBS Snapshots Operations and Encryption
- EBS RAID and AWS Batch
- AWS Lightsail
- AWS Outposts
- VMware Cloud on AWS

## Elastic Load Balancing (ELB) & Auto Scaling

- Elastic Load Balancing - Target Groups, Listeners, and Health Check
- ELB Cross Zone Load Balancing and ELB Design for High Availability
- ELB and Security Groups
- ELB and Digital Certificates - Encryption In-Transit
- ELB Client IP, Monitoring, Scaling and PFS Support
- Application Load Balancer - Specific Features
- ALB Desync Mitigation
- Network Load Balancer (NLB) and Endpoint Services
- Auto Scaling
- Auto Scaling - Launch Templates and Scaling Policies
- Auto Scaling - Lifecycle Hooks and Timers

## Relational Database Services (RDS) , Aurora, and Redshift

- RDS - Multi AZ and Backups (Automated and Manual)
- RDS Scaling and Read Replicas & RDS Snapshot Operations and Security
- Amazon RDS Cross Region Automated Backups
- RDS Custom for Oracle and MS SQL
- Amazon RDS-multi-AZ DB cluster Deployment MySQL and PostgreSQL
- Amazon RDS Proxy
- Amazon Aurora
- Aurora and RDS Proxy
- Amazon Aurora Serverless
- Aurora Machine Learning
- Amazon Redshift

## NoSQL Database Services (DynamoDB, ElastiCache, DocumentDB, and Neptune)

- NoSQL and Introduction to DynamoDB
- Amazon DynamoDB-Capacity Modes Auto Scaling and Table Class
- DynamoDB - Advanced Features
- Database Transaction Models - ACID vs. BASE
- ElastiCache
- ElastiCache - Caching Strategies
- Amazon DocumentDB and Neptune (GraphDB)
- Amazon KeySpaces
- Amazon Quantum Ledger DB
- Amazon Teamstream
- ElastiCache for Redis-Sorted Sets and Global Data Stores

## Identity & Access Management - Intermediate

- Introduction To The Second Half Of The Course
- IAM - Identity-based Policies
- IAM - Security Token Service (STS) and IAM Roles
- Cross Account Access with External ID
- IAM - Resource-based Policies, Permissions Boundary & Evaluation Logic

## Simple Storage Service (S3) - Deep Dive

- S3 Overview and Data Consistency Model
- S3 Tiered Storage Classes
- S3 Storage Classes- Lifecycle Policies
- S3 Intelligent- Tiering Class
- S3 Glacier- Archiving Classes
- S3 Multi-Part Upload
- S3 Encryption At Rest and In-Transit
- S3 Server-Side Encryption SSE-S3
- S3 Server-Side Encryption SSE-KMS
- S3 SSE - Customer Provided Keys SSE- C
- S3 Buckets - Default Encryption
- S3 Versioning and Cross (and Same) Region Replication [CRR and SRR]
- S3 Object and Glacier Vault Lock
- S3 Static Website Hosting
- S3 Features : Pre-Signed URLs, Transfer Acceleration and Requester Pays
- Understanding S3 Access Management and Object Ownership
- S3 Bucket Policy Examples
- S3 Cross Origin Resource Sharing (CORS)
- S3 & Glacier SELECT, Performance Considerations, and AWS Transfer Family
- Sec 10 S3 Monitoring Notification and Server Access Logs
- S3 Additional Features

## CloudFront, Route53, and Global Accelerator

- CloudFront Deep Dive
- CloudFront - Serving Private Content using CloudFront
- CloudFront Geo Restriction (GeoBlocking)
- CloudFront Caching Layers

- CloudFront - Monitoring , Logs , Access , Classes and Pricing
- Amazon Route 53 - The AWS DNS Service
- Route 53 Routing Policies (cont.) & Route 53 Resolver
- IP-Based Routing For Route53
- Global Accelerator

## **Serverless Computing in AWS**

- AWS Lambda
- AWS Lambda- Concurrent Execution
- AWS Lambda- Function URL
- S3 Object Lambda
- Lambda@Edge>
- API Gateway
- Serverless Application Repository

## **Storage Services (EFS, FSx, Storage Gateway, Snow Family, Backup and DataSync)**

- Elastic File System (EFS)
- EFS Storage Classes
- EFS Additional Features
- Amazon FSx
- Storage Gateway
- FSx File Gateway
- Snow Family
- AWS Backup and Datasync

## **Container Services in AWS (ECS, ECR, EKS)**

- Introduction to Containers and Amazon Elastic Container Service (ECS)
- Amazon ECS - Features and Use Cases
- Amazon AppRunner
- ECS Anywhere
- Amazon Elastic Kubernetes Service (EKS)
- EKS Distro
- EKS Anywhere
- AWS Porton

## **Notifications, Application Integration, and Messaging Services in AWS**

- Amazon Simple Queue Service - Deep Dive
- SQS Temporary Queues
- Amazon Simple Notification Service (SNS) - Deep Dive
- Amazon MQ and Step Functions
- Amazon AppFlow

## **Management and Monitoring in AWS (CloudWatch, CloudWatch Logs, and EventBridge)**

- CloudWatch and CloudWatch Alarms
- CloudWatch Logs
- Amazon EventBridge (The Successor of CloudWatch Events)

## **Governance, Deployment Automation, and Operations in AWS**

- AWS Organizations
- AWS Control Tower
- AWS CloudFormation
- Elastic Beanstalk
- AWS OpsWorks
- Systems Manager (SSM) and Parameter Store
- Secrets Manager
- AWS Config
- Trusted Advisor
- AWS Health Dashboard and AWS Service Health Dashboard
- Compute Optimizer
- License Manager
- AWS Service Catalog
- Service Quotas
- Amazon Managed Service For Prometheus AMP

## **Security, Identity, and Compliance Services**

- AWS CloudHSM (Hardware Security Module)
- AWS Shield (Standard and Advanced) for DDoS Protection in AWS
- AWS Web Application Firewall (WAF)
- Amazon GuardDuty
- Amazon Inspector
- Amazon Macie
- Amazon Cognito
- AWS Directory Services
- IAM Identity Center (Formerly - AWS Single Sign-On (SSO))
- AWS Audit Manager
- AWS Certificate Manager



- Amazon Detective
- AWS Security Hub
- AWS Firewall Manager
- AWS Network Firewall
- AWS and Defence In-Depth
- KMS Multi-Region Keys

## **Analytics Services in AWS**

- Amazon Redshift Spectrum
- Amazon Elastic Map Reduce (EMR)
- Amazon Athena
- AWS Glue
- Amazon Kinesis Data Streams
- Amazon Kinesis Data Firehose & Data Analytics
- Amazon QuickSight
- AWS Data Pipeline
- Amazon MSK (Managed Streaming For Apache Kafka)
- AWS Lake Formation
- AWS Data Exchange

## **Machine Learning Services in AWS**

- Machine Learning
- AWS Forecast
- Amazon SageMaker
- Amazon Rekognition
- Amazon Polly
- Amazon Lex

- Amazon Connect
- Amazon Transcribe
- Amazon Comprehend & Amazon Comprehend Medical
- Amazon Translate
- Amazon Alexa
- Amazon Kendra
- Amazon Textract
- Amazon Personalize
- Amazon Fraud Detector

## **Mobile and Web Services**

- AWS Device Farm
- AWS Amplify
- AWS AppSync
- Amazon Pinpoint

## **Migration and DR Services**

- Amazon Application Discovery Service
- Elastic Disaster Recovery Service(AWS DRS)
- Application Migration Service(MGN) (CloudEndure migration)
- AWS Database Migration Service (DMS)
- AWS Server Migration (SMS)
- AWS Migration Hub
- AWS Migration Strategies - The 7R's

## AWS - The Well Architected Framework

- The Well Architected Framework

### Additional Services

- Amazon OpenSearch
- Elastic Transcoder
- Amazon AppSync
- Amazon WorkSpaces
- Amazon WorkDocs
- AWS X-Ray
- AWS Resource Access Manager (RAM)
- AWS Cost Explorer
- Cost Management
- AWS Budgets
- AWS Artifact

# Terraform

## Understand infrastructure as code (IaC) concepts:

- Explain what IaC is
- Describe advantages of IaC patterns

## Understand Terraform's purpose (vs other IaC):

- Explain multi-cloud and provider-agnostic benefits
- Explain the benefits of state

## Understand Terraform basics:

- Handle Terraform and provider installation and versioning
- Describe plugin based architecture
- Demonstrate using multiple providers
- Describe how Terraform finds and fetches providers
- Explain when to use and not use provisioners and when to use local-exec or remote-exec

## Use the Terraform CLI (outside of core workflow):

- Terraform format code
- Taint Terraform resources
- Import and reuse of terraform modules
- Terraform workspaces
- Terraform states
- Terraform verbose logging

## Interact with Terraform modules:

- Contrast module source options
- Interact with module inputs and outputs
- Describe variable scope within modules/child modules
- Discover modules from the public Terraform Module Registry
- Defining module version

## Navigate Terraform workflow:

- Describe Terraform workflow
- Initialize a Terraform working directory
- Validate a Terraform configuration
- Generate and review an execution plan for Terraform
- Execute changes to infrastructure with Terraform
- Destroy Terraform managed infrastructure

## **Implement and maintain state:**

- Describe default local backend
- Outline state locking
- Handle backend authentication methods
- Describe remote state storage mechanisms and supported standard backends
- Describe effect of Terraform refresh on state
- Describe backend block in configuration and best practices for partial configurations
- Understand secret management in state files

## **Read, generate, and modify configuration:**

- Demonstrate use of variables and outputs
- Describe secure secret injection best practice
- Understand the use of collection and structural types
- Create and differentiate resource and data configuration
- Use resource addressing and resource parameters to connect resources together
- Use Terraform built-in functions to write configuration
- Configure resource using a dynamic block
- Describe built-in dependency management

## **Understand Terraform Cloud and Enterprise capabilities:**

- Describe the benefits of Sentinel, registry, and workspaces
- Differentiate OSS and TFE workspaces
- Summarize features of Terraform Cloud