DevOps for Networking

Category: Enterprise IT & Operations (Dev & Business)

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ABSTRACT

• DevOps is a new methodology that combines developers and operations team.
• It closely integrate people, processes and technology for an automated software delivery that is agile, scalable and cost-effective.
• DevOps delivery is a combination of two previous methods; agile software development and the collaboration between developments and operations team.
• By changing the way we think to deploy an infrastructure through the entire product life-cycle, from the design through the production phase, we can deliver consistent and repeatable designs.
• By abstracting the configuration needed to launch server instances with specific configurations into consistently repeatable recipes or manifests, the entire technology stack becomes converged.
• In order to do this, both operation and development skills are required.
• To demonstrate the power of DevOps tool we have deployed a web-based ticket booking website using GIT, Ansible, Vagrant, Docker and Jenkins.
AGILE TO DEVOPS

Agile Development

1) Requirements
2) Plan
3) Design
4) Develop
5) Release
6) Track & Monitor

Developers
(application)

IT Operations

Business

Agile Development

- Iterative Development
- Scrum, Sprint, Stories
- Velocity

DevOps

- Continuous Integration
- Continuous Deployment
- IT Automation
- Application Management

Business Agility

IT Agility

Business case
Requirement
Use cases
Features
Plan
Go to Market

Design
Code
Refactor
Unit Test
Bug Fix
Deploy

Provision
Configure
Orchestrate
Deploy
Report
Monitor

Hosted By

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DEVOPS CULTURE OF COLLABORATION

Local Test → Commit → myRepo → Push → Project Repo → Continuous Integration/Continuous Deployment pipeline

- Build
- Test
- Review/Approve
- Deliver
- Deploy

Monitor and Iterate
DEVOPS INFRASTRUCTURE

- **WEB SERVER**: Apache Z
- **DATABASE SERVER**: Maria DB
- **JENKINS**: ISTIO INSTALLED
- **WEB DEVELOPMENT**: JAVA INSTALLED
- **Replica of Web Server**: INSTANCE INSTALLED
- **Virtual Box**: BENTO/ CENTOS -7.3
- **CLIENT**: PYTHON PLUGINS, ANSIBLE
- **GITHUB**: To keep a common repository for all developers
- **OPERATING SYSTEM**: Software’s installed: GitBash, Vagrant, Visual Basic

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- LILF NETWORKING
Peer to peer approach
- contains full project history
- Ability to work on same project
- Developers can edit or change code and can work differently
- Git can be integrated with GitHub so repository can be accessed from anywhere
JENKINS
• **Continuous Integration**: Pull together various software components - build and test as single unit

• **Continuous Delivery**: More automation, delivers app code from master to non-prod

• **Continuous Deployment**: Full automation, code is deployed to binary artifacts and to live prod servers for users
Cloud Providers

AWS vs. Google Cloud Platform vs. Azure
CONTAINERIZATION v/s VIRTUALIZATION
DOCKER

**Project Code**

- DockerFile

**Docker Image**

**Docker Container**

**Virtual Machine**

**Docker Hub**

**Staging Server**

**Production Server**
DOCKER COMMANDS & STORAGE

- **docker run** – Runs a command in a new container
- **docker start** – Starts one or more stopped containers
- **docker stop** – Stops one or more running containers
- **docker build** – Builds an image from a Docker file
- **docker pull** – Pulls an image or a repository from a registry
- **docker push** – Pushes an image or a repository to a registry
- **docker export** – Exports a container’s filesystem as a tar archive
- **docker exec** – Runs a command in a run-time container
- **docker search** – Searches the Docker Hub for images
- **docker attach** – Attaches to a running container

**VOLUMES**
- It is stored in a part of the host file system managed by the docker

**BINDS**
- It can be stored anywhere on host system whether they are important file system or directories. This mount can be modified by non-docker processes as well

**MOUNTS**
- It stores data in memory of the host system
WORD-PRESS INSTALLATION USING DOCKER
KUBERNETES ARCHITECTURE

Master

Controller

api-Server

Scheduler

Key-Value Store

User

CLI / APIs / Dashboard

External World

Kube-proxy

Container Runtime

Kublet

Pods

Pods

Pods
HELM CHART & KUBE COMMANDS

- Helm is a package management tool and can be used to add packages, services etc to the APPs which are deployed using Kubernetes.
- Helm-Charts helps the user to install, upgrade any applications of Kubernetes
- The advantages of Helm-Chart is that they are easy to create, is faster, easy to version and easy to publish and share
- Helm-Charts describe even the most complex Kubernetes apps, they provide reliable application installation, and they serve as a single point of authority

- kubectl get pods
- kubectl get deployments
- kubectl get replicaSets
- kubectl get secrets
- kubectl get events
Usage of Kubernetes

➢ Developing a complex application and requires high resource computing without restrictions
➢ For deployment and monitoring option
➢ For fast and reliable response times
➢ Deploying a big cluster

Usage of Docker

➢ To initiate with the tool without spending time on configuration and installation
➢ Developing a basic and standard application with default use of docker image
➢ Testing and running the same application on the different operating system is not an issue
➢ Functionality is provided and limited by Docker API
DEVOPS TROUBLESHOOTING TOOLS

WireShark

Nagios

Progress Telerik Fiddler

Datadog

SolarWinds

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CHECK OUR LIVE PROJECTS & FOLLOW US ON

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INTERNATIONAL CONFERENCE PAPERS

• Published Paper in ITERA on “Software Defined Networking (SDN) in Telecommunication Industry” at Lexington, Kentucky, Mar’18

• Published Paper in ‘IEEE-UEMCON’, on “A Survey of DevOps tools for Networking” at Columbia University, New York, Nov’18

• Published Paper in ‘IEEE-CCWC’ on “Building Modern Clouds: Using Docker, Kubernetes & Google Cloud Platform” held in Las Vegas, Nevada, Jan’19
So, get your Hands Dirty on DevOps !!

THANK YOU !