سرفصل های آموزشی

پک پیشرفته متخصص Cloud Computing

فهرست سرفصل‌های دوره‌های آموزشی

AWS 2

Microsoft Azure 13

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سرفصل‌های دوره آموزشی

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, Back-up 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

سرفصل‌های دوره آموزشی

Microsoft Azure

Cloud Computing

- Define cloud computing
- Describe the shared responsibility model
- Define cloud models, including public, private, and hybrid
- Identify appropriate use cases for each cloud model
- The consumption-based model
- Compare cloud pricing models
- Describe server-less

The benefits of using Cloud Services

- High availability and scalability in the cloud
- Reliability and predictability in the cloud
- Security and governance in the cloud
- Manageability in the cloud

Cloud Service types

- Infrastructure as a service (IaaS)
- Platform as a service (PaaS)
- Software as a service (SaaS)
- Appropriate use cases for each cloud service (IaaS, PaaS, and SaaS)

The core architectural components of Azure

- Azure regions, region pairs, and sovereign regions
- Availability zones
- Azure datacenters
- Azure resources and resource groups
- Subscriptions
- Management groups
- The hierarchy of resource groups, subscriptions, and management groups

Azure compute and networking services

- Compare compute types, including containers, virtual machines, and functions
- Virtual machine options, including Azure virtual machines, Azure Virtual Machine Scale Sets, availability sets, and Azure Virtual Desktop
- The resources required for virtual machines
- Application hosting options, including web apps, containers, and virtual machines
- Virtual networking, including the purpose of Azure virtual networks, Azure virtual subnets, peering, Azure DNS, Azure VPN Gateway, and ExpressRoute
- Define public and private endpoints

Azure storage services

- Compare Azure Storage services
- Storage tiers
- Redundancy options
- Storage account options and storage types

- Identify options for moving files, including AzCopy, Azure Storage Explorer, and Azure File Sync
- Migration options, including Azure Migrate and Azure Data Box

Azure identity, access, and security

- Directory services in Azure, including Azure Active Directory (Azure AD), part of Microsoft Entra and Azure Active Directory Domain Services (Azure AD DS)
- Authentication methods in Azure, including single sign-on (SSO), multi-factor authentication (MFA), and passwordless
- External identities in Azure, including business-to-business (B2B) and business-to-customer (B2C)
- Conditional Access in Azure AD
- Azure role-based access control (RBAC)
- The concept of Zero Trust
- The purpose of the defense-in-depth model
- The purpose of Microsoft Defender for Cloud

Cost management in Azure

- Factors that can affect costs in Azure
- Compare the pricing calculator and the Total Cost of Ownership (TCO) Calculator
- Cost management capabilities in Azure
- Purpose of tags

Features and tools in Azure for governance and compliance

- Purpose of Microsoft Purview in Azure
- Purpose of Azure Policy
- Purpose of resource locks

Features and tools for managing and deploying Azure resources

- The Azure portal
- Azure Cloud Shell, including Azure Command-Line Interface (CLI) and Azure PowerShell
- The purpose of Azure Arc
- Infrastructure as code (IaC)
- Install & Configure Docker in Azure
- Install & Configure Kubernetes Cluster in Azure
- Azure Resource Manager (ARM) and ARM templates

Monitoring tools in Azure

- The purpose of Azure Advisor
- Azure Service Health
- Azure Monitor, including Log Analytics, Azure Monitor alerts, and Application Insights

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Topic 351: Full Virtualization

351.1 Virtualization Concepts and Theory

Weight: 8

Description: Candidates should know and understand the general concepts, theory and terminology of virtualization. This includes Xen, QEMU and libvirt terminology.

Key Knowledge Areas:

- Understand virtualization terminology
- Understand the pros and cons of virtualization
- Understand the various variations of Hypervisors and Virtual Machine Monitors
- Understand the major aspects of migrating physical to virtual machines
- Understand the major aspects of migrating virtual machines between host systems
- Understand the features and implications of virtualization for a virtual machine, such as snapshotting, pausing, cloning and resource limits
- Awareness of oVirt, Proxmox, systemd-machined and VirtualBox
- Awareness of Open vSwitch

The following is a partial list of the used files, terms and utilities:

- Hypervisor
- Hardware Virtual Machine (HVM)
- Paravirtualization (PV)
- Emulation and Simulation
- CPU flags
- /proc/cpuinfo
- Migration (P2V, V2V)

351.2 Xen

Weight: 3

Description: Candidates should be able to install, configure, maintain, migrate and troubleshoot Xen installations. The focus is on Xen version 4.x.

Key Knowledge Areas:

- Understand architecture of Xen, including networking and storage
- Basic configuration of Xen nodes and domains
- Basic management of Xen nodes and domains
- Basic troubleshooting of Xen installations
- Awareness of XAPI
- Awareness of XenStore
- Awareness of Xen Boot Parameters
- Awareness of the xm utility

The following is a partial list of the used files, terms and utilities:

- in0 (Dom0), DomainU (DomU)Doma
- PV-DomU, HVM-DomU
- /etc/xen/
- xl
- xl.cfg
- xl.conf
- xentop

351.3 QEMU

Weight: 4

Description: Candidates should be able to install, configure, maintain, migrate and troubleshoot QEMU installations.

Key Knowledge Areas:

- Understand the architecture of QEMU, including KVM, networking and storage
- Start QEMU instances from the command line
- Manage snapshots using the QEMU monitor
- Install the QEMU Guest Agent and VirtIO device drivers
- Troubleshoot QEMU installations, including networking and storage
- Awareness of important QEMU configuration parameters

The following is a partial list of the used files, terms and utilities:

- Kernel modules: kvm, kvm-intel and kvm-amd
- /dev/kvm
- QEMU monitor
- qemu
- qemu-system-x86_64
- ip
- brctl
- tunctl

351.4 Libvirt Virtual Machine Management

Weight: 9

Description: Candidates should be able to manage virtualization hosts and virtual machines (‘libvirt domains’) using libvirt and related tools.

Key Knowledge Areas:

- Understand the architecture of libvirt
- Manage libvirt connections and nodes
- Create and manage QEMU and Xen domains, including snapshots
- Manage and analyze resource consumption of domains
- Create and manage storage pools and volumes
- Create and manage virtual networks
- Migrate domains between nodes
- Understand how libvirt interacts with Xen and QEMU
- Understand how libvirt interacts with network services such as dnsmasq and radvd

- Understand libvirt XML configuration files
- Awareness of virtlogd and virtlockd

The following is a partial list of the used files, terms and utilities:

- irtdlibv
- /etc/libvirt/
- virsh (including relevant subcommands)

351.5 Virtual Machine Disk Image Management

Weight: 3

Description: Candidates should be able to manage virtual machines disk images. This includes converting disk images between various formats and hypervisors and accessing data stored within an image.

Key Knowledge Areas:

- Understand features of various virtual disk image formats, such as raw images, qcow2 and VMDK
- Manage virtual machine disk images using qemu-img
- Mount partitions and access files contained in virtual machine disk images using libguestfish
- Copy physical disk content to a virtual machine disk image
- Migrate disk content between various virtual machine disk image formats
- Awareness of Open Virtualization Format (OVF)

The following is a partial list of the used files, terms and utilities:

- u-imgqem
- guestfish (including relevant subcommands)
- guestmount
- guestumount
- virt-cat
- virt-copy-in
- virt-copy-out
- virt-diff
- virt-inspector
- virt-filesystems
- virt-rescue
- virt-df
- virt-resize
- virt-sparsify
- virt-p2v
- virt-p2v-make-disk
- virt-v2v
- virt-sysprep

Topic352: Container Virtualization

352.1 Container Virtualization Concepts

Weight: 7

Description: Candidates should understand the concept of container virtualization. This includes understanding the Linux components used to implement container virtualization as well as using standard Linux tools to troubleshoot these components.

Key Knowledge Areas:

- Understand the concepts of system and application container
- Understand and analyze kernel namespaces
- Understand and analyze control groups
- Understand and analyze capabilities
- Understand the role of seccomp, SELinux and AppArmor for container virtualization
- Understand how LXC and Docker leverage namespaces, cgroups, capabilities, seccomp and MAC
- Understand the principle of runc
- Understand the principle of CRI-O and containerd
- Awareness of the OCI runtime and image specifications
- Awareness of the Kubernetes Container Runtime Interface (CRI)
- Awareness of podman, buildah and skopeo
- Awareness of other container virtualization approaches in Linux and other free operating systems, such as rkt, OpenVZ, systemd-nspawn or BSD Jails

The following is a partial list of the used files, terms and utilities:

- nsenter
- unshare
- ip (including relevant subcommands)
- capsh
- /sys/fs/cgroups
- /proc/[0-9]+/ns
- /proc/[0-9]+/status

352.2 LXC

Weight: 6

Description: Candidates should be able to use system containers using LXC and LXD. The version of LXC covered is 3.0 or higher.

Key Knowledge Areas:

- Understand the architecture of LXC and LXD
- Manage LXC containers based on existing images using LXD, including networking and storage
- Configure LXC container properties
- Limit LXC container resource usage
- Use LXD profiles
- Understand LXC images
- Awareness of traditional LXC tools

Partial list of the used files, terms and utilities:

- dlx
- lxc (including relevant subcommands)

352.3 Docker

Weight: 9

Description: Candidate should be able to manage Docker nodes and Docker containers. This include understand the architecture of Docker as well as understanding how Docker interacts with the node's Linux system.

Key Knowledge Areas:

- Understand the architecture and components of Docker
- Manage Docker containers by using images from a Docker registry
- Understand and manage images and volumes for Docker containers
- Understand and manage logging for Docker containers
- Understand and manage networking for Docker
- Use Dockerfiles to create container images
- Run a Docker registry using the registry Docker image

Partial list of the used files, terms and utilities:

- rddocke
- /etc/docker/daemon.json
- /var/lib/docker/
- docker
- Dockerfile

352.4 Container Orchestration Platforms

Weight: 3

Description: Candidates should understand the importance of container orchestration and the key concepts Docker Swarm and Kubernetes provide to implement container orchestration.

Key Knowledge Areas:

- Understand the relevance of container orchestration
- Understand the key concepts of Docker Compose and Docker Swarm
- Understand the key concepts of Kubernetes and Helm
- Awareness of OpenShift, Rancher and Mesosphere DC/OS

Topic 353: VM Deployment and Provisioning

353.1 Cloud Management Tools

Weight: 2

Description: Candidates should understand common offerings in public clouds and have basic feature knowledge of commonly available cloud management tools.

Key Knowledge Areas:

- Understand common offerings in public clouds
- Basic feature knowledge of OpenStack
- Basic feature knowledge of Terraform
- Awareness of CloudStack, Eucalyptus and OpenNebula

Partial list of the used files, terms and utilities:

- IaaS, PaaS, SaaS
- OpenStack
- Terraform

353.2 Packer

Weight: 3

Description: Candidates should able to use cloud-init to configure virtual machines created from standardized images. This includes adjusting virtual machines to match their available hardware resources, specifically, disk space and volumes. Additionally, candidates should be able to configure instances to allow secure SSH logins and install a specific set of software packages. Furthermore, candidates should be able to create new system images with cloud-init support.

Key Knowledge Areas:

- Understanding the features and concepts of cloud-init, including user-data, initializing and configuring cloud-init
- Use cloud-init to create, resize and mount file systems, configure user accounts, including login credentials such as SSH keys and install software packages from the distribution's repository
- Integrate cloud-init into system images
- Use config drive datasource for testing

Partial list of the used files, terms and utilities:

- cloud-init
- user-data
- /var/lib/cloud/

353.4 Vagrant

Weight: 3

Description: Candidate should be able to use Vagrant to manage virtual machines, including provisioning of the virtual machine.

Key Knowledge Areas:

- Understand Vagrant architecture and concepts, including storage and networking
- Retrieve and use boxes from Atlas
- Create and run Vagrantfiles
- Access Vagrant virtual machines
- Share and synchronize folder between a Vagrant virtual machine and the host system
- Understand Vagrant provisioning, i.e. File and Shell provisioners
- Understand multi-machine setup

Partial list of the used files, terms and utilities:

- vagrant
- Vagrantfile