



DEVOPS Course – 424 Hours

Course summary

Sometimes you end up working on projects that just don't go well. Distractions, no focus, impossible to develop. Shifting requirements, brutally hard to test, non-stop bugs.

What is DevOps, really? In this course, we look the problems faced by today's R&D and IT departments and how a DevOps transformation can help focus on value and streamlined delivery.

This course is a full and comprehensive course for developers that wish to become an expert in the latest devops methodologies and tools

we will first start by examining why devops role is so important for fast delivery of software today, and continue by learning the principles of what is continuous integration and how we can take it to the next step of continuous delivery.

The rest is going to be a lot of practical information, showing you how to take that DevOps mindset and actually do DevOps using various tools and technologies

we will cover in git and maven in dept, and then go through the world of micro services focusing on micro services solutions using java and spring boot.

Testing our software is crucial for having a good working software , we will learn how to implement unit and automation testing on our software using best practices.

once we have a deep understanding for how to create micro services that communicate with each other , we will continue by learning how to deploy CI/CD with Jenkins 2 as an orchestration

tool together with groovy as a programming language enabling us to create pipeline as code.

we will cover Ansible framework as mean to help us provision machines whether is is on premise or on the cloud.

focusing on amazon as the most popular cloud provider , we will walk through the most popular AWS services, and learn the best practices of using them.

containerized solutions are king citizens when it comes to fast deployment and fast delivery, we will learn in depth how to create image and containers using docker, and how to orchestrate them using

kubernetes.using kubernetes , we will start by creating local cluster and then we will learn how to use kubernetes on Amazon EKS.

Audience

- software developers with at least 1 year of experience with one or more software languages and platform
- IT managers with a strong familiarity with scripting languages like python ,perl , bash or something similar ,and basic understanding of software development lifecycle
- Automation developers who wish to expand their knowledge and skill set

Topics

Introduction to devops

- What is devops
- The need for Devops
- Making a Devops Transition
- The Agile Manifesto Problems that devops solves
- Continuous Integration Continues Delivery
- Tools and Processes

Linux Fundamentals

- Users and Permissions
- Uses and Groups
- Understand the difference between root and normal user
- Becoming root with su
- Sudoers
- Executing commands with sudo
- Configuring /etc/sudoers
- Package Managers
- Yum package manager
- Repositories Management
- Installing from repository
- Installing from RPM file
- Systemd

Bash Scripting

- A first look on shell scripts
- Variables
- if, then, else
- Input and output
- Control flow
- Handling Script Parameters
- Shell Functions
- Using Strings
- Running scripts

Python Fundamentals

- Getting Starting With Python
- Strings and Collections
- Modularity
- Objects
- Collections
- Handling exceptions
- Iterables
- Classes
- Files and Resource Management
- Shipping Working and Maintainable Code
- Creating a Productive Python Environment
- Managing the File System with Python
- Interacting with the Linux System
- Combining Python with Other Tools
- Manipulating Strings in Python
- Processing Text and Binary Files

Git Fundamentals

- What is version control?
- What is Git
- Git architecture
- Creating Git repository
- Committing changes
- Using branches
- Creation, deletion
- Merging strategies
- Rebase
- Merge
- Cloning repositories
- Pushing changes to remote repo
- Synchronizing with a remote repository
- Working with pull requests
- Using the stash for temporary changes
- Undoing changes
- Rewriting history
- Feature branches
- Git flow

Maven

Introduction to Maven:

- Why Another Build Framework?
- Maven Principles
- Maven Architecture
- Installation & Configuration
- IDE integration

Maven core:

- POM Explained
- Working with Artifact Repositories
- Project Structure
- Managing Dependencies
- Using Profiles
- Creating Sites
- JEE and Maven

Introduction to microservices

- introduction to microservices
- software development lifecycle
- monolith architecture
- what are micro services
- distributed services
- scalability and availability
- monitoring
- deployment

Jenkins 2 fundamentals

- Setting up Jenkins
- Installing and Running Jenkins
- jenkins security
- Creating Application Builds
- Anatomy of the Build
- 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
- The Jenkins Dashboard
- Troubleshooting Build Failures
- Anatomy of the Job
- Testing and Continuous Integration
- Continuous Integration
- Creating a Pipeline Job to Execute Maven
- Archiving in a Pipeline
- Checking out a Git Repository in a Pipeline
- Changing Directories in a Pipeline

- The Master Agent Model
- Allocating a Node and Workspace in a Pipeline
- High-level Progress with Pipeline Stages
- Triggering Automatic Builds
- Notifications When a Build Fails
- Visualizing Test Results
- jenkins plugins
- overview of jenkins plugins
- Integrating Code Coverage
- Installing the HTML Publisher Plugin
- Publishing HTML Reports
- Testing Plugins and Plugin Types
- Building Continuous Delivery Pipelines
- Starting Point and Pipeline Stashing
- A Second Node Allocation
- Adding an Agent Node
- Setup Parallel Integration Testing in a Pipeline
- Executing and Monitoring Parallel Pipelines
- Manual Approval for Deployments
- Setup Deployment to Staging
- Executing a Deployment Pipeline
- Jenkinsfile - Checking the Pipeline Script into VCS

Ansible

Inventory and ad-hoc commands:

- Static inventory
- Dynamic inventory
- Using Ansible and Using Ad-hoc Modules
- Inventory variables
- Host variables
- Group variables
- Hands-on session

Playbooks:

- Anatomy of a Playbook
- YAML Syntax
- Anatomy of a Task
- Module and its Arguments
- Testing your playbook (dry run)
- Popular Modules
- Amdocs yum_secure module
- Hands-on session

Advanced Playbooks:

- Variables
- Play variables
- Variable files
- Extra variables
- Using variables in playbooks
- Basic variables
- Lists
- Dictionaries
- Compound variables
- Registering output of tasks in variables

- Facts
- Conditions
- Loops
- Handlers
- Hands-on session

Structuring Best Practices:

- Structuring playbooks
- Includes
- Variable includes
- Play includes
- Task includes
- Dynamic vs Static includes
- Hands-on session

Roles:

- Introduction to roles
- Building Simple roles
- Invoking Roles from playbooks
- Ansible Galaxy
- Using Ansible Galaxy Roles in Playbooks

Docker

Intro:

- The problem domain
- How Docker works
- Linux namespaces
- cgroups
- Docker vs VM
- Docker architecture
- Installing Docker

Containers:

- Running containers
- 3rd party containers
- Logging
- Logging
- Managing containers

Volumes:

- Mounting volumes to a container
- Managing volumes
- Listing
- Deleting
- Using data containers

Building images:

- Dockerfile syntax
- FROM, ADD, RUN, CMD ..
- Build configuration
- Image caching
- Managing Docker images

- Tagging
- Publishing to registry
- Deletion

Docker compose:

- Docker compose syntax
- Services
- Build definitions
- Inheritance
- Networking
- Docker-compose cli api

Docker swarm:

- Clustering Docker containers
- Swarm architecture
- Managers
- Workers
- Building a swarm cluster
- Publishing a service to Docker swarm
- Service discovery
- Load balancing

Hands on Terraform

- Deploying Your First Terraform Configuration
- Updating Your Configuration with More Resources
- Configuring Resources After Creation
- Adding a New Provider to Your Configuration
- Using Variables in Deployments
- Using Modules for Common Configurations

Mastering the aws ecosystem

High level overview of AWS Cloud Computing

- Why Cloud Computing?
- Benefits of Cloud Computing
- Concerns when running applications in the cloud
- High level overview of the AWS services (EC2, ELB, VPC, DBs)
- SLAs
- Tools for AWS
- AWS Regions

Identity and Access Management (IAM)

- Intro to IAM
- IAM Users and Groups
- Roles
- Credentials
- Permissions and Policies

S3 – Simple Storage Service

- S3 – 101
- Creating a bucket
- Versioning
- CloudFront CDN overview
- Creating static website using S3
- Permissions
- Encryption
- Using the AWS cli for S3

Deploying your code to EC2

- EC2 instances
- Creating and managing EC2 instances
- Connecting to your EC2 machine
- Building your own AMI (Amazon machine image)
- Using the AWS cli for EC2

Handling Scale

- Loadbalancers
- Autoscaling
- Lambda

Route53

- Overview of DNS
- Register your domain
- Routing policies

VPC

- Introduction and overview
- Building a custom VPC
- NAT
- Logs

Monitoring

- Using CloudWatch
- CloudTrail

Kubernetes

Intro

- The problem domain
- How Docker works
- Linux namespaces
- cgroups
- Docker vs VM
- Docker architecture
- Installing Docker

Understanding basic Kubernetes Concepts

- An overview of images and containers
- Pods
- Labels & Selectors
- Replica Sets (and Replication Controllers)

Using Deployments to manage your services declaratively

- Update management and update strategies
- Deploy multiple revisions
- Blue/green deployment
- Canary release strategies
- Audit releases (event log)

Services

- How services work
- Load balancing
- Virtual service IP
- Abstract away backends (simple local database/external database)
- Talking to services
- Environment variables
- DNS (A cluster addon)
- Headless services

Secrets and ConfigMaps

Daemon Sets and Jobs

- Communicate with daemons
- Push
- NodeIP
- DNS
- Service
- Jobs types
- Non-parallel
- Parallel and fixed completion count
- Parallel with a work queue
- Kubernetes in the cloud
- understanding different cloud vendor support for kubernetes
- implementing kubernetes cluster on amazon using aws EKS