DevOps E. Degree Syllabus

Since 2005

Dev-Ops E. Degree Syllabus = HLD

Note: Landmarker-→Dev-QA—PreProd---Production/Engineer

1) We are offering Hands on Training from basic (no prior IT knowledge) to advanced and expert working knowledge in all the topics mentioned below.
2) Soft copy materials and Interview Questions will be provided.
3) Realtime Use Case Scenarios
4) Resume Preparation and Job Assistance.
5) **Do not share Landmark Resources – Videos/ClassLinks/**
6) Refundable Fee $20,000USD --
7) non-Refundable discounted **Fee $3,000 for Class41**
8) $100,000 fees for Pharmacology --

1) DevOps Introduction

- Software Development Life Cycles (SDLC)
  Waterfall Model
- Agile Methodology
  Scrum Model---
  ITERATIONS
- What is DevOps?
- Why DevOps? Automation
- DevOps Importance
- DevOps Model
- DevOps Life cycle

- ❖ Market Trend and Career Scope for DevOps -,→
- ❖ DevOps Tools

2) Linux – 3 – 27 hours

- ❖ Installing Pre-requisite software's (SSH Tools and FTP Tools) in Desktop/Laptop.
- ❖ Create an account in AWS.
- ❖ Create EC2 Instance in AWS.
- ❖ Understand Linux Command Line.
- Linux File/Directory structure.
- Linux Commands

mkdir	cat	service	userdel	Uname
Is	head	uptime	groupdel	cat /etc/*releases
tree	Tail	last	crontab	watch
cd	more	ps	ssh	netstat
pwd	less	kill	scp	exit/logout/ctrl+d
rmdir	sort	top	rsync	Uname
touch	tr	sar	ssh-keygen	cat /etc/*releases
find	sed	zip	ssh-cpy-id	watch
umask	grep	unzip	awk	netstat
chmod	who	tar	cut	exit/logout/ctrl+d
chown	w	useradd	free	Uname
chgrp	whoami	passwd	dmidecode	Uname
cp	whereis	chage	mail	cat /etc/*releases
mv	date	groupadd	clear	watch
rm	df	usermod	cal	netstat
file	du	id	wget	exit/logout/ctrl+d
WC	hostname	lid	tee	Uname
In	ipconfig	SU	script	cat /etc/*releases
vim	man	sudo	ping	watch
nano	help	users	telnet	netstat
echo	info	groups	history	exit/logout/ctrl+d

2. Shell Scripting - 1 – 2 weeks - 40 commands 7%

- Introduction
- What is Shell?
- Types of Shells
- What is Shell Scripting?
- First Shell Script program

mkdir	cat	service	userdel	uname
Is	head	uptime	groupdel	cat /etc/*releases
tree	tail	last	crontab	watch

- File Naming Conventions
- Comments
- Variables
- Command line Arguments
- Escape Characters
- String
- Arithmetic Operations
- User Interaction using read command
- Input and Output Redirection
- Control commands - if
- Control commands - for
- Control commands - while loop
- Control commands - Switch case
- Functions
- Pipe

3) Git and GitHub - Versioning - Developers – 12 hours

- What is Git?
- What is the VCS?
- What is SCM?
- What is Branch? = code review
- What is Tag?
- Git Administration.
- Git commands
- Working with git from a Developer perspective
- SSH Key generation
- PAT creation
- Cloning Repositories / fork
- Merging Branches
- Branching strategy
- Best practices for Releases/Code commits in any VCS

4) Maven – 4 hours

- Introduction
- Features & Benefits of Maven

- Installation (Maven Environment Setup)
- Directory Structure
- Content of pom.xml
- Maven Repositories
- Maven Life Cycles
- Executing some Examples
- Maven Multi Modules
    - Parent pom
    - Child pom
    - Maven Profiles

5) Tomcat / JBoss /

- Introduction
- Difference between App server and Web server
- Understating of Web Servers, App Servers and DataBase Servers
- Installation (In Windows - Extraction, In Linux Installation)
- Directory structure
- Start the Tomcat server
- Users creation
- Stop the server
- Roles
- Port number change
- Application Deployment
    - Through Admin Console
    - Copy artifact into webapps folder
- Tomcat Tuning
- Data source Creation

6) Apache HTTP Server

- Introduction
- Installation
- Directory Structure
- Start the HTTP server
- Deploy the web static application.

7) SonarQube

- Introduction

- Pre-Requisites
- Architecture
- Installation
- Change the Port Number
- Execution
- Administration
  - Users Creation (Normal User and Administrator)
  - Project Creation
  - Project deletion
  - Token Generation
  - Create Quality Profiles
  - Create Quality Gates
  - Configure Email settings

8) Nexus

- Introduction
- Installation
  - Password and Email change for Admin User
  - Email server Configuration
  - Port Number Change
  - Context root change
- Nexus Directory structure
- Create the Repositories
- Integrate the Maven with Nexus
- Create Users

9) Jenkins

- **Introduction**
  - Continuous Integration (CI)
  - Continuous Delivery (CD)
  - Continuous Deployment (CD)

- **Installation**
  - In Linux Server
- **Create the Maven Project using Freestyle Project type**

- Integrate Maven software if not done.
- Integrate Nexus with Jenkins
- Integrate SonarQube with Jenkins
- Deploy the App into Tomcat
- Through "Deploy to container" plugin
- Through Script - SSH Agent Plugin
- Configure Email Functionality
- Poll SCM
- Build Periodically
- Git Web Hooks
- Discard Old Build
- Disable this project
- Delete workspace before build starts
- Add timestamps to the Console Output
- JACOCO plugin

- **Jenkins Directory structure**

- **Create the Maven Project using Maven Project type**

- **Plugin Management**
  - Safe Restart
  - Next Build Number
  - Email Extension
  - SonarQube Scanner
  - Schedule Build
  - Artifactory Plugin
  - Cloud Foundry
  - Blue Ocean
  - Deploy to container
  - Deploy WebLogic
  - Maven Integration
  - JACOC
  - SSH Agent
  - Publish Over SSH

  - Thin Backup
  - Build Name Setter
  - Convert To Pipeline
- **External Plugins Installation**
  - Urban Code Deploy

- **Port Number Change**

- **Build with parameters**
- **Create View**
- **Jenkins Security**
  - Create Users (Default Adrnin)
  - Provide the specific access Jenkins
  - Provide the access to specific access to specific projects

    - **Create the Pipeline Project Jobs**

      http:/!localhost:8080/env-vars.html/

- **Create the Multibranch Pipeline Project Jobs**
- **Create Master/Slave**
- **Jenkins Backup**
- **Jenkins Migration**
- **Optional Topics**
  - Jenkins Horne Directory Change in RHEL 7.5 Version
  - Jenkins CLI
  - Integrate the Urban Code Deploy server with Jenkins
  - Deploy the App into IBM Cloud
  - Slack integration

10) Docker – 18 hours

- Docker Introduction
- Containerization Vs Virtualization
- Docker Vs Virtual Machine
- Docker Installation

- Dockerfile
- Dcoker Image
- Docker Container

- Docker Adhoc Commands
- Docker Networks
- Docker Volumes
- Docker Keywords
- Dockerfile Creation
- Docker Images creation
- Docker Images save to Dockerhub
- Docker Private Repo
- Docker Compose
- Docker Swarm

11) Kubernetes - 27 hours - CKA

- Kubernetes Introduction
- Architecture
- Kubernetes Cluster (Self-Managed) Setup Using Kubeadm.
- Kubernetes Namespace
- Kubernetes Objects
  - POD
  - Replication Controller
  - Replica Set
  - Daemon Set
  - Deployment
    - Rolling Update Recreate
    - Blue Green
  - Stateful Set
  - Service
    - ❖ ClusterIP
    - ❖ NodePort
    - ❖ Load Balancers
  - Volumes
  - Persistent Volume
  - Persistent Volume Claim
  - Dynamic Volumes
  - Config Maps & Secrets
- HPA & Metrics Server
- Kubernetes Cluster Setup in AWS Using KOPS

- EKS Kubernetes Cluster Setup Using Terraform
- Load balancer Service
  - ❖ Network LB
  - ❖ Application LB
  - ❖ HAProxy
- Ingress Controller & Resource
- Liveness & Readiness probes
- Kubernetes RBAC
- Kubernetes & Jenkins Integration
- Kubernetes Dashboard Setup
- Helm
- Monitor Kubernetes Using Prometheus And Grafana.

12) Ansible

- Introduction
- Architecture
- ssh-key generation
- Copy SSH Key
- Ansible adhoc Commands
- Ansible Playbooks
- Execution of Ansible Playbooks
- Ansible Modules
- Ansible Variables, Group/Host Variables
- Loops & Conditions
- Roles
- Ansible Vault
- Ansible Galaxy
- Dynamic Inventory

13) Cloud Computing with AWS and Security

- Cloud & AWS – Cloud Infrastructure Engineer
  - ❖ Managed and Self-Managed Infrastructures
  - ❖ IaaS
  - ❖ PaaS
  - ❖ SaaS

- Elastic Compute Cloud (EC2)
  - Introduction to Amazon EC2
  - Launch Our First EC2 Instance - Part 1
  - Launch Our First EC2 Instance - Part 2
  - How to use Putty (Windows Users Only)
  - Security Groups
  - EC2 Instance User Data.
  - Summary of EC2 Section
  - Amazon Machine Instance (AMI)
  - Elastic IP (EIP)
- EBS
  - Volumes
  - Snapshots
- EFS
- Simple Storage Service (S3)
- o S3 Essentials
  - Creating S3 Buckets Using The Console and CLI
  - S3 Storage Options and Types
  - Create an S3 Website
  - S3 Version Control
  - Cross Region Replication
  - S3 Lifecycle Management & Glacier
  - S3 – Security, Snowball & S3 Summary

- Elastic Block Store (ELB)
  - What is ELB and it's uses
  - ELB Policies and it's benefits
  - How to launch ELB with N nodes and other concepts on ELB.
- Auto Scaling
  - Launch Configurations
  - Scaling Polices
  - Demo with Dynamic Scaling
  - Integrate Autoscaling with ELB.

- Virtual Private Cloud (VPC)
  - VPC Overview
  - Building our own custom VPC
  - Build A Custom VPC - Part 2
  - Network Address Translation (NAT)
  - Access Control Lists (ACLs)
  - Custom VPC's
  - VPC Clean Up
  - VPC Summary

- Identity Access Management (IAM)
  - Introduction of IAM
  - Users
  - Groups
  - Roles
  - Policies
  - Permissions

- AWS CLI Setup

15) Monitoring Tools (New Relic)

- Introduction
- Creating Synthetic Monitors
  - Ping
  - Simple Browser
  - Scripted Browser
  - API Test

- Creating Channels
- Creating Alerts
- Integrating with Slack

Addon Tools

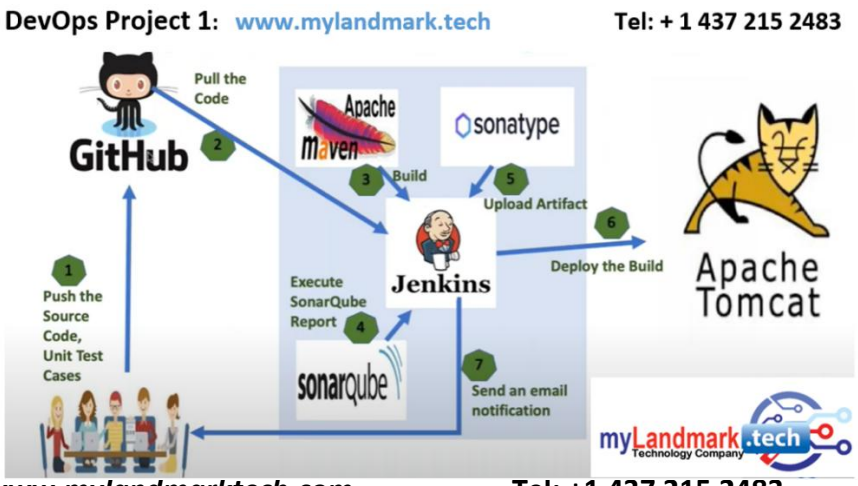
16) MySQL
17) Cloud Foundry
18) IBM Cloud

19. Infrastructure as a code (IaaC) with Terraform

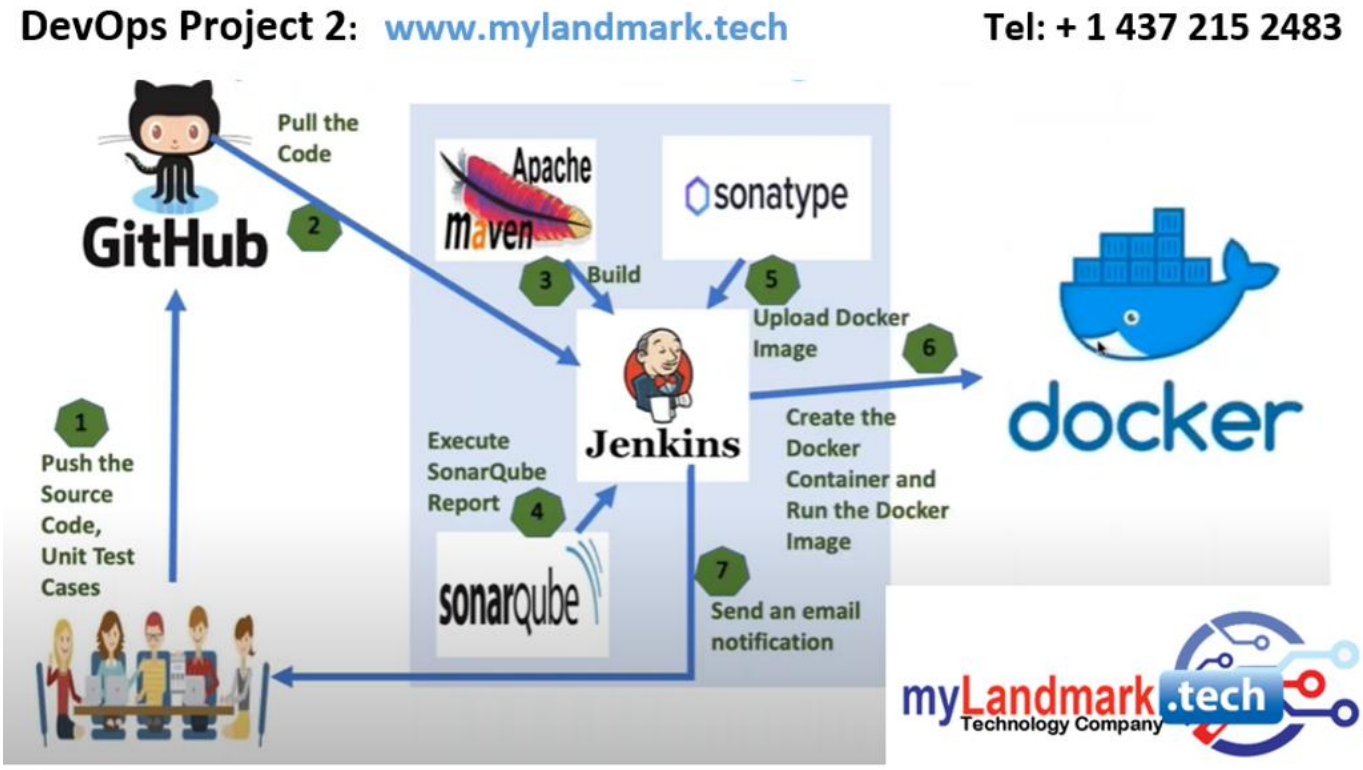
- ❖ What is Terraform
- ❖ Importance of Terraform over other IaaC tools
- ❖ Terraform installation on Windows and Linux
- ❖ Infrastructure automation using Terraform and Ansible

20. Projects

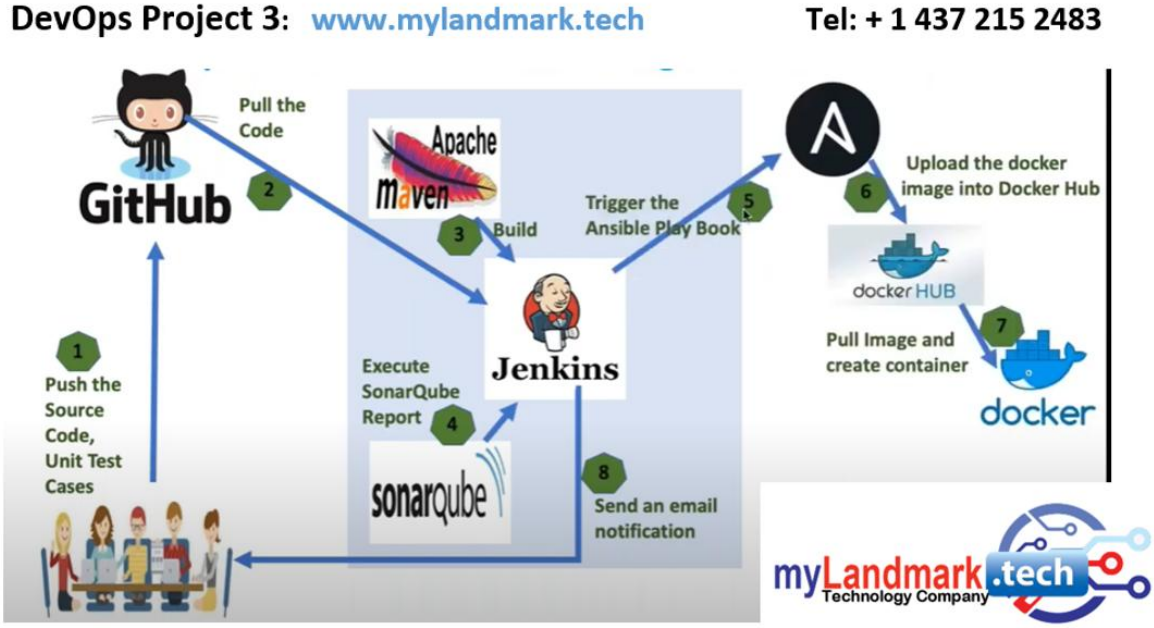
1. Jenkins integration with GitHub, Maven, SonarQube, Nexus and Tomcat for an e-commerce client



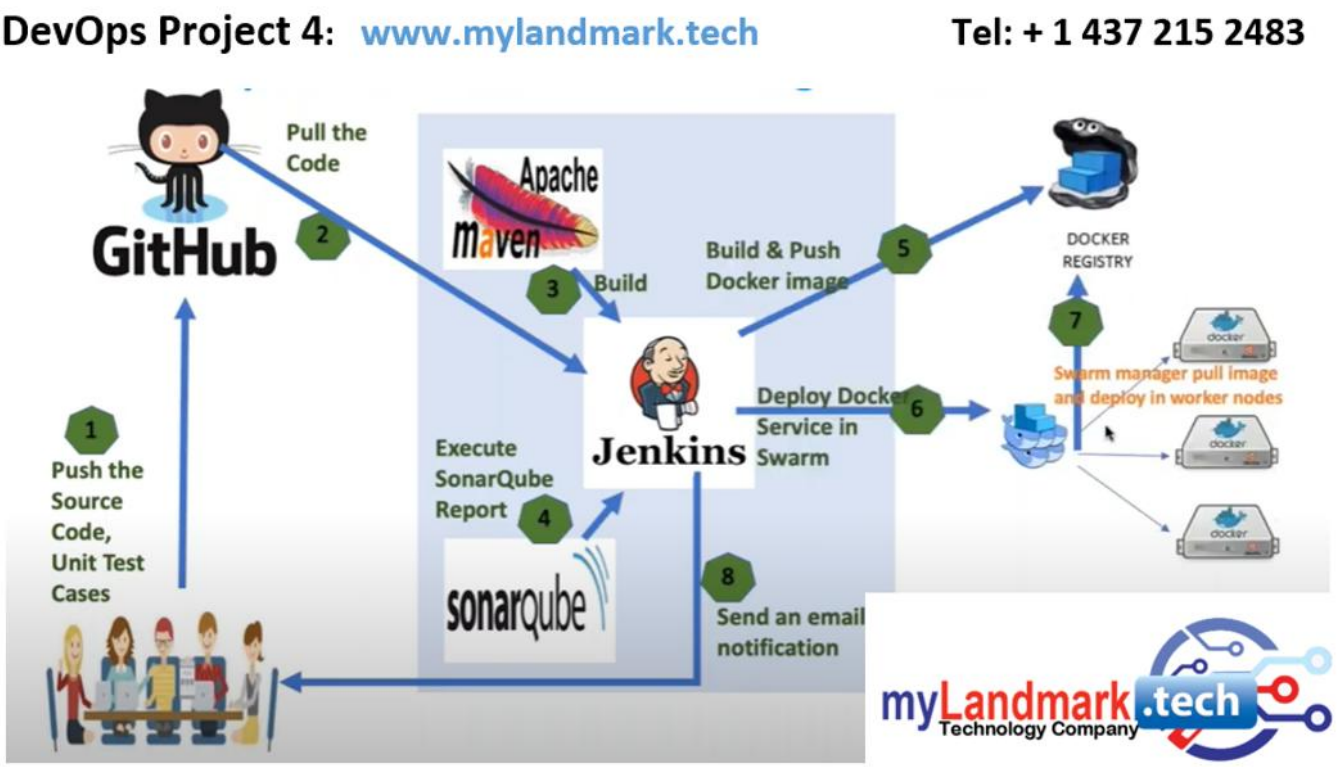
2. Jenkins integration with GitHub, Maven, SonarQube, Nexus and Docker for an e-commerce client



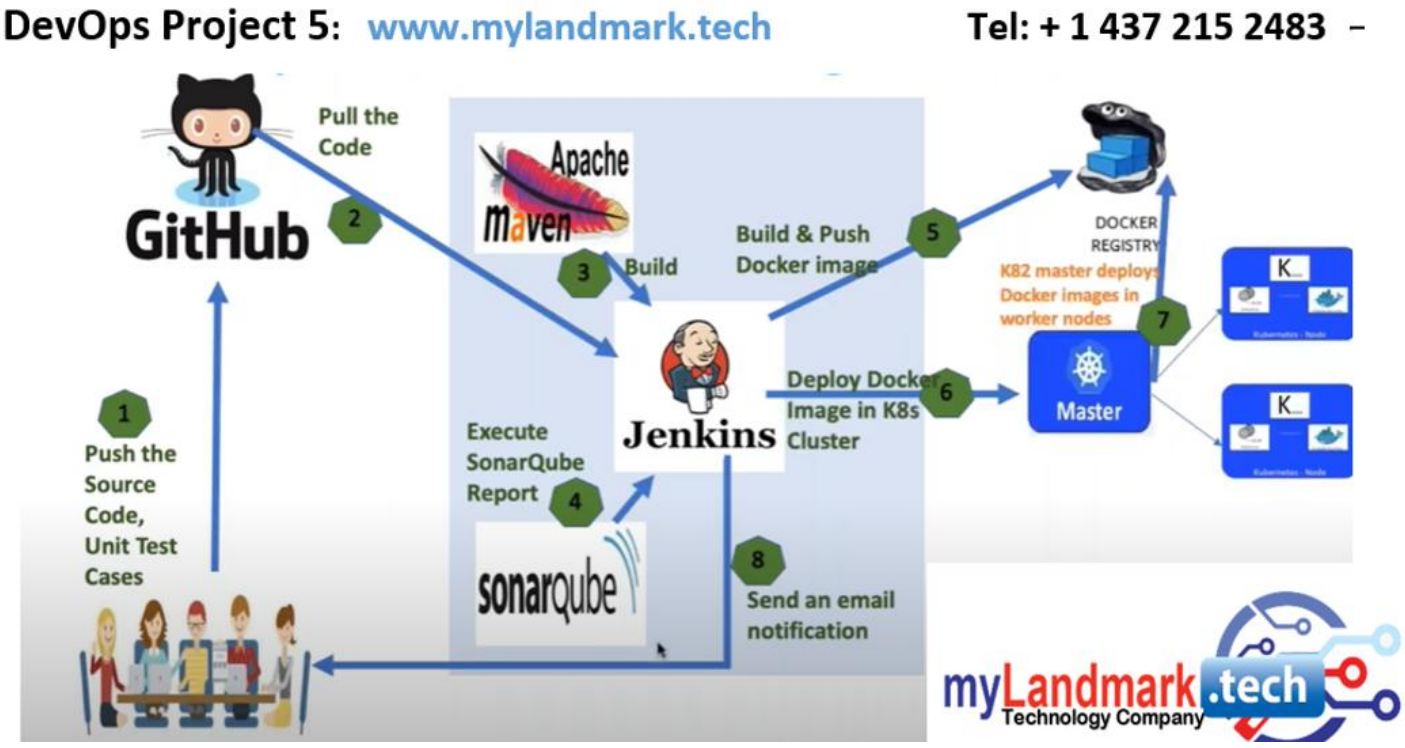
3. **Jenkins integration with Maven, SonarQube, Ansible and Docker**



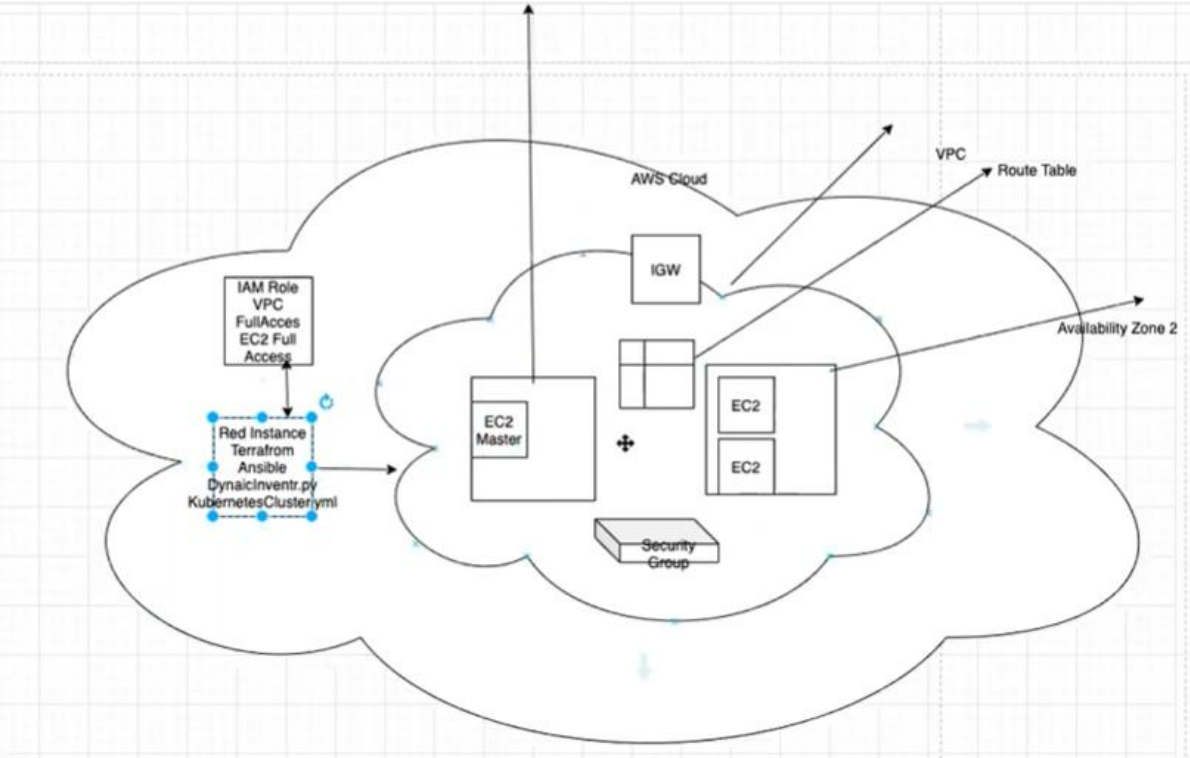
4. **Jenkins integration with Maven, SonarQube, Docker and Docker Swarm**



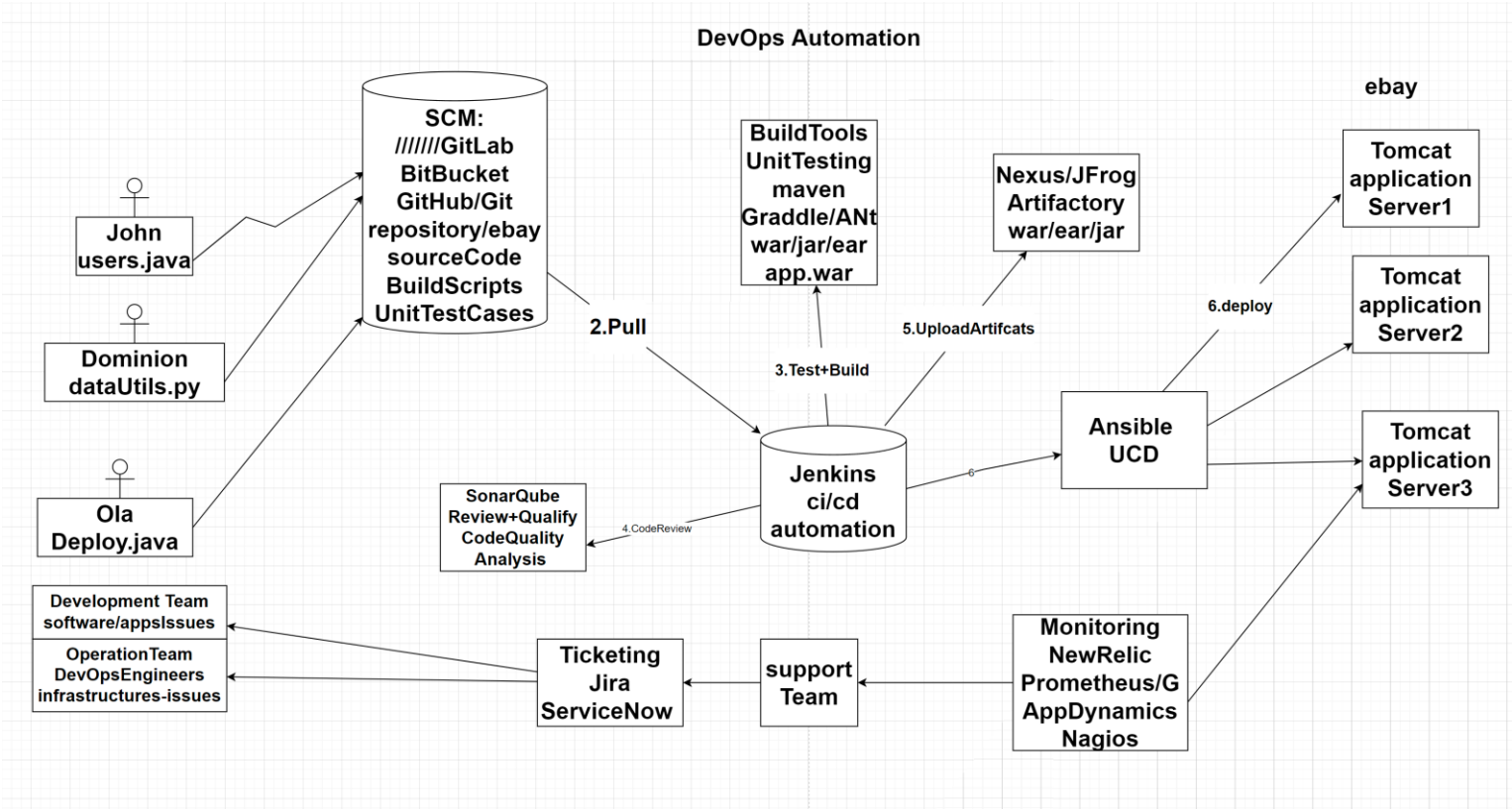
5. Jenkins integration with Maven, SonarQube, Docker and Kubernetes

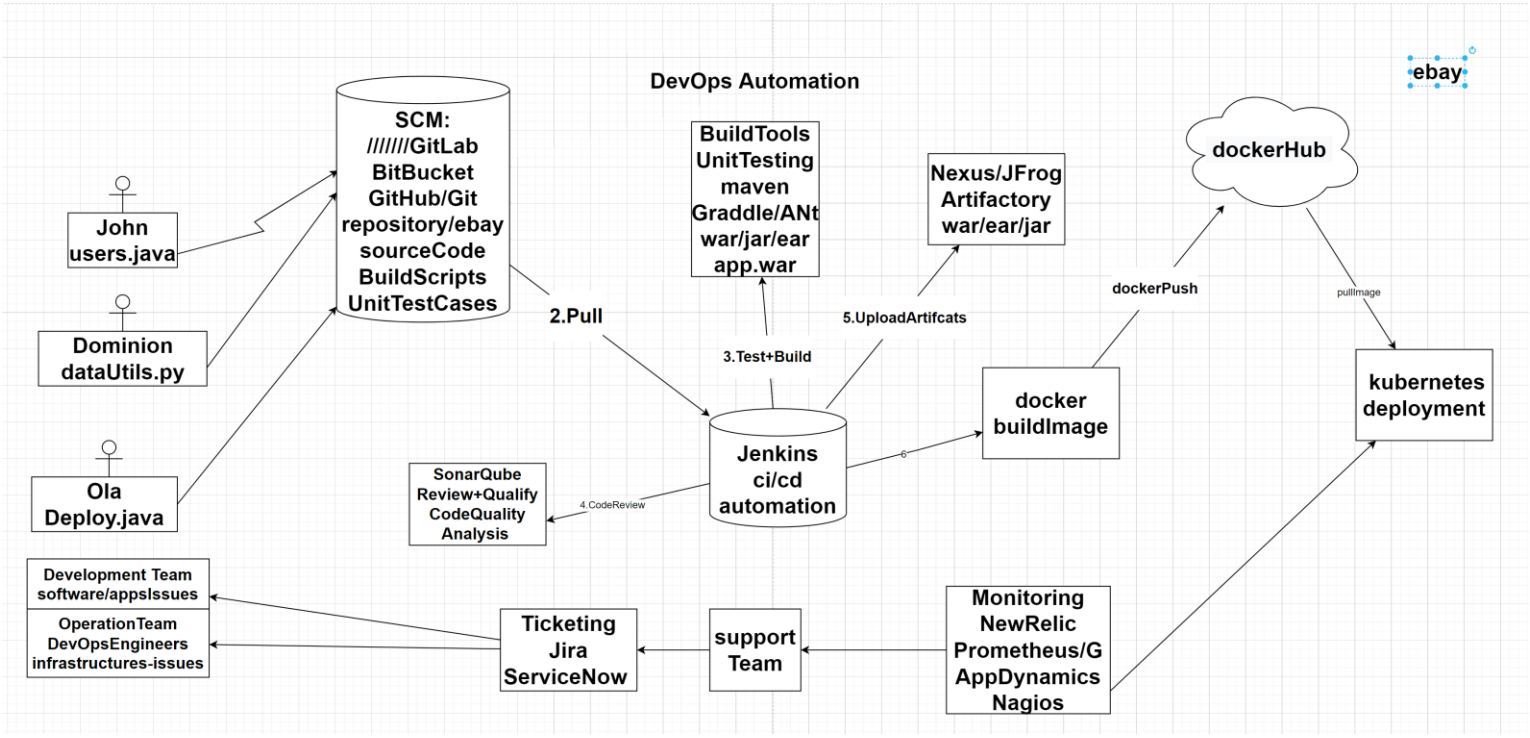


6. **Infrastructure automation using Terraform and Ansible**



- **FOLLOW ALL INSTRUCTIONS FROM LANDMARK TECHNOLOGY**
- **Run commands**
- **7 days – 7 < x < 10**

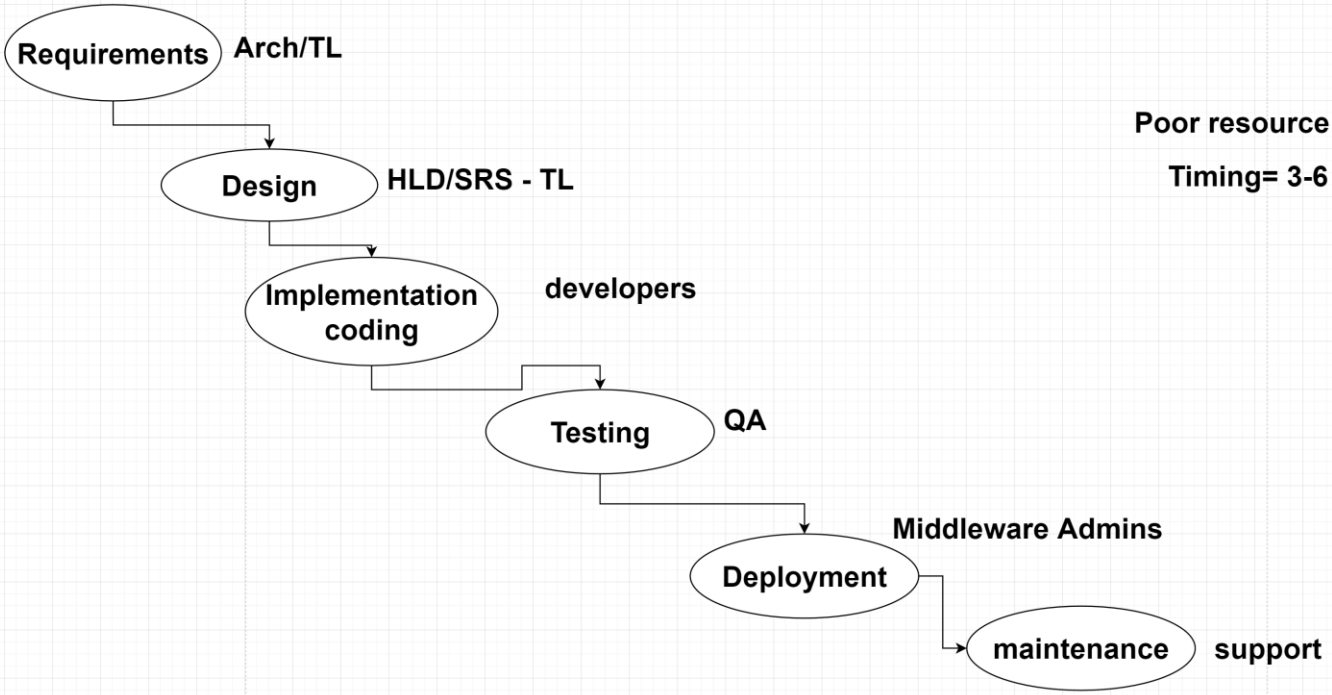



DevOps Automation
ebay
SCM:
///////GitLab
BitBucket
GitHub/Git
repository/ebay
sourceCode
BuildScripts
UnitTestCases
BuildTools
UnitTesting
maven
Graddle/ANt
war/jar/ear
app.war
Nexus/JFrog
Artifactory
war/ear/jar
dockerHub
John
users.java
Dominion
dataUtils.py
Ola
Deploy.java
2.Pull
3.Test+Build
5.UploadArtifcats
dockerPush
pullImage
kubernetes
deployment
docker
buildImage
Jenkins
ci/cd
automation
6
SonarQube
Review+Qualify
CodeQuality
Analysis
4.CodeReview
Development Team
software/appsIssues
OperationTeam
DevOpsEngineers
infrastructures-issues
Ticketing
Jira
ServiceNow
support
Team
Monitoring
NewRelic
Prometheus/G
AppDynamics
Nagios

Software Company
LandmarkSS

SDLC:
waterfall

client:ebay



Poor resource utilisation

Timing= 3-6 months

Software Company
LandmarkSS

Agile
Scrum

client:ebay

resource/Team
8developers
2QA
2SysAdmin
1scrumMaster

resource/Team
6developers
2QA
2SysAdmin
1scrumMaster

resource/Team
7developers
2QA
2SysAdmin
1scrumMaster

iterations/sprint
sprint1=10WD=8features
sprint2=10WD=6features
sprint3=10WD=7feature

MEETINGS:
sprintPlanning
dailyStandup=15mins
restrospect

team velocity is high