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DEVOPS with AWS Course Details

Batch Date: June 5th @6:00PM

Faculty: Mr. Maha (15+ Yrs of Exp,..)

Duration: 4 Months

Venue :
DURGA SOFTWARE SOLUTIONS,
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Syllabus:

DEVOPS

Model 1: Continues Integration and Continues Delivery

- Git
- Jenkins
- Maven
- Jfrog
- SonarQube

Model 2: Configuration management

- Vagrant
- Chef

Model 3: Configuration Management

- Ansible

Model 4: Containerization

- Docker
- Kubernetes

Model 5: Infrastructure Automation

- Terraform

Model 6: Monitoring

- Elastic search
- Kibana
- Log stash
- Nagios

Why DevOps:

- Business Perspective
- IT Perspective
- Developer Perspective
- Tester Perspective
- Operations Perspective

What is SDLC:

- Phases of SDLC
- Role of Dev in SDLC
- Role of Ops in SDLC

Introduction to DevOps Automation:

- Introduction
- Tools
- DevOps Technology Categories
- Collaboration
- Planning
- Issue Tracking
- Configuration Management
- Source Control
- Dev Environments
- Continuous Integration
- Continuous Testing
- Continuous Deployment
- Monitoring

Linux Essentials:

- History
- Types of OS
- Flavours
- OS Structure
- File system
- All Linux basic commands
- File & directorys persmisions
- User & groups administration
- Accessing Servers with ssh
- How multi user works in Linux
- How make normal user as sudo user.

Shell Script:

- Introduction
- Type of shells
- Variables
- Types of variables
- Operators
- Input arguments
- String comparison
- Athematic comparison
- File conditions
- If, loops, case, functions
- Examples

Virtualization:

- Introduction
- What is Virtualization
- Server Virtualization
- Desktop Virtualization
- Application Virtualization

Apache Webserver:

- Installations
- Configuration

Tomcat Application Server:

- Installation, configuration
- Tomcat Manager
- Application Management
- Application Deployment

DevOps Tools

Model 1: Continues Integration and Continues Delivery

Source Code Management:

What is Version Control System?

Git:

- Source Code Management
- SCM Tools
- What is Git
- Installation
- Work space/ work dir/ work tree
- Configuration
- Commit/check-in
- Version/version-ID/commit-ID,
- Work space, staging area, buffer area
- Local Repo/remote repo
- Customer Branching
- Release Branching
- Merge, stash, fast-forwarding, rebase
- Chery-pick, cat-file and hocks
- Repositories and Tracking

- **Git Commands:** add, commit, log, push, status, ignore, branch, checkout merge, confict, stash, reset, revert
- Git GUI

Automate Build Process:

Maven:

- Introduction, Maven Structure
- Maven Dependenciess
- Maven Repositories
- Maven Plugins and goals
- Integrated Maven Build
- Maven project

Jenkins:

What is Jenkins?

Installation and configuration

- Prerequisitesd
- Download and installation
- Configuration.

Managing Jenkins

- Securing Jenkins, Managing Credentials, Plugin Management
- Jenkins Backup, Create a Build Slave

Creating Application Builds

- Manual compilation with Maven
- Manually Testing, Packaging and Running the App
- Creating a Jenkins Job and configuring a Git Repo
- Compiling in Jenkins
- App Packaging in Jenkins
- Archiving artifacts
- Cleaning up Past Builds
- Build time trend
- The jenkins Dashboard
- Troubleshooting build failures
- Build linking upstream and downstream

Plugins

- Introduction
- Plugin Architecture
- Extension Points
- Getting Plugins
- Useful Plugins Overview
- Build Tool Plugins
- Installing a plugin
- Plugin configuration
- Security Overview

Continuous Testing and Continuous Integration and Testing

- Adding steps to Freestyle Project
- Creating a Pipeline job to execute Maven
- Archiving in a Pipeline
- Checking out git repository in pipeline
- The Master Agent Model
- Allocating a node and workspace in Pipeline
- Triggering Automated Builds
- Configuring an Email Server
- Notifications when a build fails
- Executing unit tests

Finding and Managing Plugins

- The need for plugins
- Integrated Code Coverage
- Assessing a plugin
- Testing Plugins and Plugin Types

Building Continuous Delivery Pipeline

- Continuous Delivery
- Backup and Restore
- A Second Node Allocation
- Adding an Agent Node
- Setup parallel integration testing in a pipeline
- Executing and Monitoring Parallel pipelines
- Setup Deployment to staging
- Executing a Deployment pipeline
- Checkin pipeline script to Git

Master and Slave Configuration

Integrating Jenkins with jfrog and sonarqube

Model 2: Configuration / Provisioning

CHEF:

Introduction to Chef

- What is Chef
- Common Chef Terminology
- Chef Serverand Workstation
- Chef-Client
- Server and Nodes
- Chef Configuration Concepts
- Run_list

Setting up the Environment

- Intro to ChefDK
- Chef Workstation Setup

Chef Server

- Installing Chef Server
- Chef-Repo, Setting Up the Work Station, and Bootstrapping A Node
- Configuring Git
- Chef Client, Nodes and Run Lists
- Building A Quick Apache Cookbook
- Managing Node Run_Lists
- Chef-Client Configuration

Resources

- Understanding Chef and Chef Convergence
- Common Chef Resources
- Default Resource Actions
- Working with not_if and only_if Guards

Recipes and Cookbooks

- Understanding Chef Recipes and Run Lists
- Understanding Chef Cookbooks
- Generating a Cookbook
- Cookbook Pro-Tips

Local Cookbook Development Basics

- Test Kitchen Configuration
- Using Test Kitchen
- Static Code Analysis
- Troubleshooting

Building Web & application server Cookbook

- Getting Setup
- Starting the Apache Recipe
- Adding Platform Support to the Cookbook
- Adding Local Chef-Repo to Github
- Install and configure Chef Reporting
- Node Object and Search
- What is Node Object
- Writing cookbook & recipes for webserver
- Writing cookbook & recipes for tomcat application server

Attributes:

- Node Attributes
- Type of Attributes
- Attributes presidency

Environments

- Chef Environments
- What are Environments and why do they matter
- Creating and Configuring Environments
- Deploying to Different Environments
- Viewing and Environments with Knife

Roles

- What are Roles
- Creating A web server Role
- Creating Db Server Role
- Creating a Base Role

Chef Supermarket

- Chef Supermarket

Vagrant:

Introduction

- What is Vagrant
- Virtualization Overview

Setting Up Vagrant

- Virtual Box Installation
- Vagrant Installation

Using Vagrant

- Vagrant Machine
- Vagrant Files
- Boxes
- Running Vagrant Machines
- SSH to Vagrant Machine
- Synced Folders
- Environment Management

Automated Provisioning

- Provisioning
- Installing Apache /Shell Script
- Installing Apache /Chef

Networking

- Private Networking
- Public Networking

Model 3: Configuration / Provisioning

Ansible:

Introduction

- What is Ansible
- Change Management
- Provisioning
- Automation
- Orchestration
- Why use Ansible
- YAML
- Built in Security
- Extendable
- Conclusion

Architecture and Process Flow

- Architecture Introduction
- System Requirement
- Components Overview
- Process of Execution
- Conclusion

Setup and Configuration

- Test Environment Setup
- Download and Installation
- Ansible Configuration File
- The HOSTS File
- Overriding the Default HOSTS File
- Overriding the Default System Ansible.Cfg File
- Overriding the Default Roles Path
- Understanding the core components of Ansible
- Ad-hoc commands in Ansible

Ansible Inventory and Configuration

- Introduction to Inventory &Configuration
- Inventory Fundamentals
- Scaling out with Multiple Files
- Ansible Configuration Basics

Ansible Playbooks

- Ansible Command Line
- Our First Playbook
- Variables: Inclusion Types
- Target Section
- Variable Section
- Task Section
- Handler Section
- Outlining Playbook

- Create a Playbook from Outline
- Optimizing Playbook
- Taking Playbook for a Dry Run
- Simple Variable Substitution
- Loops
- Conditionals
- Vault
- Basic Include Statements
- Tags
- Basic Error Handling
- Includes - Breaking Your Playbook Into Discrete Plays
- Starting At Task or Stepping Through All Tasks
- Passing Variables Into Playbooks at the Command Line
- Using Jinja2 Templates
- Use a playbook to copy a program and customize it for the target host.
- Wiring Play books for java, webservers and applications server

Ansible Modules

- Introduction
- Ansible Modules Fundamentals
- Module Docs
- Yum Module
- Setup Module
- Other modules

Create and use templates to create customized configuration files

- Introduction
- Templates

Working with Ansible facts and variables.

- Let see how we get ansible facts and how we use facts
- Using Ansible facts
- Using variables to gather server info

Roles

- Introduction to Roles
- Role Basics
- Creating Role
- Ansible Galaxy
- Roles - The Directory Structure
- Role Based Tasks
- Task Order - Pre and Post Tasks
- Roles - Conditional Execution
- Roles - Variable Substitution
- Roles - Handlers
- Roles - Configuring Alternate Roles Paths
- Roles - Conditional Include Statements
- Roles - Waiting For Events
- Roles - Executing a Task Until
- Roles - Using Tags
- Roles - Breaking a Playbook Into a Role
- Roles - Passing Variables from Command Line
- Roles - Using Jinja2 Templates
- Roles - LocalAction
- Roles - Lets create a role to install apache.
- Lets use the previous role and add a new one.
- Lets build on the previous role
- Create Role for installing tomcat on multiple nodes
- Create Role for deployapplication on multiple nodes

Model 4: Containerization

Docker:

- Introduction
- What is Docker
- Docker Life Cycle
- How Docker Containers working

Installing Docker

- Installing Docker on Linux

Working with Containers

- How to create the containers
- Docker commands
- Theory of pulling and Running Containers
- Working with images
- Container Life cycle
- Dockerfile
- Build Docker images
- Docker push
- Docker compose

- Docker volumes
- Docker cpu
- Docker memory
- Docker Networking

Kubernetes

- What is kubernets
- Purpose of Kubernets
- How kubernets works
- Master components, how works
- Node Compenents, how works
- How pods works
- Installations and configuration kubernets cluster
- Pod lifecycle
- Work with pods
- Work with Services
- Work with Replica controller
- Work with Deployment
- How to Releases java application by using RC and Deploy
- KOPS

Model 5: Terraform

Infrastructure Automation

- What is Infrastructure as Code and why is it needed?
- Declarative vs Procedural tools for Infrastructure as Code
- Infrastructure as Code in the Cloud
- Requirements for infrastructure provisioner
- Deploying First Server
- Preparing work environment
- Terraform providers
- Configuring AWS provider e. Creating EC2 instance with Terraform
- Working with state
- Handling resource updates

Resource Dependencies and Modules

- Creating AWS Virtual Private Cloud
- Controlling dependencies with depends_on and ignore_changes
- Making sense of our template
- Removing duplication with modules
- Configuring modules
- Retrieving module data with outputs
- Using root module outputs

Storing and Supplying Configuration

- Understanding variables
- Configuring data sources
- Exploring Terraform configuration resources
- Taking a quick look at Consul

Model 6: Monitoring

System Monitoring: Nagios

- Installation of Nagios
- Configuring Nagios
- Monitoring with Nagios

Application Monitoring: ELK

- Installation of Elasticsearch, logstash, Kiban stack
- Configuring the ELK Stack
- Monitoring logs with ELK

Amazon Web Services

Model 7: Elastic Cloud Computing (EC2)

- EC2
- EBS (Elastic Block Storage)
- CLB (Classic Load Balancer)
- ALB (Application Load Balancer)
- Cloud Watch
- SNS (Simple Notification Service)
- Auto Scale
- Route53
- EFS (Elastic File Storage)
- EC2 CLI
- EC2 Cloud Formation
- Price optimization

Model 8: Networking (VPC)

- Basic Networking
- VPC (Virtual Private Cloud)
- Subnet
- Rout table
- NAT
- SG (Security groups)
- NACL (Network Access Control Lists)
- Peering connection
- Transit Gateway
- VPN (virtual private network)
- Cloud Formation
- VPC CLI
- VPC Cloud Formation
- Price optimization

Model 9: Storage and Permissions (S3, IAM)

- S3
- Storage Classes
- Version
- Object Lifecycle
- Statistic webhost
- Glacier
- IAM users
- IAM groups
- IAM roles
- IAM Policies
- S3 CLI
- Price optimization

Model 10: Database (RDS)

- RDS (Relation Database Services)
- Replica
- MAZ (Multi Available Zone)
- Private RDS
- Dynamo DB
- RDS CLI
- DMS (Data Migration Services)
- Elastic Cache
- Price optimization

AWS Introduction

Model 7: Elastic Compute Cloud (EC2)

- EC2 Basics
- Amazon Machine Images (AMIs)
- Instance types
- Elastic Block Store (EBS)
- Security Groups
- IP Addressing
- Launching and using an EC2 instance
- EC2 Essentials
- Understanding Reserved Instances
- Selecting and Building EC2 Instances
- Working with public and private IP Addresses
- Cloud-init User data and Metadata
- Cloud Watch and EC2
- EC2 Placement Groups o Serving Traffic to Private Web Servers

EBS (Elastic Block Storage)

- Hard disk Basics
- EBS Types
- EBS vs Instance Storage

EBS Volumes And Snapshots:

- Working with Elastic Block Storage
  - Understanding AWS Storage Types
  - Increasing IOPS Performance
  - Configuring Optimized Instances
- EBS Snapshots and Replication
  - EBS Snapshots Characteristics
  - Working with Snapshots in the AWS Management Console
- AWS Command Line Interface
  - Working with EC2 using CLI
- EC2 Troubleshooting Scenarios

Elastic File Storage

- Demonstrate ability to create backups for different services
- Overview of Backup Services on AWS and Services that Include Backups
- Creating and Scripting Automation for EC2 Snapshots

Load Balancing Basics

- OSI Network Layer
- Load Balancing
  - Classic Load Balancer
  - Application Load Balancer
- Auto Scaling Groups
- Target Groups
- Health Checks

Simple Notification Service (SNS)

- Introduction
- SNS Topics
- SNS Subscriptions and SNS Subscription Protocols
- SNS Push Notifications

Cloudwatch

- Creating Cloud Watch Alarms for EC2 Monitoring
- Creating custom cloudwatch metrics
- Configuring Alarms

Monitoring and Metrics

- Understanding AWS Instance types, Utilization and Performance
- EC2 Instance and System Status Checks
- Creating Cloud Watch Alarms
- Installing and Configuring Monitoring Scripts for EC2 Instances
- Dedicating an instance to monitoring
  - Monitoring EBS for performance and availability

CloudTrail

- CloudTrail Workflow
- Concepts
- CloudTrail Log Files

Auto Scaling:

- Basics
- Using Auto Scaling
- Auto Scaling Troubleshooting scenarios
- Auto Scaling Features
- How Auto Scaling Works
- Configuring Auto Scaling

Route 53:

- Route 53 Basics
- Using Route 53
- Route 53 and DNS Failover
- Weighted Routing Policies In Route 53
- Configuring DNS with Route 53
  - Where we are in the reference architecture
  - The role of DNS in a distributed cloud system
  - Using Route 53 with ELB, CloudFront, S3
  - Configuring Route 53
  - Route 53 Best Practices

Billing:

- AWS Billing and linking AWS Accounts
- AWS Billing Dimensions and metrics for Cloud Watch
- Cost Optimizing
- Using the AWS Price List API and Cost Explorer

AWS EC2 CLI:

- Creation and management of EC2 resources using CLI

Model 8: Virtual Private Cloud (VPC)

- AWS Global Infrastructure
- VPC Basics
- Internet Gateways (IGW)
- Route Tables (RTs)
- Network Access Control Lists (NACLs)
- Subnets o Availability Zones
- Introduction to VPC and AWS Networking o Building A VPC From Scratch
  - VPC Networking
  - VPC Security
- Configuring a NAT Instance
- DB Subnet Groups
- Elastic IP Addresses and Elastic Network Interfaces
- Configure a Web Application In VPC
- Extending the VPC to On-Premise Networks
- VPC Peering o Troubleshooting scenarios
- Network and Data Security o Network Monitoring with Flow Logs

Extending On-Premise Networks with VPN:

- Using Directory Service to Connect Hybrid Architectures
- Security Zones
- Understanding AWS IP Subnet Reservations
- Hybrid Cloud AWS
  - Overview
  - AWS Hybrid Cloud Scenario
  - Network Integration in to AWS VPC
    - Best Practices
    - AWS VPC Wizard Creation
    - Creating an OpenVPN Instance for Client Connections

Cloud Formation:

- Cloud Formation Essentials
- Creation and deployment of VPC Using Cloud Formation

Billing:

- Cost Optimizing

AWS VPC CLI:

- Creation and management of VPC resources using CLI

Model 9: S3, IAM

Simple Storage Service (S3)

- S3 Basics
- Buckets and objects
- Storage Classes
- Object Lifecycles
- Permissions
- Object Versioning
- S3 Essentials
- S3 Bucket/Object Versioning and Policies
- Website Hosting with S3
- AWS Command Line Interface
  - Working with S3 using CLI
- Introduction To S3 Developer Requirements
- Creating a static hosting Website with S3
- S3 IAM & Bucket Policies

Glacier:

- Overview
- Introduction to Glacier
- Creating a Glacier Vault
- Storing Archives in Glacier
- Understanding Glacier's Retrieval Pricing
- Restoring Archives from Glacier

Billing:

- Cost Optimizing

AWS S3 CLI:

- Creation and management of s3 resources using CLI

Identity Access Management (IAM)

- What is IAM
- Create User
- Create Groups
- Roles
- Polices
- Custom polices
- Create/Set an IAM Policy for an IAM User

Model 10: Relational Database Service (RDS) Dynamo DB

RDS:

- Overview
- Essentials
- Working with RDS
- Subnet Groups
- Security Options
- RDS Security Groups and Connecting to RDS from EC2
- Monitoring RDS for performance and availability
- MySQL and Maria DB on RDS
- Replica & MAZ
- Private RDS

Amazon Dynamo DB:

- Getting Started with Dynamo DB
- Local and Global Secondary Indexes

- Dynamo DB overview and Limits
- Dynamo DB Multi-Region Replication

Database Migration Service

- How AWS DMS Works
- Security Setup
- Replication Instance
- Endpoints
- Tasks
- Migrating Mysql
- Migrating Microsoft SQL Server

Elastic Cache

- Caching Overview
- Memcached
- Redis
- Clusters
- Backups

Billing:

- AWS Billing and linking AWS Accounts
- AWS Billing Dimensions and metrics for Cloud Watch
- Cost Optimizing o Using the AWS Price List API and Cost Explorer

AWS CLI

- Creation & Managing EBS & EFS using CLI
- Creation and Management of DB Services using CLI