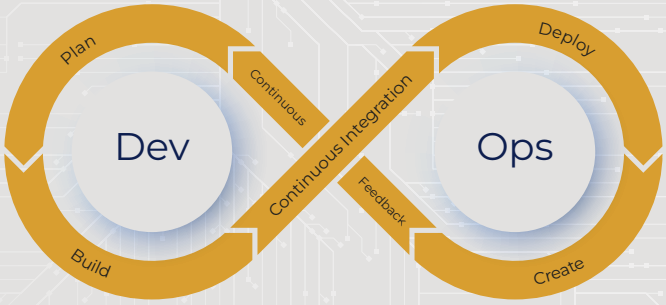
DEVOPS

Linux
git
docker
kubernetes
ANSIBLE
HashiCorp Terraform
GitLab
aws



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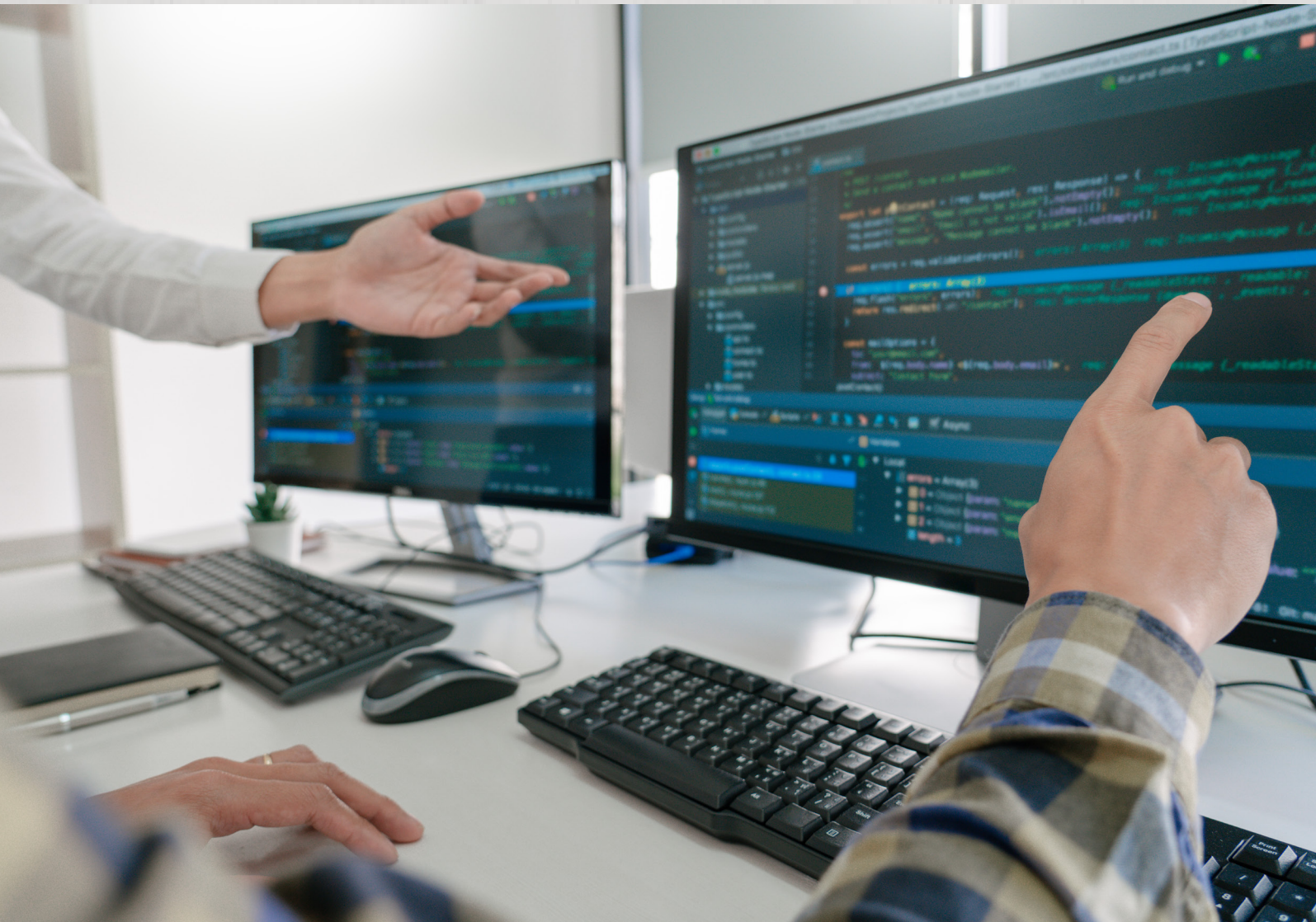
About the Course

DevOps training program will provide you with in-depth knowledge of various DevOps tools, including Git, Jenkins, Docker, Ansible, Terraform, Kubernetes, Prometheus, and Grafana. This DevOps certification course is entirely hands-on and designed in a way to help you become a certified practitioner through best practices in Continuous Development, Configuration Management, Continuous Integration, and finally, Continuous Monitoring of software throughout its development life cycle.



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Know How !

DevOps

Pick a language

It can be anything from: Python, Go, JavaScript, Ruby, Rust, c, c++.
Main Purpose is automation.

OS Concepts

Important Topics: I/O managment, memory, file system, networking, sockets, threads, and etc.

Learn Terminal

Get familiar with linux (Ubuntu for example), Unix (OpenBSD), bash scripting, Vim/Nano/PowerShell

Networking

Learn about HTTP, HTTPS, FTP, SSL, TLS, SSH, Port Forwarding, Security, and etc.

Learn to setup

Revers Proxy, Forward Proxy, Firewall, Caching Server, Load Balancer, Web Server(Nginx).

Infrastructure

Service Mesh (Consul, Istio), Docker, Kubernetes, Configuration Management (Ansible), Terraform.

Cloud Providers

Learn to use: AWS, Google Cloud, Alibaba Cloud, Digital Ocean, Azure, Linode, Heroku, Vultr.

CI / CD Tools

Gitlab CI, Jenkins, Github actions, Circle CI, Azure DevOps service, Travis CI, TeamCity.

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Learning Path

Stage 1 — Linux & Git

Stage 2 — Docker

Stage 3 — Kubernetes

Stage 4 — Kubernetes

Stage 5 — Automation

Stage 6 — CI / CD

Stage 7 — CI / CD

Stage 8 — AWS

Stage 9 — AWS

Stage 10 — Continuous Monitoring

Stage 11 — Project 1
DevOps for PHP laravel stackLabs

Stage 12 — Project 2
DevOps for Pyhton Django stack

Project 3
DevOps for Nodejs stack

12 Stages **24** Sessions **28** Workshops **3** final projects

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Stage 1 2 3 4 5 6 7 8 9 10 11 12

Linux & Git

Session 1

- Linux History
- Linux Distributions and differences
- Linux scope for devops
- Linux Directory structure
- Linux Volumes
- Linux Networking

Session 2

- Linux Services / Process
- Linux Security
- Linux working with files
- Linux file / dir permissions
- Linux install and update packages
- Linux Cron jobs
- Shell and Bash script overview

Workshop 1

- Install Ubuntu 20.04 with LVM
- Extend LVM space
- Install Nginx and allow port on firewall
- Configure nginx file
- Deploy static website on nginx

Workshop 2

- Deploy Nextcloud App [Nginx - PHP - Mysqldb] on ubuntu 20.04
- Configure nginx to serve Nextcloud App
- Check permissions on Nextcloud dir
- Create bash script to Back nextcloud Files and Mysqldb on AWS S3
- Create Cronjob to daily Auto-back Nextcloud App , DB day at 3:00 AM

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Stage 1 2 3 4 5 6 7 8 9 10 11 12

Docker

Session 1

- Docker Overview
- Containerization vs Virtualization
- Docker Architecture
- Docker Build / Ship / Run
- Docker Hub

Workshop 1

- Install docker on Ubuntu 20.04
- Discover docker architecture
- Run sandbox container
- Run bash cli command inside docker container

Session 2

- Dockerfile
- Docker Images
- Docker Networks
- Docker Volumes
- Docker Inspect

Workshop 2

- Create Dockerfile for Nodejs
- Build Nodejs image
- Push image to dockerhub
- Run Nodejs container and expose port

Session 3

- Docker Compose
- Dcoker stack intro
- Docker Swarm intro

Workshop 3

- Install docker compose
- Build Docker compose file for Wordpress App
- Expose http port 80 to nginx conatiner
- Add volume to mysqldb
- Start up compose and down then check data

Workshop 4

- Init docker Swarms
- Build Docker stack for Wordpress App
- Expose http port 80 to nginx services
- Add volume to mysqldb
- Deploy stack
- Discover swarm services , stacks and logs
- Undeploy stack then redeploy stack and check data

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Stage 1 2 3 4 5 6 7 8 9 10 11 12

kubernetes

Kubernetes

Day 1 Implementation

Session 1

- Container Orchestration
- Kubernetes vs Docker swarm
- Kubernetes Architecture
- Kubernetes Resources
- Kubernetes Pods / Deployments

Workshop 1

- Install Micro k8s
- Install k8s Dashboard
- Describe Kube-system K8s compnents

Session 2

- Kubernetes StatefulSets
- Kubernetes DaemonSets
- Kubernetes ConfigMap
- Kubernetes Secrets
- Kubernetes ServiceAccount
- Kubernetes CustomResource

Workshop 2

- Create Web UI app Angular 10 yaml
- Deploy Angular 10 deployment
- Add SVC loadbalancer to access UI

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Stage 1 2 3 **4** 5 6 7 8 9 10 11 12

kubernetes

Kubernetes
Day 2 Implementation

Session 1

- Kubernetes Multi-nodes Architecture
- Multi-nodes Communications
- Master / Node roles
- Node placement preferences
- Kubernetes Networks
- Kubernetes Services
- Kubernetes ingress Controller

Session 2

- Kubernetes Volumes
- Kubernetes Nfs
- Kubernetes rook.io Ceph storage
- Kubernetes Auto-Scaling
- Kubernetes Self-healing
- Kubernetes liveness/ Readiness

Workshop 1

- Install Multi-node Architecture
  1 Master / 2 Nodes
- Install Weave network & CoreDNS
- Install Dashboard

Workshop 2

- Implement Rook.io Ceph
- Run Mysql DB deployment with volume Ceph PVC
- Manage volumes
  [Create / Delete /Snapshots]

Workshop 3

- Create YAML file for PHP laravel stack
  [Nginx / VueJs / PHP / Redis / Mysqldb]
- Deploy PHP laravel stack on k8s cluster

Workshop 4

- Add 3 replica PHP-backend deployments
- Manage auto-scale PHP-backend deployments
- Add healthcheck to Nginx / php / mysql deployment
- Rollout PHP image Using CongfigMap.
- Rollback PHP image using cli .
- Auto-backup PHP laravel stack with volumes on AWS s3

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Stage 1 2 3 4 **5** 6 7 8 9 10 11 12

Automation
[Ansible - Terraform]

Session 1

- Automation Overview
- Why devops using Automation
- Automation vs Orchestration
- Automation tools
- Ansible Overview

Session 2

- Install Ansible
- Connet Ansible to hosts
- Manage Network , Services on hosts using Ansible playbook

Session 3

- Terraform Overview
- Install Terraform
- Discover Terraform Resources and Providers
- Discover Terraform with Gitlab
- Discover Terraform with Kubernetes
- Discover Terraform with AWS

Workshop 1

- Install Kubernets Multi-node using Ansible.
- Deploy PHP laravel Stack on K8s using Ansible playbook
- Roll-out Laravel App new release on K8s using Ansible playbook

Workshop 2

- Configure Terraform with AWS provider
- Create Ec2 linux instance using Terraform YAMl file
- Deploy docker on EC2 linux using Terraform
- init docker swarm using Terraform
- Deploy Nodejs app docker stack on EC2 using Terraform
- Create Snapshot from EC2
- Terminate Ec2

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Stage 1 2 3 4 5 **6** 7 8 9 10 11 12

Jenkins

CI / CD
Pipeline Jenkins

Session 1

- Could Computing Overview
- AWS overview
- Check Node Status
- AWS vs Azure vs GCP

Session 2

- Discover AWS Services
- AWS VPC
- AWS IAM / Route53 / CloudWatch / SNS / SQS
- AWS EC2 Instances / EBS / AMI
- AWS EC2 Network & Security

Session 3

- AWS S3 Overview
- AWS S3 Bucket Management [properties / permissions]
- AWS S3 Access Points
- AWS CloudFront

Session 4

- AWS RDS Overview
- AWS RDS DB Engines
- AWS RDS features
- AWS Aurora Serverles

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Stage 1 2 3 4 5 **6** 7 8 9 10 11 12

Jenkins

CI / CD
Pipeline Jenkins

Workshop 1

- Create AWS Account
- Create EC2 ubuntu instance
- Install docker on ubuntu instance
- Deploy Wordpress using docker compose
- Configure Security group to access Wordpress APP

Workshop 2

- Use EFS to share wordpress uplods files
- Create Auto-Scaling Group with ELB
- Configure Auto-Scaling Group from 1 to 10 instance based on CPU usage
- Use CloudWatch to monitor CPU for all instance and number of instance

Workshop 3

- Create RDS Aurora Serverless mysql DB
- Edit Wordpress env to connect Aurora Serverles
- Create Auto-backup for Aurora Serverless mysql DB

Workshop 4

- Create S3 bucket to store Wordpress users upload files
- Configure S3 Bucket properties & permissions
- Create CloudFront and configure Wordpress to use CDN
- Use CloudWatch to show S3 insights

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Stage 1 2 3 4 5 6 **7** 8 9 10 11 12

Session 1

- AWS ECS - Elastic Container Service
- AWS ECR - Elastic Container Registry
- AWS ECS Task Definitions
- AWS Fargate Serverless compute for containers
- AWS Fargate deploy and manage applications

Session 2

- AWS Fargate scale container workloads
- AWS Fargate Optimize Costs
- AWS EKS - Elastic Kubernetes Service
- AWS EKS configure VPC, ALB, EC2 Kubernetes worker nodes
- AWS EKS scale based on workloads
- AWS EKS application migration

Session 3

- AWS Lambda Overview
- AWS Lambda layers
- AWS Lambda step function Overview
- AWS Lambda step function serverless workflows

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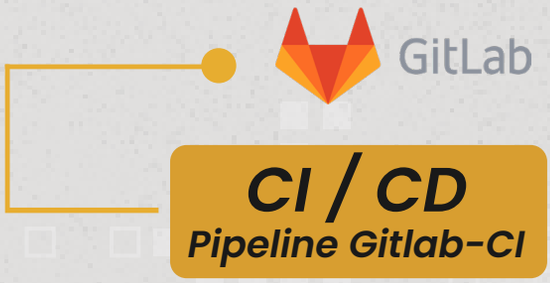
Stage 1 2 3 4 5 6 **7** 8 9 10 11 12



Workshop 1

- Create ECR container registry
- Push Nginx , wordpress php , mysql db to ECR
- Create ECS Task Definitions for wordpress
- Deploy wordpress using ECS

Workshop 2

- Create Fargate Task Definitions for wordpress
- Deploy wordpress using Fargate
- Scale serverless container
- Discover difference between scale in ECS and Fargate

Workshop 3

- Create EKS Cluster with 2 node worker
- Write PHP laravel stack YAML for EKS
- Deploy laravel stack YAML using EKS
- Configure CloudWatch for EKS Monitor

Workshop 4

- Create python 3.7 lambda function
- Use Lambda function to detect uploads on S3 Bucket on specific extension
- Trigger function when upload finish and copy S3 fles to another S3 bucket

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Stage 1 2 3 4 5 6 7 **8** 9 10 11 12

Session 1

- CI / CD pipeline overview
- Discover CI stages and jobs
- Discover CD stages and jobs
- Jenkins Overview
- Jenkins plugins

Session 2

- Jenkins Maven
- Jenkins Agents
- Jenkins file
- Jenkins System Administration
- Jenkins Pipeline and Blue Ocean
- Jenkins intgeration with Github / Sonarqube / Kubernetes

Workshop 1

- Install Jenkins on ubuntu 20.04
- Integrate jenkins with github repo
- integrate jenkins with sonarqube
- Configure jenkins agents / runners

Workshop 2

- Create jenkins file
- Build pipeline for PHP laravel stack
- Build CI stages [Pre-commit checks - Lint testing - Buid app -Unit testing]
- Build CD stages [Build master branch - Deploy on staging - Deploy on Production]

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Stage 1 2 3 4 5 6 7 8 **9** 10 11 12

Session 1

- Gitlab Overview
- Gitlab Administation
- Gitlab Projects / Repositories / Merge requests
- Agile with GitLab

Session 2

- Gitlab Registry [Package / Container]
- Gitlab Deployments [Releases / Tags]
- Discover Gitlab CI pipeline Stages and Jobs
- Discover Gitlab CD Stages pipeline and Jobs

Workshop 1

- Create PHP laravel Project on gitlab .
- Configure Shell and docker Runners
- Add Gitlab-ci, Changelog , gitignore and env file

Workshop 2

- Build CI stages [Pre-commit checks - Lint testing - Buid app -Unit testing]
- Build CD stages [Build master branch - Deploy on staging - Deploy on Production]
- Check Review APP and Env Deployment after CD process

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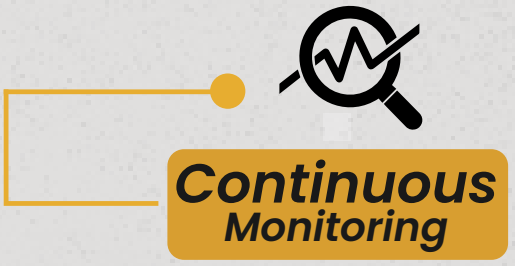
Stage 1 2 3 4 5 6 7 8 9 10 11 12



Session 1

- Monitoring tools overview
- Installation Elasticsearch, Logstash and Kibana
- ELK integrate to kubernetes
- ELK integrate to Gitlab

Session 2

- Prometheus & Grafana Overview
- Installation Prometheus & Grafana
- Prometheus & Grafana integrate to kubernetes
- Prometheus & Grafana integrate to Gitlab

Workshop 1

- Install ubuntu 20.04
- Install ELK
- Integrate to kubernetes

Workshop 2

- Install ubuntu 20.04
- Install Prometheus & Grafana
- Integrate to kubernetes

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Stage 1 2 3 4 5 6 7 8 9 10 11 12

- Build baseline for project [Diagram and process steps]
- Design two architecture for CI process and CD Process
- Create docker files for PHP laravel stack [Nginx - Vuejs- PHP - artisan- composer - Mysqldb]
- Build images for PHP laravel stack
- Create PHP laravel stack docker compose file for developers env
- Create PHP laravel stack K8s YAMl file for staging and production
- Build runners using Shell - docker - kubernetes
- Add runner to gitlab runners
- Create repo on gitlab and push all files
- Create milestone with issues to simulate MR workflow
- Create gitlab-ci file with CI [Pre-commit checks - Lint testing - Buid app -Unit testing]
- Add CD stages on gitlab-ci file [Build master branch - Deploy on staging - Deploy on Production]
- Simulate developer workflow with merge request and track changes and pipeline on gitlab
- Simulate CD process from update master , Releasing with artifacts , update staging and update production

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Stage 1 2 3 4 5 6 7 8 9 10 11 12

- Build baseline for project [Diagram and process steps]
- Design two architecture for CI process and CD Process
- Create docker files for Python django stack [Nginx - Python django - pip - postgresdb]
- Build images for Python django stack
- Create Python django docker compose file for developers env
- Create Python django K8s YAMl file for staging and production
- Create repo on gitlab and push all files
- Create milestone with issues to simulate MR workflow
- Create gitlab-ci file with CI [Pre-commit checks - Lint testing - Buid app -Unit testing]
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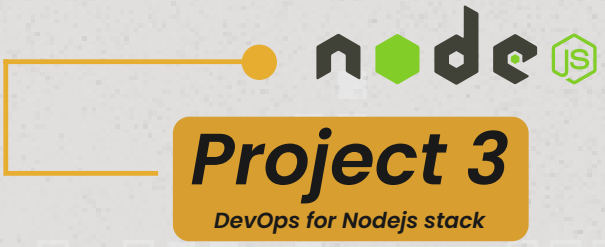

- Build baseline for project [Diagram and process steps]
- Design two architecture for CI process and CD Process
- Create docker files for Nodejs stack [Nginx - Nodejs - npm - Mysqldb]
- Build images for Nodejs stack
- Create Nodejs docker compose file for developers env
- Create Nodejs K8s YAMl file for staging and production
- Create repo on gitlab and push all files
- Create milestone with issues to simulate MR workflow
- Create gitlab-ci file with CI [Pre-commit checks - Lint testing - Buid app -Unit testing]
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