DevOps Training

The DevOps Plus course takes a comprehensive look at the discipline that covers all key concepts, methodologies, and tools, regardless of your understanding of the IT technologies and practices. Starting with a foundational introduction to DevOps, it covers the concepts of virtualization, its benefits, and the many virtualization products that play a significant role in both learning and implementing the DevOps culture. You'll also learn about DevOps tools such as Vagrant, Version Control Systems, Docker, Containerization, and Configuration Management with Chef, SaltStack, Puppet, and Ansible.

This course focuses on both mid-level and advanced concepts, including open-source monitoring application Nagios, its plug-ins, and its use as a GUI. The CI/CD Pipeline Automation covers the Advanced DevOps concepts that are covered in detail along with Docker container clustering using Docker Swarm and Kubernetes.

Curriculum

Introduction to Devops

Course Duration – 60 hrs.

Defining Devops

- What is Devops?
- SDLC models – Lean, ITIL, Agile
- Why Devops?
- History of Devops
- Devops stakeholders
- Devops goals
- Important terminology
- Devops perspective
- Devops and Agile
- Devops tools
- Configuration management
- Continuous integration and deployment

Introduction to virtualization

- What is Virtualization?
- History of Virtualization
- What is Hypervisor?
- Types of Server Virtualization
- Benefits of Virtualization
- Important Virtualization products

VAGRANT

- Introduction
- Why (and what) is Vagrant
- Uses of Vagrant in an environment
- Alternatives of Vagrant
- Vagrant versions
- Installation and Configuration
- Installing VirtualBox
- How to install Vagrant on Windows
- Configuring Vagrant
- Provisioning with Vagrant
- Creating your first VM with Vagrant
- Operations on the VM
- Connecting to the VM
- Add required images to Vagrant
- Using Vagrant

GIT: Version Control

- Introduction
- Version control systems
- Local, centralized and distributed
- Installing Git
- Installing on Linux
- Installing on Windows
- Initial setup
- Git essentials
- Creating repository
- Cloning, Check-In, and Committing
- Fetch, Pull and Remote
- Branching

Docker – Containers

- Introduction
- What is a Docker
  - Use-Case of Docker
  - Platforms for Docker
  - Dockers vs Virtualization
- Architecture
  - Docker architecture
  - Important Docker components
  - Understanding the Docker components
- Installation
  - Installing Docker on Linux

    - Understanding installation of Docker on Windows
    - Some Docker commands
- Provisioning
    - Docker Hub
    - Downloading Docker images
    - Running Docker images
    - Running commands in Container
    - Running multiple containers
- Custom images
    - Creating a custom image
    - Running a Container from the custom image
    - Publishing the custom image
    - Docker networking
    - Accessing Containers
    - Linking Containers
    - Exposing Container ports
    - Container routing
    - Docker compose

Chef for configuration management

Chief overview

- Common Chef terminology (Server, Workstation, Client, Repository, etc.)
- Servers and Nodes
- Chef configuration concepts
- Workstation setup
- How to configure Knife
- Executing commands to test connection between Knife and Workstation
- Organization setup
- Creating Organizations
- Adding yourself and Nodes to Organizations
- Testing Node setup
- Creating Servers and adding to Organizations
- Checking Node details using Knife
- Node Objects and Search
- Adding Run List to Node
- Checking Node details
- Introduction to environments in Chef

SaltStack for configuration management

- Salt overview
- Salt terminologies
- Master and minions
- Salt configuration concepts
- Salt access control
- Salt job management
- Salt package manager
- Salt working example
- Salt logging

Puppet for configuration management

- What is Puppet?
  - How does Puppet work?
  - Puppet architecture
  - Master and Agents
  - Configuration language
  - Resource abstraction layer
  - Transactional layer
- Installation and Configuration
  - Installing Puppet
  - Configuring Puppet master and Agent
  - Connecting Agents
- Puppet Master
  - Puppet configuration tree
  - Puppet configuration files
- Puppet language basics
  - The Declarative language
  - Resources
  - Resource collectors
  - Virtual resources
  - Exported resources
  - Manifests
  - Relationships and Ordering
  - Modules and Classes

  - Class parameters
  - Defined Types
- Advanced Puppet language concepts
  - Factor
  - Variables
  - Conditional Statements
  - IF – ELSE
  - Case and Selectors
  - More Conditionals and Logic
  - Resource Relationships
- Templates
  - Static contents explosion
  - Using Dynamic content with Templates
  - Templates overview
  - ERB
- Example Of Code Manifests/Modules
  - NTP Module
  - Users Module
  - SSH
  - Sudo

Ansible

- Introduction To Ansible
- Ansible architecture
- Ansible terminology
- Ansible commands
- Adding Nodes to server
- Ansible installation and configuration
- Installing SSH on Nodes
- Generating Keys
- Components of Ansbile
- Inventory
- Configuration
- Modules
- Playbooks
- Global configuration
- Roles
- Tags

- Writing Playbooks
- PYYAML overview
- Ansible modules
- Ansible Rroles
- Ansible galaxy
- Download Playbooks from Galaxy
- Real time Playbooks

Nagios: Monitoring

- Introduction and Installation
  - Obtaining Nagios
  - Compiling and installing Nagios
- Basic configuration
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  - Creating a new host and service
  - Creating a new email contact
  - Verifying configuration
  - Creating a host group and service group
  - Creating a new contact group
  - Creating a new time period
- Plug-ins and Commands
  - Finding and installing a plug-in
  - Removing a plug-in
  - Creating a new command
  - Customizing commands
- Using Nagios GUI
  - Scheduling downtimes
  - Generating reports
  - Configuring notification
  - Configuring checks
  - Managing flapping
- NRPE monitoring
  - Enabling remote execution
  - Monitoring local services on a remote machine with NRPE
  - Setting the listening address for NRPE
  - Setting allowed client hosts for NRPE
  - Creating new NRPE command definitions securely

  - Creating a custom NRPE script

Jenkins – Continuous Integration

- Introduction
  - Understanding Continuous Integration
  - Introduction about Jenkins
  - Build Cycle
  - Jenkins architecture
- Installation
  - Obtaining and installing Jenkins
  - Installing and configuring GIT
  - Java installation and configuration
  - Maven installation
  - Exploring Jenkins dashboard
  - Creating Jobs
  - Running Jobs
  - Adding and updating plug-ins
  - Disabling and deleting Jobs
- Build Deployments
  - Understanding Deployment
  - Tomcat installation and configuration
  - Deployment plug-ins
  - Deploying a .war file from Jenkins to Tomcat
  - Securing Jenkins

- **How to integrate Jenkins with Ant**
- **How to integrate Jenkins with Maven**
- Authentication
- Jenkins plug-in
- Authorization
- Confidentiality
- Creating Users
- Best practices for Jenkins
- **Jenkins parameterized build**
- **Environment inject plug-in**
- **Use of Jenkins environment variables**
- **Deploying a specific revision**
- **Customizing the Jenkins UI**

- **Project-based matrix plug-in**
- **Parallel execution**
- **Configuring Jenkins hub and Node in the Cloud (AWS)**
- **Configuring a Selenium desktop node with a Linux server (AWS)**
- **Case Study**
- **Real-time implementation of automated rollback**
- **Multi-branch deployment**

Docker Container Clustering using Docker Swarm

- Need for Clustering
- Setting up and initializing Swarm
- Managing Docker Swarm
- Backup and Recovery
- Managing services
- Docker Compose
- Deploying application Stack on Docker Swarm

Docker Container Clustering using Kubernetes

- Introduction
- Kubernetes ecosystem: Community, contributions, governance, and integrations
- Kubernetes architecture
- Kubernetes networking and services
- Kubernetes users tools
- Configuring and deploying an application on Kubernetes

Advanced DevOps (CI/CD Pipeline Automation)

- Jenkins Blue Ocean
- PipeLine as code
- End-to-end CI/CD pipeline automation
- Automated code deployment from repository to server with configuration management

DevOps on Cloud

- Introduction to Cloud Computing
- Cloud Services and Models
- Why DevOps on Cloud?
- Introduction to AWS
- Using AWS in DevOps
- AWS Services and Models
- DevOps using AWS