

Python with aws Introduction

Aws is a cloud platform with many resources available for almost all use cases related to IT industry. Sadly we don't scale up those resources with the click of buttons. We need to use something like Terraform/ CloudFormation/ Serverless / other third party SDKs in real time. In General most of us use Python SDK to communicate between the resources for very common needs. In this course we are going to cover all types of production ready techniques without leaving basics about the resources.

Python Overview

- What is Python?
- The Birth of Python, Python Timeline, Features of Python, Versions of Python

The Python Environment

- Installation of Python, Python Documentation, Getting Help
- Python Editors and IDEs, Basic Syntax, Running a Python Script
- Python Scripts on UNIX/Windows

Getting Started

- Keywords, Data Types, Variables, Naming Conventions, Print(),Type(),Id() Functions
- Input(), Raw_input() functions, Conversion functions, Del Keyword

String Handling

- What is String?
- Single-quoted string literals, Tripe-quoted string literals
- String Indexing, String Slicing
- Working with String Functions, Working with String Methods

Operators

- Arithmetic Operators, Relational Operators, Logical Operators
- Assignment Operators, Short Hand Assignment Operators, Bitwise Operators
- Membership Operators, Identity Operators

Flow Control

- About Flow Control, Conditional Statements (Simple if, if...else, if...elif...)
- Looping Statements (while loop, while ... else, for loop, infinite loop, nested loops)
- Break, Continue, Pass

Sequences

- About Sequences, List, Multi-Dimensional Arrays, Tuples
- Indexing and Slicing, Iterating through a sequence, Functions for all sequences
- Operators and keywords for sequences, The xrange() function, Nest sequences
- List comprehensions, Generator expressions, Yield vs return, Iterators and Generators

Dictionaries and Sets

- About Dictionaries, When to use dictionaries, Creating Dictionaries
- Getting dictionary values, Iterating through a dictionary, Reading file data into a dictionary

- Counting with dictionaries, About sets, Creating sets, Working with sets

Functions

- Defining a function, Calling a function, Function Parameters
- Returning Values, Variables scope, Call by value, Call by reference
- Passing collections to a function, Passing functions to function, Lambda function

Modules

- What is a module?
- Creating user defined module, Setting path, The import statement, Module search path
- From ... Import, Module Aliases, Dir function
- Working with Standard modules (Math, Random, Date and time, Os and sys, String,...)

Packages

- Introduction to Packages, Executing Modules as Scripts, Packages in Multiple Directories
- Fancier Output Formatting, Compiled Python Files, Types of Compiled Python Files
- Compatibility of Compiled Python Files

Errors and Exception Handling

- Syntax Errors,
- What is Exception?,
- Need of Exception handling, Predefined Exceptions, Predefined Exceptions Hierarchy
- Except, try, finally clause, Handling Multiple Exceptions, User defined Exceptions
- Raise, assert statements

File Handling

- Opening a file, Closing a file, Writing data to files
- Reading a data from files, Tell(),Seek() functions, Working with Directories

ADVANCED PYTHON

OOPs concepts

- About OO programming, Defining Classes, Creating object
- Class methods and data, Static methods, Private methods
- Constructors, Destructors, Inheritance
- Types of inheritances, Polymorphism (over loading & over riding), Data hiding

Regular Expressions

- What is regular expression?
- Wild card characters, Forming regular expressions, Character classes
- Quantifiers, Greedy matches, Grouping, Match, Search functions
- Matching vs searching, Sub function, Splitting a string, Replacing text, Flags

Multi Threading

- Defining a thread, Starting a thread, Threading module
- Threads synchronization, Multithreaded priority queue

SECTION1: INTRODUCTION TO CLOUD COMPUTING

- A Short History, Client Server Computing Concepts, Challenges with Distributed Computing
- Introduction to Cloud Computing
- Why Cloud Computing?
- Benefits of Cloud Computing

SECTION2: CLOUD COMPUTING DEPLOYMENT MODELS

- Private Cloud, Public Cloud, Hybrid Cloud

SECTION3: CLOUD DELIVERY/SERVICE MODELS

- **Software as a Service (SaaS), Platform as a Service(PaaS), Infrastructure as a Service (IaaS)**

SECTION4: LINUX BASICS

- Linux basic Commands, Linux basic Administration

SECTION5: INTRODUCTION TO AWS SERVICES

- Amazon Elastic Compute Cloud(EC2)
- Amazon Simple Storage Service (S3)
- Elastic Block Storage (EBS)
- Elastic Load Balancing (ELB)
- Amazon Relational Database Service (RDS)
- Amazon DynamoDB
- Auto Scaling
- Amazon ElastiCache
- Identity and Access Management (IAM)
- Virtual Private Cloud (VPC)
- Cloud Formation
- Simple Email Services (SES)
- Simple Queue Services (SQS)
- Simple Notification Services (SNS)
- Server less computing (Lambda)
- Import/Export (Snowball)
- Code Commit
- Cloud Trail
- Elastic Beanstack
- Cloud Front
- Route-53
- Glacier
- Key Management Service (KMS)

SECTION6: INTRODUCTION TO AWS

- RSubscription to AWS
- Introduction to the AWS Management Console

SECTION7: ELASTIC COMPUTE CLOUD (EC2) ESSENTIALS

- Regions and Availability Zones – Choose the right Region
- Amazon Machine Images (AMI)
- Working with AMIs
- Choosing the right AMI
- Deciding what goes into an AMI
- Finding the right AMI
- Pricing model in EC2 instances
- On-demand, Reserved, Scheduled, Spot instances, Dedicated Hosts
- EC2 Reserved Instance Marketplace
- Importing and Exporting Instances

SECTION8: EC2 INSTANCES

- Building an EC2 Windows instance & Linux Instance
- Bootstrapping with user-data
- Setting up security
- Security with Key Pairs
- Working with the Security Group
- Different IPs assigned to an EC2 instance
- Assigning Elastic IPs
- Login/Access to the instance
- Creating your own custom AMI, Registering & Granting access to the AMI
- Placement groups
- EC2 instance protection
- Instance Roles
- Importing and Exporting Instances
- Elastic Network Interfaces(ENIs)
- Resources and Tags
- Accessing Meta-Data & use cases.

SECTION9: ELASTIC BLOCK STORE (EBS)

- Elastic Block Store (EBS)
- EBS Volume Types
- EBS Encryption
- EBS Performance
- Instance Store volumes
- Instance Stores Available on Instance Types
- Instance Store Usage Scenarios
- Adding Instance Store Volumes to an AMI
- Optimizing Disk Performance
- Creating and deleting volumes
- Attaching and detaching volumes
- Mounting and Unmounting the attached volume
- Increasing the volume size
- Creating snapshots
- Creating Volumes & AMIs from Snapshots.
- Cross-Region snapshot copy & use cases.

SECTION10: ELASTIC LOAD BALANCER (ELB)

- What Is Elastic Load Balancing
- How Elastic Load Balancing Works

- Classic & App ELB types.
- Creating load balancer
- Internal & External Load balancers
- Load balancing protocols
- Listener Configurations
- SSL Negotiation Configurations
- Attach & Detach Subnets
- Security groups for the load balancer
- Configure health check for the load balancer
- Adding multiple instances to the load balancer
- Custom Domain Names
- Cross-Zone Load Balancing
- DNS Failover
- Sticky Sessions
- Monitoring and Logging
- DNS Failover
- Sticky Sessions
- Monitoring and Logging
- Cross-zone load balancing
- Connection Draining
- ELB traffic logging

SECTION11: AUTO SCALING

- What is auto scaling
- Auto scaling components
- Benefits of auto scaling
- Creating launch configuration, and its prerequisites.
- Creating Auto Scaling Groups (ASG)
- Attach & Detach EC2 Instances in ASG
- Configuration of auto scaling policies based on the Load on EC2 instances.
- Using Auto scaling with Elastic Load balancer (ELB).
- Temporarily Removing Instances
- Suspend and Resume Process
- Shut Down Your Auto Scaling Process
- Monitoring Your Auto Scaling Instances
- Health Checks
- Getting Notifications When Your Auto Scaling Group Changes

SECTION12: SIMPLE STORAGE SERVICE (S3)

- Creating and deleting buckets, Adding objects to buckets
- Getting objects, Deleting objects, Notifications
- Uses of S3 storage, Working with Permissions of S3, Access Control, Bucket policy
- S3 Data encryption types, Enable Versioning, Logging for S3 objects
- Lifecycle rules in s3, Accessing S3 storage with Tools
- Hosting a Static Website, Cross-Origin Resource Sharing
- Cross-region replication, Audit Logging with AWS CloudTrail

SECTION13: GLACIER STORAGE

- Creating Vaults, Working with Archives
- Accessing the Glacier vault using tools

- Using Glacier for backups, Job Operations, Data Retrieval Policy Operations

SECTION14: IDENTITY AND ACCESS MANAGEMENT (IAM)

- Creation of user accounts, Setting up multi factor Authentication (MFA)
- Roles in IAM, Groups in IAM, Delegation of permissions for users
- Creation of custom policies for delegation, Using Identity Providers
- Cross-Account Access, Account settings, Credential Report
- Encryption – Key Management Service (KMS)

SECTION15: VIRTUAL PRIVATE CLOUD (VPC)

- Different types of networks that can be setup in AWS
- Creating a custom VPC, NACLs & Security Groups
- Creation of Internet Gateway (IGW), Connecting to instances in the gateway
- Subnets, Route Tables & Association, NAT Instances & NAT-Gateways
- DHCP Options Sets & DNS
- VPC Peering, VPN overview & components

SECTION16: ROUTE 53

- Configuring Amazon Route 53 as Your DNS Service
- Registering a Domain Name and Configuring Amazon Route 53 as the DNS Service
- Migrating DNS Service for an Existing Domain to Amazon Route 53
- Creating a Subdomain That Uses Amazon Route 53 without Migrating the Parent Domain
- Working with Public Hosted Zones
- Working with Private Hosted Zones
- Working with Resource Record Sets
- Health Checks and DNS Failover
- Creating, Updating, and Deleting Health Checks
- Transferring a Domain from a Different AWS Account or Registrar
- Using IAM to Control Access to Amazon Route 53 Resources

SECTION17: CLOUD WATCH

- Debugging cloud related issues
- Monitoring the AWS Service Health Dashboard
- Monitoring with Cloud watch
- Getting statistics for a specific EC2 instance
- Getting aggregated statistics
- Metrics for other AWS Services and related namespaces
- Setting up notifications

SECTION18: SIMPLE NOTIFICATION SERVICES (SNS)

- Creation of a topic
- Subscribing to topic via Email
- Setting notification for EC2 instance changes

SECTION19: SIMPLE QUEUE SERVICE (SQS)

- Creation of a queue
- Sending messages to the queue
- Sending SNS to SQS
- Retrieving messages from SQS

SECTION20: SIMPLE EMAIL SERVICES (SES)

- Setting up email domain
- Limits of SES
- Test Email setup

SECTION21: ELASTIC BEANSTALK

- Creation of Web-App using Elastic Beanstalk
- Building a sample application using Beanstalk
- Modifying the properties of the deployment.

SECTION22: RELATIONAL DATABASE SERVICE (RDS)

- DB Instances
- Selecting the DB-Engine
- Configuring the Database Server
- Creating your Database
- Setting up automatic backups, snapshots & restores
- Authorizing access to the DB with RDS Security Groups
- DB Instance Replication
- Security: Using IAM to Manage Access to Amazon RDS Resources
- RDS Limits
- Managing MySQL Database server
- DB Instance Life Cycle: Renaming a DB Instance
- Deleting or Rebooting a DB Instance
- Working with Storage Types
- Upgrading a DB Instance
- Working with Option Groups & DB Parameter Groups
- Working with Reserved DB Instances
- Monitoring
- Database Log Files

SECTION23: CLOUD FRONT

- How CloudFront Delivers Content
- Working with Distributions
- Working with Web Distributions
- Working with Objects
- Request and Response Behaviour
- Serving Private Content through CloudFront
- Using an HTTPS Connection to Access Your Objects
- Using IAM to Control Access to CloudFront Resources
- Monitoring CloudFront Activity Using CloudWatch



Python with AWS

SECTION24: ELASTICACHE

- ElastiCache Terminology and Concepts
- Backup and Restore
- Clusters Explanation (Memcached and Redis)
- CloudWatch Metrics with ElastiCache
- Managing ElastiCache
- Managing Replication Groups
- DNS Names and Underlying IP

SECTION25: CLOUD FORMATION

- Building AWS infrastructure as a code
- Utilization of Sample templates
- Introduction to JSON

SECTION26: USE CASES

- Cloud Architecture Best Practices
- Cost Optimization
- Security Considerations
- Cost Calculation
- AWS CLI & use case to check instance, ELB, EBS states
- Building a simple web application in the AWS cloud
- Certification Track & guidance