

Introduction to DevOps



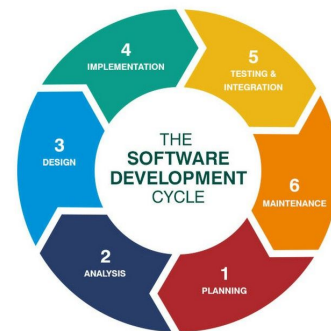
CLARUSWAY
WAY TO REINVENT YOURSELF

Table of Contents

- ▶ What is DevOps?
- ▶ What is Continuous Integration?
- ▶ Continuous Integration Basics
- ▶ Continuous Delivery vs Continuous Deployment
- ▶ Continuous Integration Server
- ▶ DevOps Tools

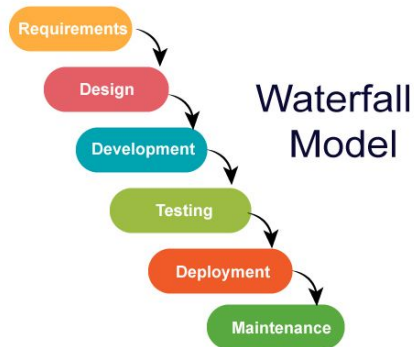
1 DevOps Basics

What is Devops?



What is DevOps?

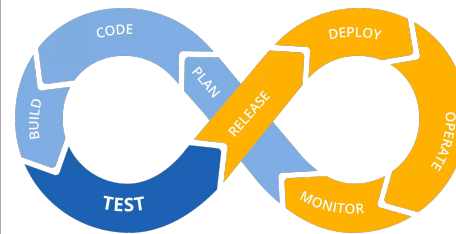
- Each phase completely wrapping up before the next phase begins
- If parameters change along the way, it's harder to change course



5

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What is DevOps ?

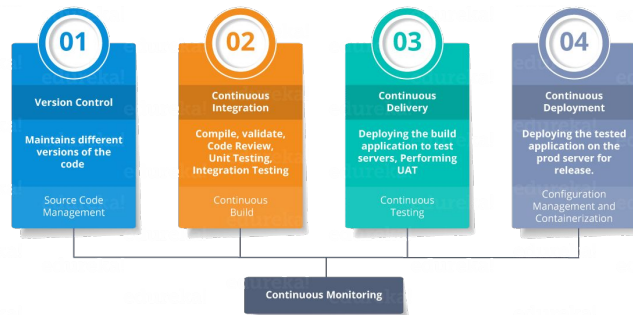


DevOps is a software development approach which involves continuous development, continuous testing, continuous integration, continuous deployment, and continuous monitoring of the software throughout its development lifecycle

6

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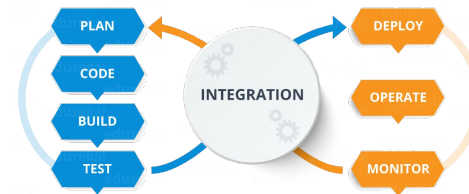
What is DevOps ?



7

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What is Continuous Integration ?



Continuous integration is a software development method where members of the team can integrate their work at least once a day. In this method, every integration is checked by an automated build to search the error.

8

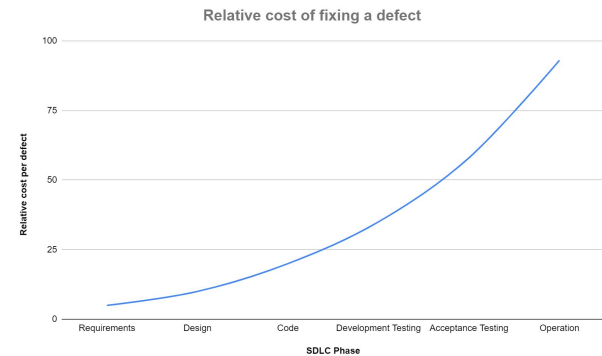
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With CI vs Without CI

Development without CI	Development with CI
Lots of Bugs	Fewer bugs
Infrequent and slow releases	Regular working releases
Difficult integration	Easy and Effective Integration
Late bug finding(days,weeks)	Early bug finding(minutes,hours)
Issue raised are harder to fix	Find and fix problems faster and more efficiently.
Poor project visibility	Better project visibility

9

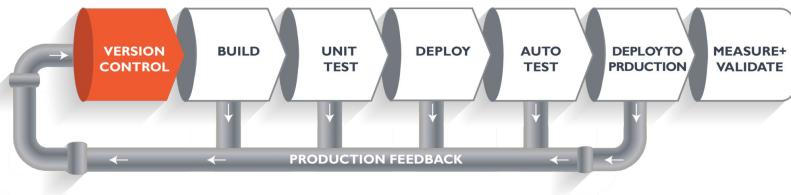
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10

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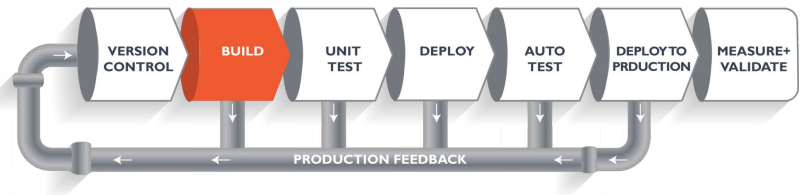
What is Continuous Integration ?



11

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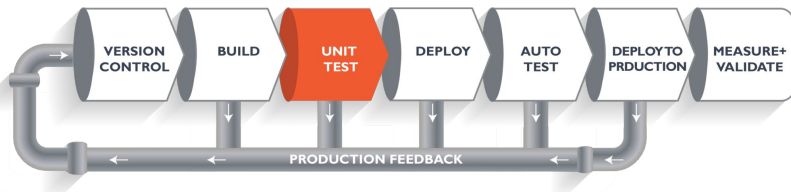
What is Continuous Integration ?



12

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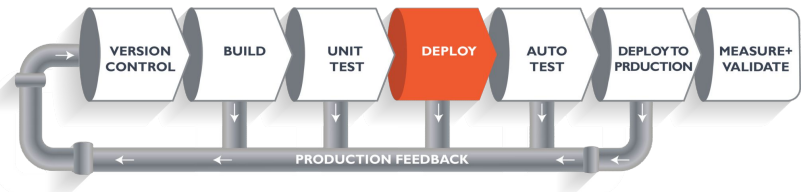
What is Continuous Integration ?



13

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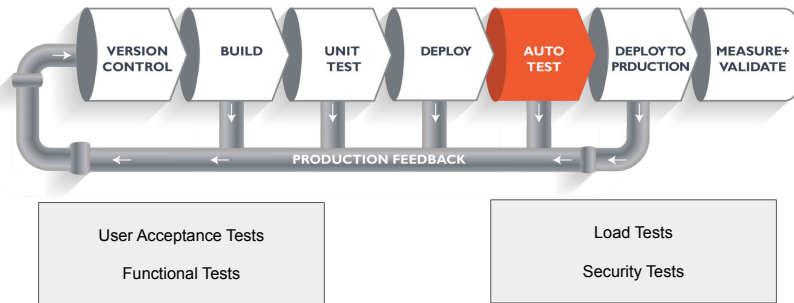
What is Continuous Integration ?



14

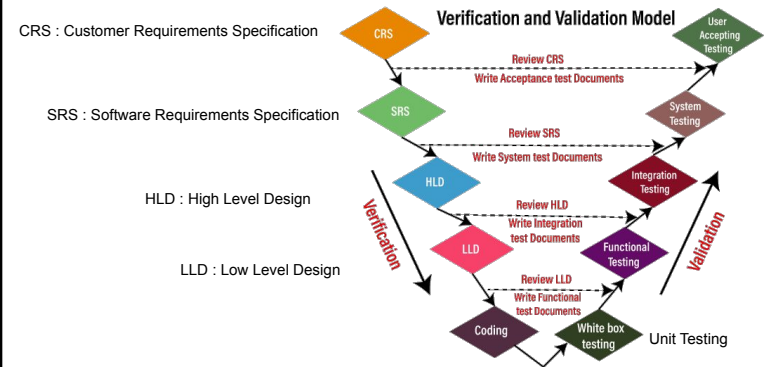
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What is Continuous Integration ?



15

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Functional Testing

Unit Testing

Integration Testing

Smoke Testing

Sanity Testing

API Testing

Regression Testing

Acceptance Testing

Exploratory Testing

Non-Functional Testing

Performance Testing

Stress Testing

Load Testing

Volume Testing

Reliability Testing

Usability Testing

Security/Vulnerability Testing

Recovery Testing

Compliance Testing

Compatibility Testing

Install/Uninstall Testing

Localization/Globalization Testing

17

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Black-box Test Techniques

- Equivalence Partitioning
- Boundary Value Analysis
- Decision Table Testing
- State Transition Testing
- Use Case Testing

White-box Test Techniques

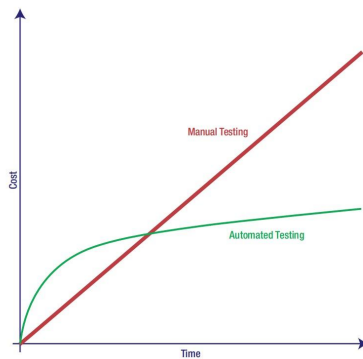
- Statement coverage
- Branch Coverage
- Path Coverage

Experience-based Test Techniques

- Error Guessing
- Exploratory Testing
- Checklist-based Testing

18

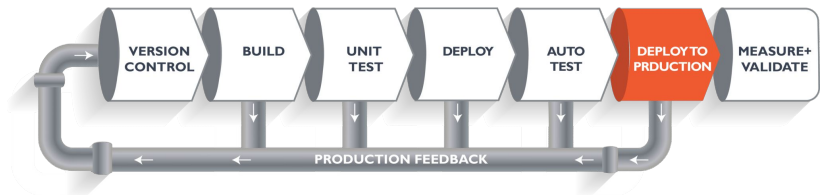
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19

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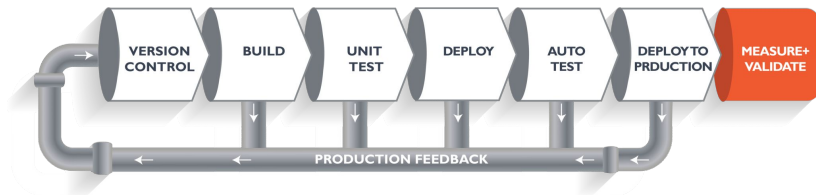
What is Continuous Delivery/Deployment ?



20

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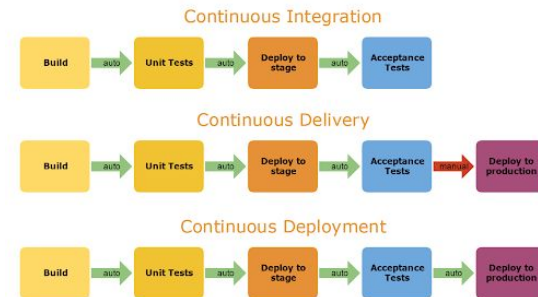
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21

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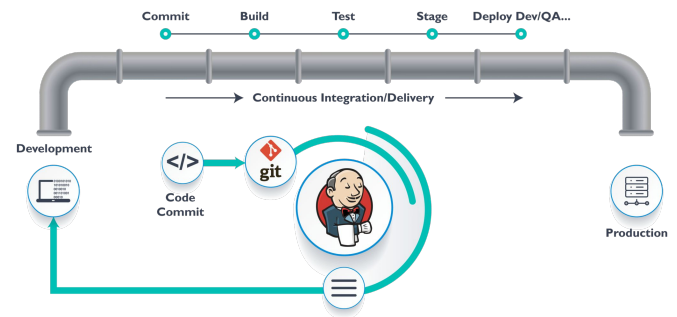
Continuous Delivery vs Continuous Deployment



22

2 DevOps Tools

Introduction to DevOps Continuous Integration Server



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Continuous Integration Server

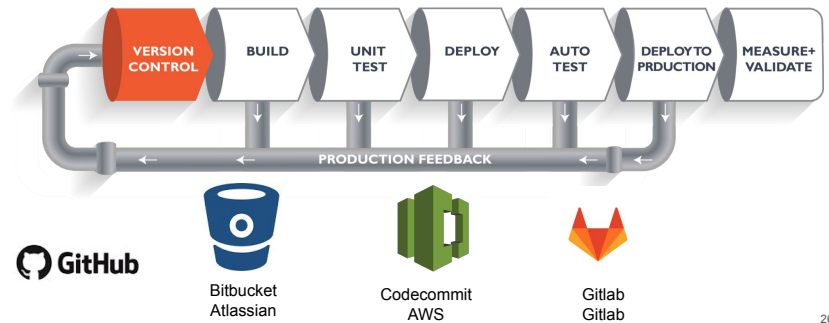


25

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Version Control Stage

EC2
CodeCommit

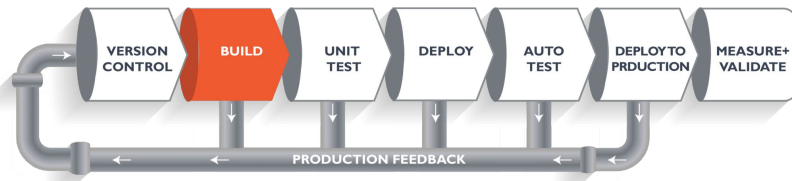


26

Introduction to DevOps

What is Continuous Integration ?

EC2
CodeCommit, CodeBuild
ECS(Elastic Container Service)



Maven

npm

nuget

BASH

Xcode

Gradle

APACHE ANT

CMake

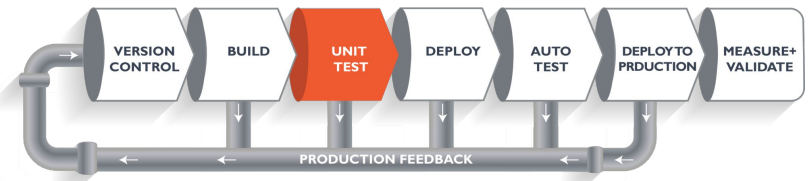
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27

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What is Continuous Integration ?

EC2
CodeCommit, CodeBuild
ECS(Elastic Container Service)



JUnit

JACOCO
Java Code Coverage

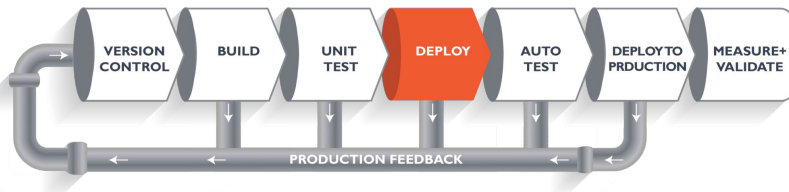
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28

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What is Continuous Integration ?

EC2
CodeCommit, CodeBuild, CodeDeploy
ECS (Elastic Container Service)
ECR, S3, RDS, DynamoDB
Cloudformation, Beanstalk
ELB, AutoScaling

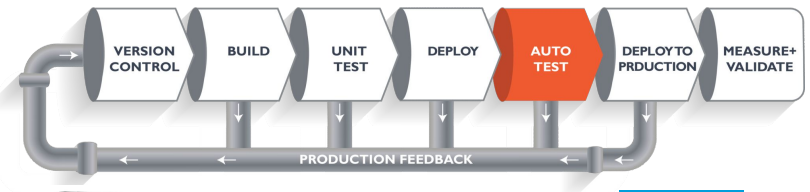


29

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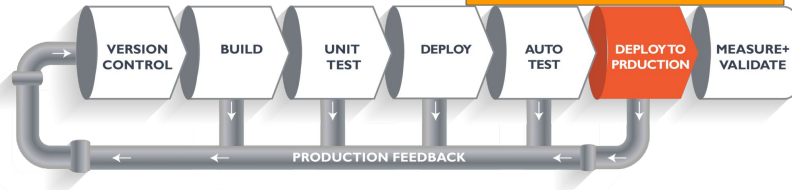


30

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Continuous Delivery/Deployment ?

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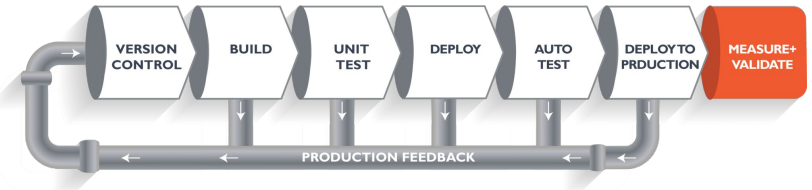


31

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Continuous Delivery/Deployment ?

Cloudwatch
SNS
SQS
SES



32

3

DevOps Setup

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Version Control Stage



1. Select repository host
2. Repository strategy single vs multi
3. Branching strategy
4. User roles and rights
5. User groups
6. Pull Request policy

- How to setup and manage repos on
- How to create branch(s) and manage rights
- What is gitflow?(dev, master, feature/XXX...)
- How to manage users, groups, roles
- PR policies?

CodeCommit

AWS Tasks

- CodeCommit repository configuration

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What is Continuous Integration ?



1. Local development setup for developers
 - a. Which IDE?
 - b. Which build tool? package manager?
2. Public/private package dependencies? Module structure?
3. Preparing local build scripts
4. CI server installation and configuration
5. Docker registry setup
6. Preparing build agents/env
 - a. Docker images/AMI(s)
7. CI server build configurations
 - a. Pipeline(s)
 - b. Build scripts

EC2
CodeCommit, CodeBuild
ECR
ECS(Elastic Container Service)

- Preparing build instance AMI(s)
- CI server EC2 integration
- CodeBuild configuration
- ECR registry setup, CI Server integration
- ECS configuration to run build containers

35

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What is Continuous Integration ?



1. Choose UT framework implementation unit tests(Engineering)
2. Choose IT framework and implement Integration tests(Engineering)
3. Choose and setup static code analysis tool
4. Updating build scripts to run UT(s)
5. Updating build scripts to run Integration tests
6. Update repository configuration based on testing requirements
7. Choose code coverage tool
8. Update build configurations to generate code coverage reports
9. Define code coverage policies for code acceptance

EC2
CodeCommit, CodeBuild
ECS(Elastic Container Service)

- Update CodeBuild pipeline
- Update build scripts

36

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Deploy Stage Tasks



DEPLOYMENT PREP

1. Setup docker registry
2. Setup artifactory server(Nexus,JFrog)
3. Prepare provisioning(Cloudformation, Terraform) templates for qa,staging infrastructure
4. Docker orchestrator setup(swarm OR kubernetes) for dev,qa and staging
 - a. Networking
 - b. Storage



EC2

CodeCommit,CodeBuild, CodeDeploy
ECS(Elastic Container Service)
ECR,S3,RDS,DynamoDB
Cloudformation,Beanstalk
ELB, AutoScaling

- Cloudformation Templates
- ECR setup
- ECS setup
- EKS configuration
- Beanstalk configuration

37

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Deploy Stage Tasks



DEPLOYMENT

1. Update CI pipeline configurations
2. Prepare Dockerfile(s)
3. Prepare Ansible scripts
4. Update build scripts to build docker images,AMI(s)
5. Prepare dev,qa and staging deployment scripts
 - a. Push to registry
 - b. Automated provisioning & deployment of each env



EC2

CodeCommit,CodeBuild, CodeDeploy
ECS(Elastic Container Service)
ECR,S3,RDS,DynamoDB
Cloudformation,Beanstalk
ELB, AutoScaling

- Update CodeDeploy
- Update ECR&ECS
- Configure AMI creation process
- Create/Update Cloudformation templates
- Automate Cloudformation stack create/update/delete

38

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What is Continuous Integration ?



1. Implementation of test suites(FT,UAT,...)(Eng)
2. Update project configuration to use related test framework
3. Create test automation run scripts
4. Update CI pipeline to add new steps
5. Update CI pipeline configurations to run test automation scripts nightly for dev branch
6. Update CI pipeline to trigger tests for each merge on release branch
7. Create/update build scripts to generate test reports

EC2
CodeCommit, CodeBuild, CodeDeploy
ECS(Elastic Container Service)
ECR, S3, RDS, DynamoDB
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- Update CodeBuild pipeline
- Create/Update Cloudformation templates



39

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What is Continuous Delivery/Deployment ?



1. Create production env docker deployment scripts
2. Create docker templates for orchestrator
3. Update docker registry for production
4. Prepare deployment process monitoring setup
5. Update CI Pipeline for manual/automated deployment

EC2
CodeCommit, CodeBuild, CodeDeploy
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- Update CodeBuild pipeline
- Create/Update Cloudformation templates
- Create/update Beanstalk
- Create/update ECS
- Create update EKS



40

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What is Continuous Delivery/Deployment ?



1. Setup Prometheus to collect data from prod env
2. Setup Grafana to collect data from Prometheus and other resources
3. Automate monitoring system deployment
4. Update CI/CD pipeline configuration for monitoring
5. Automate monitoring system updates linked to automated deployment
6. Create/update alarms

Cloudwatch
SNS
SQS
SES

- Update CodeBuild pipeline
- Create/Update Cloudformation templates
- Create/update Beanstalk
- Create/update ECS
- Create update EKS

