

It is not the strongest of the species that survive, nor the most intelligent, but the one most responsive to change.
“Charles Darwin”

- it is only for startups
- Replaces Agile
- Incompatible with ITIL()
- It is replacing Ops
- DevOps is just Automation
- It is **the collaboration of Dev and Operations**
- It treating Infrastructure as Code
- **Continuous Integration:**
 - + compilation of source code files
 - + Run unit test cases
 - + perform static code analysis
 - + ensure Gated commits
 - + Report any failure
 - + build into Deployable Binaries
- **Continuous Integration:**
 - + configure environments
 - + Automate tests
 - + set thresholds for pass and failure
 - + test end to end
 - + validate on staging environment
- **Best practices that build on quality:**
 - **Integration good practices**
 - + Maintain all assets under configuration control
 - + maintaining a single trunk or main branch for all teams involved
 - + review and check by peer before merger
 - + only changes that pass-through quality gates get into version control
 - **Testing good practices**
 - + match test environment to production as much as possible
 - + manage test data for all types of tests
 - + create multiple environments to support different types of testing
 - + deploy to staging at every iteration and run system demo from there

➤ **Deployment good practices**

- ⊕ create deployable packages from version control that can be deployed to any environment
- ⊕ anyone with access to an environment should be allowed to release the packages into production. This will be available after automating unit testing

➤ **Monitoring good practices**

- ⊕ visual displays to monitor trends
 - ⊕ provide ways to drilldown into individual applications and infrastructure
-

DevOps is not a goal, but a never ending process of continual improvement

“Jez Humble”

DevOps framework in HCL:

process framework:

1. Initiate and setup

- onboarding and initiation
- Assess and design
- roles and responsibilities

2. plan

- backlog refinement
- sprint planning
- sprint execution
- sprint review
- sprint retrospection

3. Engineer

- continuous integration
- continuous testing

- continuous deployment
- continuous monitoring

4. improve

- metrics

➤ roles in a devops team

1.product owner:

- + acts as a solution custodian and representative of the customer's requirements

2.srum master:

- + facilitates the Sprint planning, daily scrum and retrospectives.
- + he resolves /escalates impediments and enables close cooperation across roles and functions

3. DevOps Engineers:

- + these are acts as team that refines develops, builds,tests, deploys and supports the system.
- + They are involved in development , setting the pipeline , supporting and monitoring the system and focus on continuous delivery of value and relentless improvement of the system.

4.DevOps architect:

- + he is involved in the tooling and architectural decisions and setup of the continuous Delivery pipeline.
- + provides guidance and implementation support to the devops engineers.

5.delivery manager:

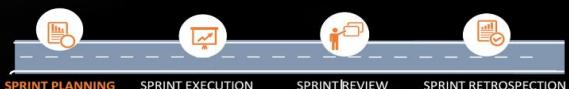
- + DM is in charge of enabling and governing the program

6.DevOps coach:

- + he promotes and facilitates the adoption of devops and agility within teams and organization



Sprint Planning



Develops the Sprint Goals

Estimate and Plan

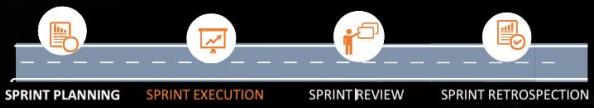
- Define the acceptance criteria
- Estimate team capacity
- Establish definition of done and obtain commitments

Assign and Track Tasks

Commit to Sprint Goals



Sprint Execution



Develops User stories

Supports and Monitors production



Sprint Review



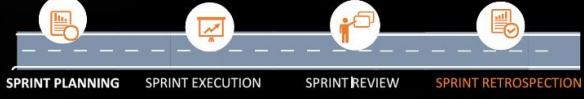
Review System Performance

- Application
- Infrastructure
- Business

Review Deliverable

Review Monitoring and Operations support Outcomes

» Sprint Retrospection



Summarize the analysis outcomes and issues and problems faced .

Define actions that may fix or improve system

Plan for actions that reinforce positive impacts



What is it?

DevOps **integrates** developers and operations teams in order to **improve collaboration** and productivity by **automating infrastructure**, **automating workflow** and **continuously measuring application performance**.


Speed

Frequent Delivery
Quick Resolution


Quality

Quality Gates
Automation


Stability

Continual Monitoring
Fast Recovery



» DevOps Metrics that Matter

SPEED	QUALITY	STABILITY
Lead Time	Code Coverage	Application / System Availability
Velocity	Maintainability a. Code Smells b. Technical Debt	Security - a. Vulnerabilities b. Security Remediation effort
Deployment Frequency	Failed Deployment %	No. of P1 Incidents
SLA Compliance Response		Team stability Index/Release
SLA Compliance Resolution		
Mean Time to Restore		

» A Leading Insurance Company

Business Challenges

Production issues!
Adhoc access to production.

Lots of rework!
Communication gap between teams.

Huge maintenance cost!
Disparate and Legacy Technologies.



» A Leading Insurance Company

Solution Highlights

Implemented CI/CD pipelines to build and deploy java application into Jfrog Artifactory both as a WAR file and Docker image.

Post the application deployment, trigger a continuous testing pipeline to perform Functional and performance testing.

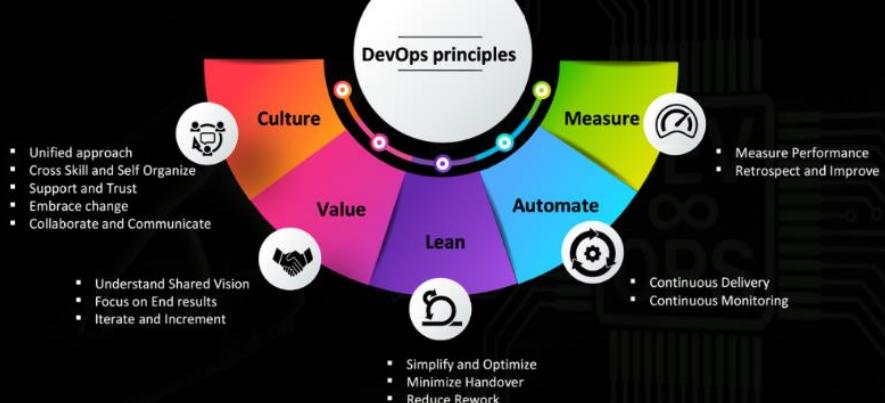
Embraced DevOps and built enterprise competency

Benefits

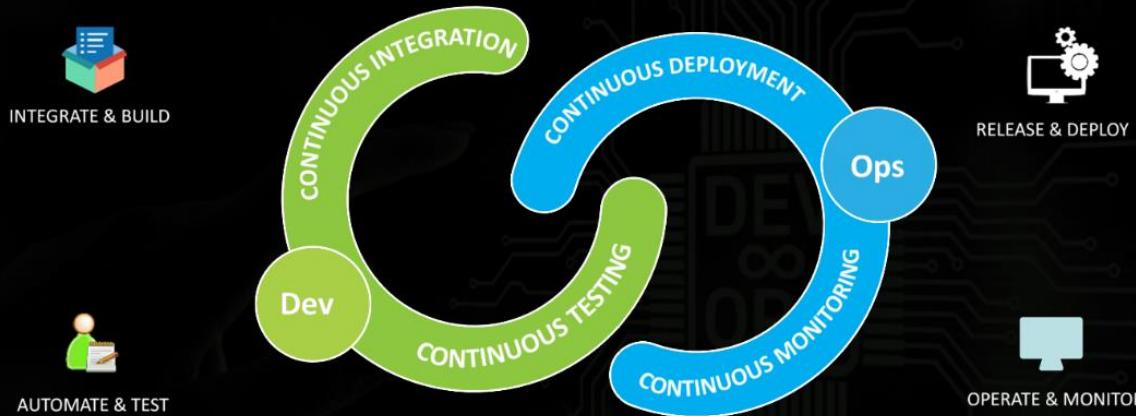
40% effort reduction in handover and takeover between teams

80% build and deployment cycle time reduction

» DevOps Essentials



» The Continuous Journey - Reduce Hand Offs



» Build in Quality

Continuous Integration

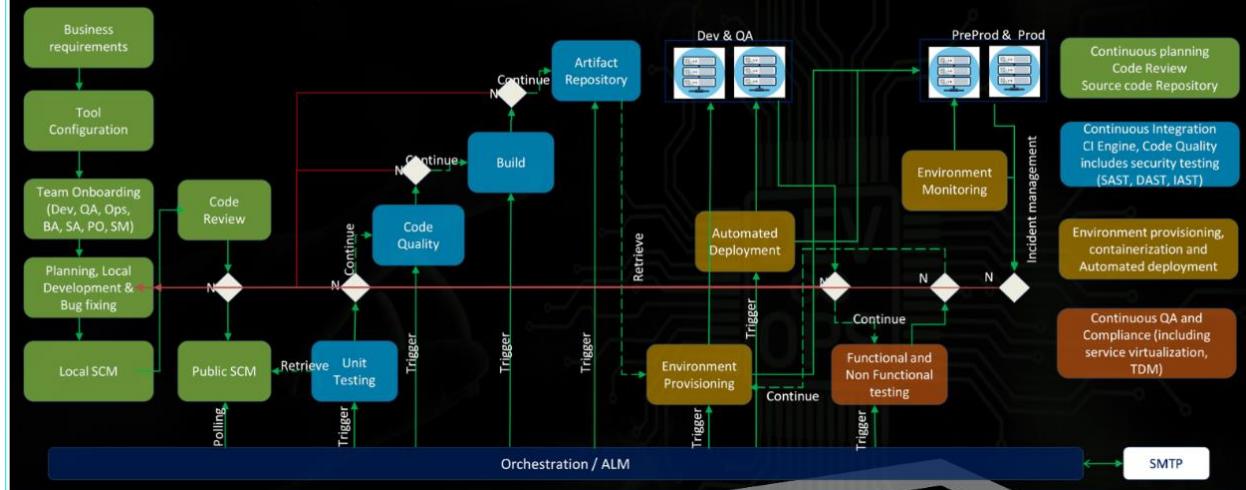
- Compilation of Source Code files
- Run Unit Test cases
- Perform Static Code Analysis
- Ensure Gated Commits
- Report any Failure
- Build into Deployable Binaries



Continuous Testing

- Configure Environments
- Automate tests
- Set thresholds for Pass and Failure
- Test end to end
- Validate on Staging environment

» Continuous Delivery transformation



» Process Framework in HCL

The screenshot displays the HCL DevOps Process Framework website. At the top, there's a navigation bar with links for Home, About, Process Framework, Resources, and Logout. The 'About' menu is currently active, indicated by a red underline. On the right side of the header is the HCL DevOps logo. Below the header is a dark banner with the text 'COLLABORATE | BELIEVE | EMPOWER'.

The main content area features a large diagram titled 'ONBOARDING & INITIATION' and 'ASSESS AND DESIGN'. The diagram illustrates a continuous DevOps process flow:

- ONBOARDING & INITIATION:** Includes PRODUCT BACKLOG, SPRINT PLANNING, SPRINT EXECUTION, SPRINT REVIEW, and SPRINT RETROSPECTION.
- ASSESS AND DESIGN:** Includes INTEGRATE & BUILD, RELEASE & DEPLOY, and OPERATE & MONITOR.
- Supporting phases:** AUTOMATE & TEST, CONTINUOUS INTEGRATION, CONTINUOUS DEPLOYMENT, CONTINUOUS TESTING, and CONTINUOUS MONITORING.
- Feedback loops:** METRICS, GOVERNANCE, and QUALITY ASSURANCE.
- Benchmark & Improve:** A horizontal arrow pointing from the end of the process back to the beginning.

To the right of the diagram, there's a sidebar titled 'About' which lists:

- DevOps Essentials
- Glossary
- Frequently asked Questions
- Contributors

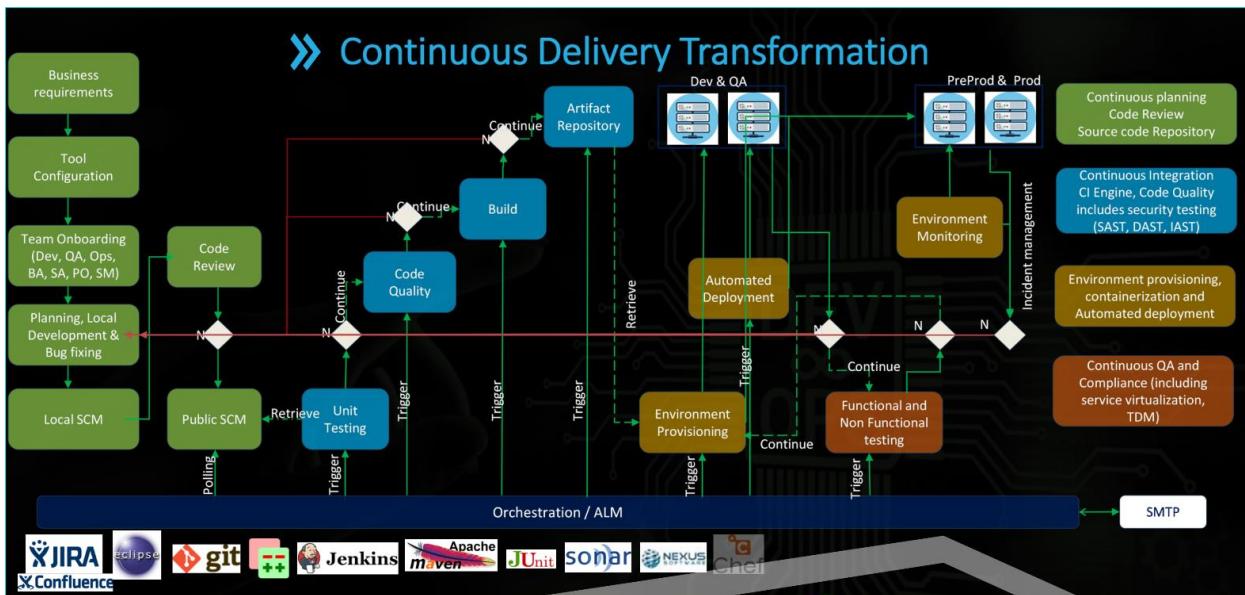
Below the sidebar, there's a list of team roles with corresponding icons:

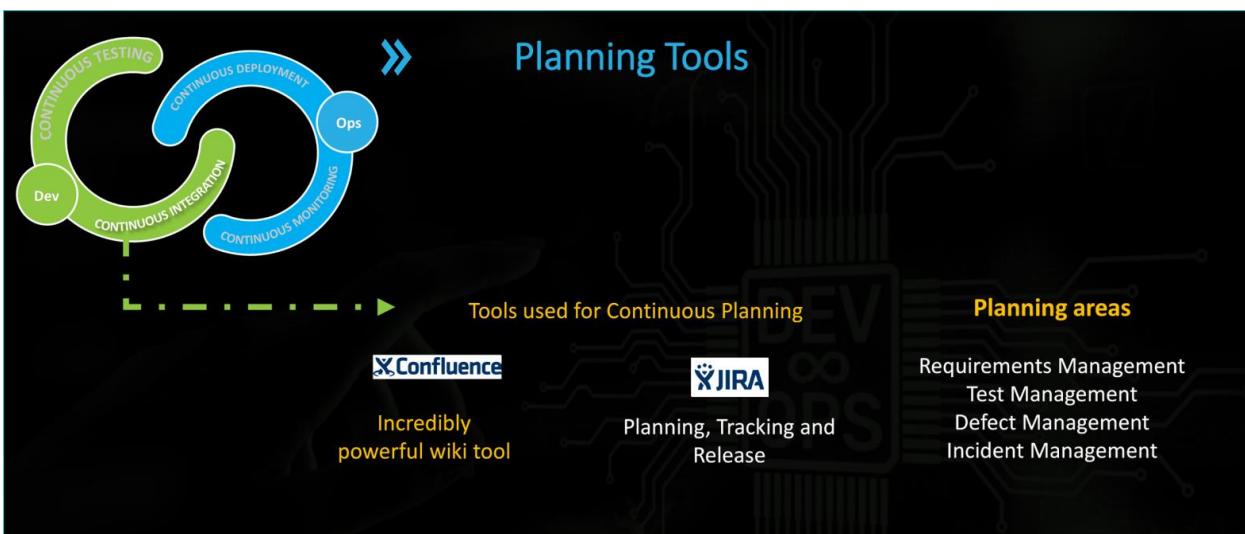
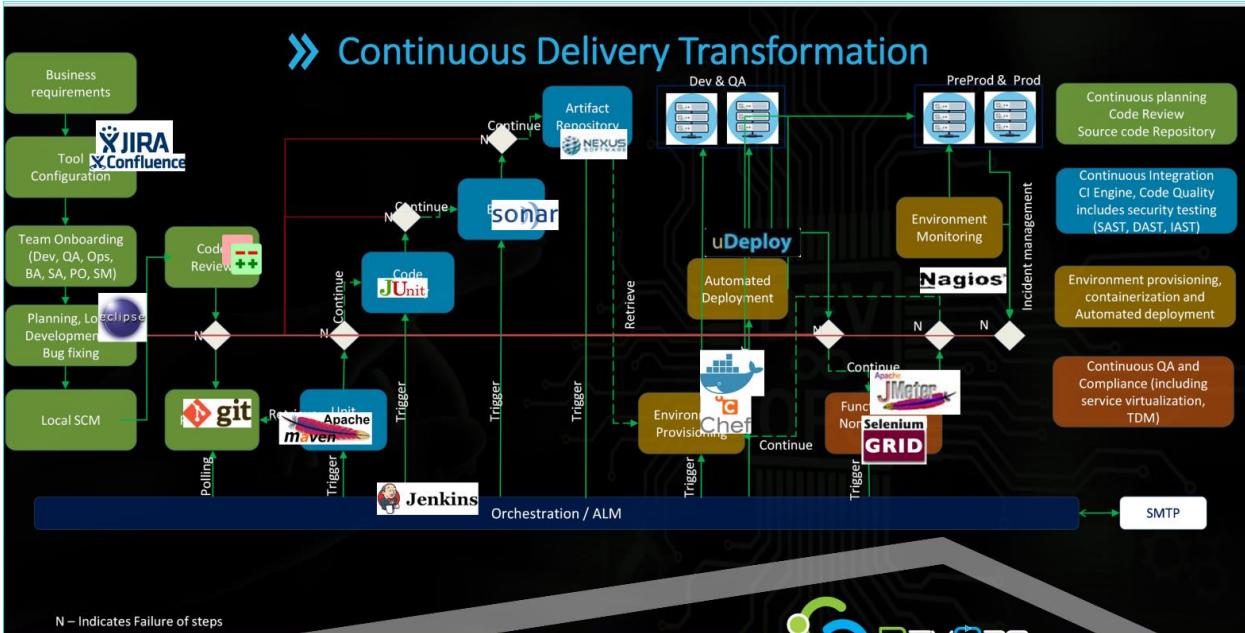
- PRODUCT OWNER
- SCRUM MASTER
- DEVOPS ENGINEERS
- DEVOPS ARCHITECT
- DELIVERY MANAGER
- DEVOPS COACH

The background of the page features a dark circuit board pattern.

» Automation in DevOps

Continuous Delivery aims at perfecting the art of Value delivery to the customer at the shortest lead time .





» Continuous Planning

CONFLUENCE helps to create, collaborate, and organize all your work in one place

CONFLUENCE

Break down team silos
Organize everything in one place
Turn conversations into action
Build a culture of open teamwork

JIRA is instrumental in building and maintaining the best software on the market

JIRA

Integrates with other tools
Planning, Tracking and Release of Software
Easy reporting
Extension of Functionality through Plugin

» About Confluence



Confluence is a collaboration wiki tool used to help teams to collaborate and share ideas, knowledge efficiently. It is a powerful collaborative editor as it gives you the power to create meeting notes, project plans, product requirements, at the same time as other users are editing and see all the changes at once.

Enables accelerated feedback loop with inline comments on pages and files attached.

Enables you to have the workflow and approvals with third party plugins like **Comala Workflows** and the **Page Approval**.

Available in both Cloud, On Prem and the subscription includes support at all times while your subscription is active.

Attributes

Organized workspaces
Page and file versioning
Quick search tips
Granular permission controls
Rich text editor with attachment drag and drop

Benefits

Blogs and discussions
'Subscribe' to contents
Blogs for individuals and teams.
Add-Ins (Plugins)

» Good Practices for Confluence

Implementation

- Identify required spaces
- Define page structure
- Use Confluence macros
- Organize Attachments
- Avoid redundancy
- Grant permissions
- Train Confluence users

Configuration

- Write and Format
- Add metadata to spaces
- Standardize documentation with page templates
- Maintain hierarchies
- Expanding and collapsing tables
- Formalize a governance process

» Screenshots - Confluence

Sample Confluence Page

The image contains two side-by-side screenshots of the Confluence software interface. The left screenshot shows the 'Create' screen, which allows users to select a space and choose from various template types such as 'Mobile Development Team', 'How-to article', 'Product requirements', and 'Task report'. The right screenshot shows a sample Confluence page titled 'Product Growth', which includes sections for 'New to Growth?' (with cards for 'Data is our compass.', 'Progress over perfection.', and 'Question everything.'), 'About the team' (with cards for 'Looking for someone?' and 'Meet our team members'), and 'Useful links' (with cards for 'Service Desk', 'Raise a request', 'Tools', and 'Houston — for experiments').

» Comparison with similar tools

Sample Confluence Page

Parameters	Confluence	Sharepoint	Doors
License Terms	Commercial	Commercial	Commercial
Origin	Java	.Net	Java
Platform Dependency	Multi Operating Systems	Windows Operating System	Multi Operating Systems
No. of Available plugin	1000+ Plugins	1000+ Plugins	30+ Plugins
Ease of Setup	Easiest	Neutral	Hard
Platform	Cloud/On-Prem	Cloud/On-Prem	Cloud (IBM Doors Next Gen)/ On-Prem



Planning Tools

Jira is a versatile tool that can be used for Process and Project tracking. JIRA is a platform independent tool; it can be used with any OS. It is very useful in Workflow and Process management such as Agile Scrum Management, Task Tracking, Bugs, Issues and Change Request Tracking.



Incredibly powerful wiki tool



Planning, Tracking and Release



About JIRA



JIRA supports Scrum and Kanban boards. These boards provide snapshot of the project to all stakeholders. JIRA supports more than a dozen reports to track progress over a specific timeframe, deadlines, individual's contribution, etc.

Easy to understand and generate different agile reports such as burn down charts, Velocity Variance, User Story Acceptance, Sprint Velocity

Attributes

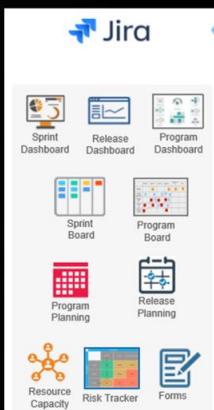
Workflows
Issue Types & Screens
Custom Fields
Notification
Permissions

Benefits

Business Predefined Templates
Task Details & Notifications
Reports
Multilingual & Power Search
Add-Ins (Plugins) & Mobile App



Good Practices for JIRA



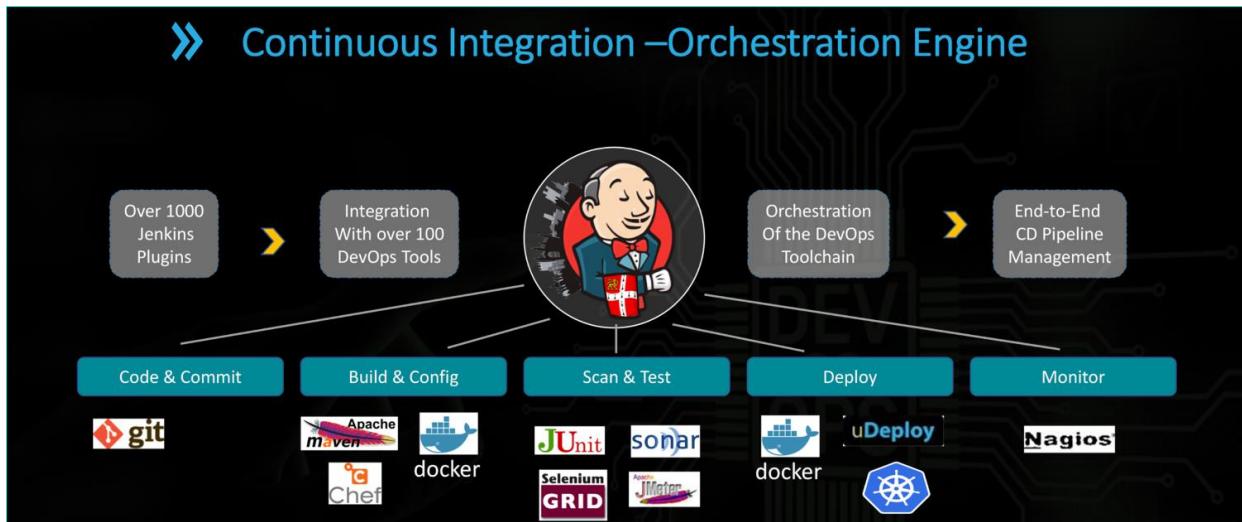
Configuration

- Suitable and committed Infrastructure
- Define Project
- Configure Workflows and Custom Fields
- Manage Project Roles
- Use Gadgets for Reports & Dashboards
- Choose appropriate plugins

» Comparison with similar tools

Parameters	JIRA	Azure DevOps	CA Agile Central (Rally)
License Terms	Commercial (Cheap)	Commercial	Commercial (Costly)
Origin	Java	Dot Net	Java
Platform Dependency	Multi Operating Systems	Multi Operating Systems	Multi Operating Systems
No. of Available Plugin	1400+ Plugins	800+ Plugins	70+ Plugins
Ease of Setup	Easiest	Easy	Neutral
Workflow Support	Available	Available	Available

» Continuous Integration –Orchestration Engine



» About Jenkins



Jenkins forms the Hub of CI-CD Pipeline

Jenkins is an open source tool to perform continuous integration and build automation.

Commercial version of Jenkins is provided by CloudBees with various stable plugins and deployments. CloudBees has developed a presentation layer that rides on top of Jenkins for SDLC pipeline, CD monitoring, and metric tracking called DevOptics.

The basic functionality of Jenkins is to execute a predefined list of steps called Pipeline. The trigger for this execution can be time or event based. This also enables us to take necessary action based on the defined steps.

Benefit

Integrates Development, Deployment and Testing
Easy scheduling of Tasks
Extension of Functionality through Plugins

Attribute

Supports multiple SCM tools
Can Execute Apache Ant and Maven Based Projects
Run Shell Scripts and Windows Batch Commands

» Good Practices in Jenkins configuration

Jenkins Configuration

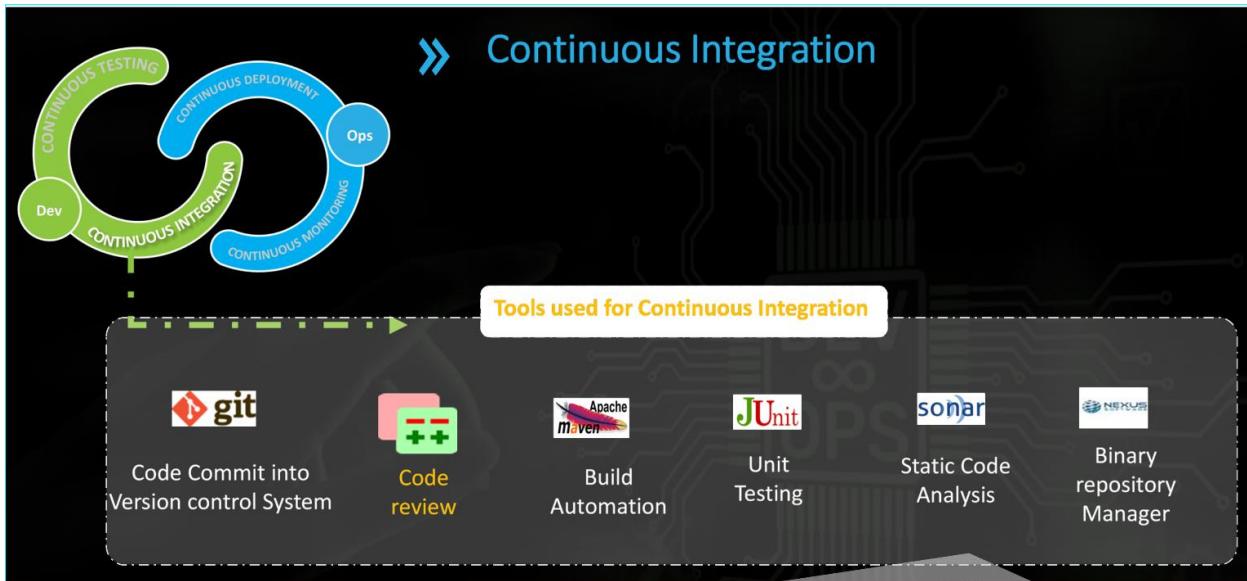
- Develop Your Pipeline As Code
- Any non-setup work within your pipeline should occur within a stage block
- All Material Work Within a Node
- Add Parallel Step to Shift Left
- Do not Use Input Within a Node Block
- Wrap Your Inputs in a Timeout
- Do not set Environment Variables With the env Global Variable

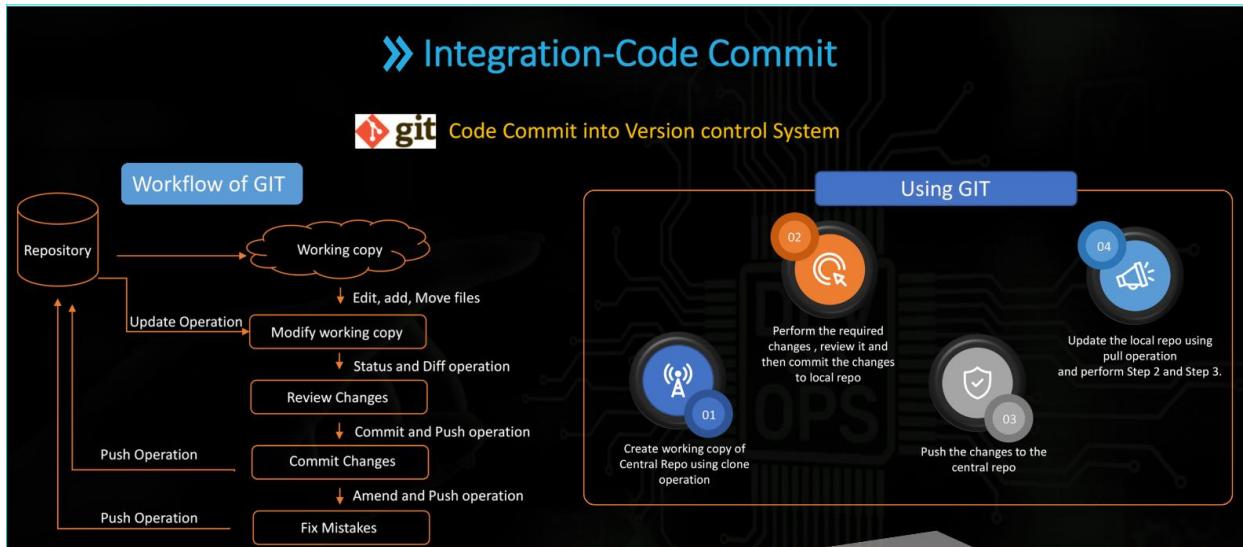
Jenkins Implementation

- Authenticating users and enforcing access control on a Jenkins instance
- Backup Jenkins Home regularly
- Use "file fingerprinting" to manage dependencies. The most reliable builds will be clean builds, which are built fully from Source Code Control
- Avoid scheduling all jobs to start at the same time
- Take steps to ensure failures are reported as soon as possible

» Comparison with similar tools

Parameters	Jenkins	TeamCity	Bamboo
License Terms	Open Source and Commercial	Commercial	Commercial
Origin	Java Programming Language	Ruby, .NET, and Java	Java Programming Language
Platform Dependency	Multi Operating Systems	Multi Operating Systems	Multi Operating Systems
No. of Available plugin	1000+ Plugins	350+ Plugins	150+ Plugins
Integrations	Does not support <ul style="list-style-type: none">Built-in JIRA Software integrationBuilt-in GIT branching workflowsBuilt-in Bit Bucket Server integration	Supports Built-in <ul style="list-style-type: none">Built-in JIRA Software integrationBuilt-in GIT branching workflowsBuilt-in Bit Bucket Server integration	Supports Built-in <ul style="list-style-type: none">Built-in JIRA Software integrationBuilt-in GIT branching workflowsBuilt-in Bit Bucket Server integration
Ease to Setup	Very Easy	Neutral	Neutral





» Comparison with similar tools

Parameters	GIT	SVN	TFS(Azure)
License Cost	Open source/ Commercial	Open source/ Commercial	Commercial
Distributed	Yes	Centralized	Centralized
GUI Client Support	Good	Good	Good
Branching & Merging	Very Good	Average	Average
Speed	Very Good	Average	Good
Window OS Support	Good	Good	Very Good
Repository Management	Good	Poor/Average	Good

» About Gerrit



Gerrit is a web-based code review tool, which is integrated with Git and built on top of Git version control system. It allows merging changes to Git repository when you are done with the code reviews.

It allows your development teams to catch major defects, improve code architecture, and discuss desired improvements, without the need for meetings.

Attributes

Single Commit when merged to GIT Repo
Unique Change number (identifier)
Maintain revision details
Approval indicator
Easy submit of change for merger into GIT

Benefits

A lightweight framework
Easy Error identification
Voting in Gerrit
Intermediate between developers and git repositories

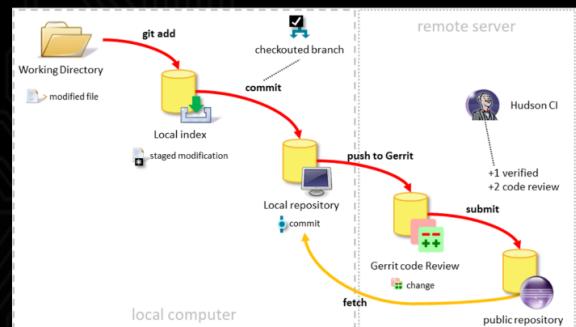
» How Gerrit works



Gerrit can prevent users from pushing directly to the Git repository. If you push to Gerrit, you use a certain path(reference) which tells Gerrit that you want to create a change and refer it by the master branch where you want to commit the change.

If you push to this ref specification, Gerrit creates a new change or makes an update of an existing one. Gerrit uses the Change-Id information in the commit message to identify if the push is a new commit or an update of an existing change.

A change consists of one or more patch sets which are used to improve the first proposal based on review comments. One patch set corresponds to one Git commit. It is still possible to bypass code review by pushing directly to refs/heads/master if sufficient rights have been granted.



» Comparison with similar tools

Parameters	Gerrit	Review Board	Crucible
License Cost	Open source	Open source	Commercial
LDAP Integration	Available	Available	Available
Support	GIT only	SVN only	All
Database	Required	Required	Required
Speed	Very Good	Average	Good
OS Support	Linux	Windows, Linux	Windows, Linux

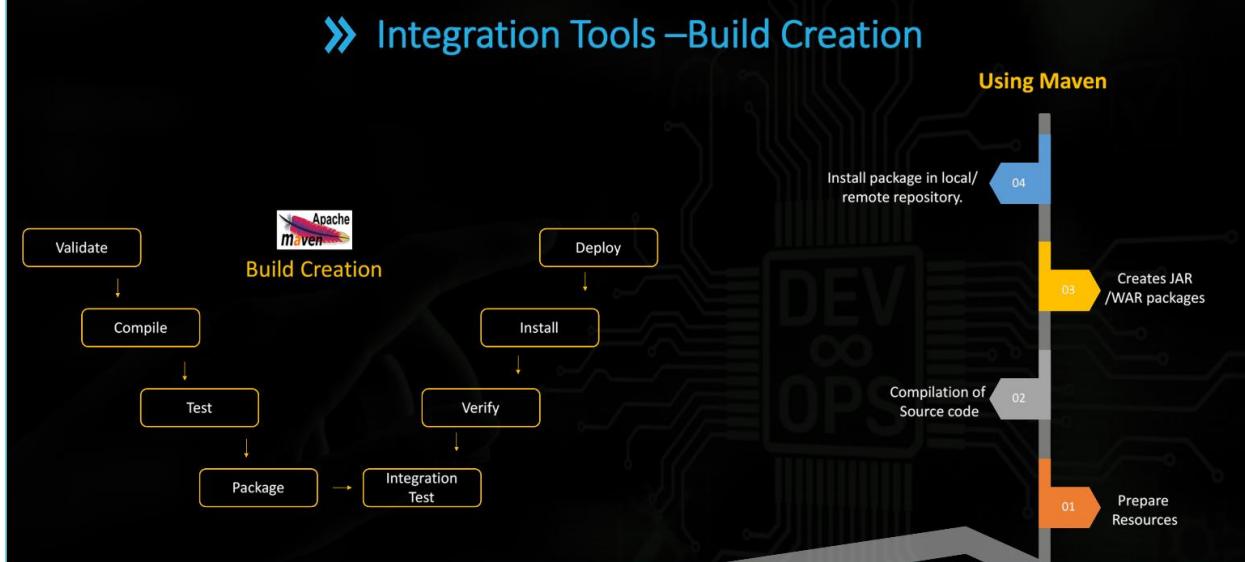
» About Maven



Maven can manage a project's build, reporting and documentation from a central piece of information. It is based on Project Object Model. Maven's primary goals are in making the build process easy, Providing a uniform build system, Providing quality project information ,Providing guidelines for best practices development ,Allowing transparent migration to new features

Attribute	Benefit
Build lifecycle framework	Package Dependency Management
Manage Builds, Documentation, Reporting, Releases, Distribution	Standard Directory Structure
	simple project setup that follows best practices
	dependency management
	isolation between project dependencies and plugins
	central repository system

» Integration Tools –Build Creation



» Good Practices in Maven configuration

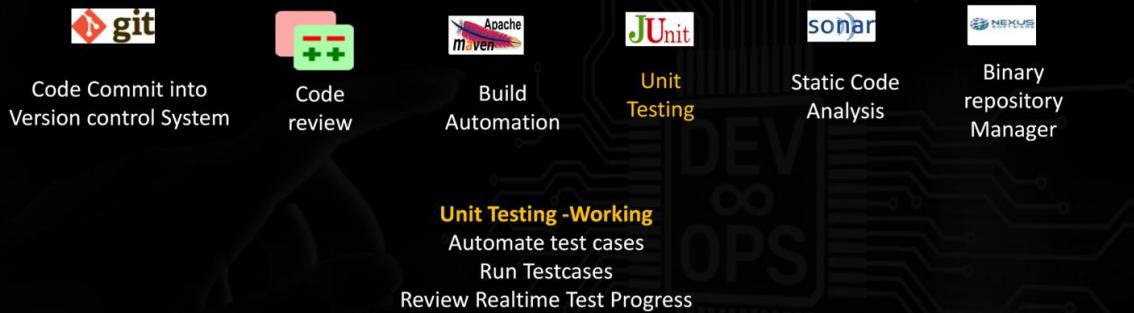
Maven Configuration: Good Practices

- Grouping Dependencies
- Use Properties Liberally
- Consider Using Profiles
- Comment Regularly

» Comparison with similar tools

Parameters	Maven	Ant	Gradle
License	Open Source	Open Source	Open Source
Reusability	Plugins and Libraries	Script not reusable	Reusable Script
Structure	Formal Conventions of Project structure	No Default Convention/Involves Scripting	Graph of Task Dependencies
Build Speed	Good	Best	Very Good
Language	XML	XML	DSL Language
Plugins	Highly extensible	Extensible	Extensible

» Integration –Unit Testing



» Integration –Unit Testing

Workflow of Junit Test case

Test Case



Using Junit

Reset the system

Execute:
Run the tests

Prepare Baseline for Testing
and Define Expected results

Validate test results

Using Junit

Reset the system

Execute:
Run the tests

Prepare Baseline for Testing
and Define Expected results

Validate test results

» Good practices of Implementing JUNIT

Junit: Good Practices

Write tests for methods that have the fewest dependencies first

Test only one code unit at a time

Make each test independent of all the others

Create unit tests that target exceptions

Mock out all external services and state

Do not load data from hard-coded locations on a filesystem

Name your unit tests clearly and consistently

» Comparison with similar tools

Parameters	Junit	xUnit	TestNG
License Terms	OpenSource	OpenSource	OpenSource
Programming languages Supported	Java	C#, F#, VB.NET and other .NET languages	Java IDEs - Eclipse, IntelliJ IDEA, and NetBeans
Levels	Cross platform	Cross platform	Cross platform
Run time	Supports integration • With automated integration testing	Supports integration • Visual Studio Community • .NET Framework 4.5.2 • TestDriven.NET • MSBuild Reference	Supports integration • With Maven tool

» About SonarQube



The SonarQube platform is an open source quality management platform,

It is used to continuously analyze , measure the technical quality of source code

It is capable of analysis from project portfolio down to the method level, and tracking the introduction of new Bugs, Vulnerabilities, and Code Smells

Attribute

- Measures Quality
- Issue Identification and Correction support
- Address Coding Rules
- Complexities
- Dashboards and reporting

Benefit

- Code Reliability
- Application Security
- Manage Technical Debts

» Integration -Static Code Analysis

Capabilities

- 〈/〉 **Multi-Language**
25+ Programming Languages
- ⌚ **Detect Tricky Issues**
Powerful Code Analyzers
- 🛡️ **Security Analysis**
Code Security, for everyone
- ♾️ **Enhance your Workflow**
CI/CD Integration, PR Decoration
- ⌚ **Built-in Methodology**
Focus on New Code
- 📊 **Release Quality Code**
Clear go/no-go indicators
- 🚀 **Elevate Your Game**
Sharpen your developer skills

7 Axes of Code Quality

BUGS

Code Reliability
Catch tricky bugs to prevent undefined behaviour from impacting end-users.

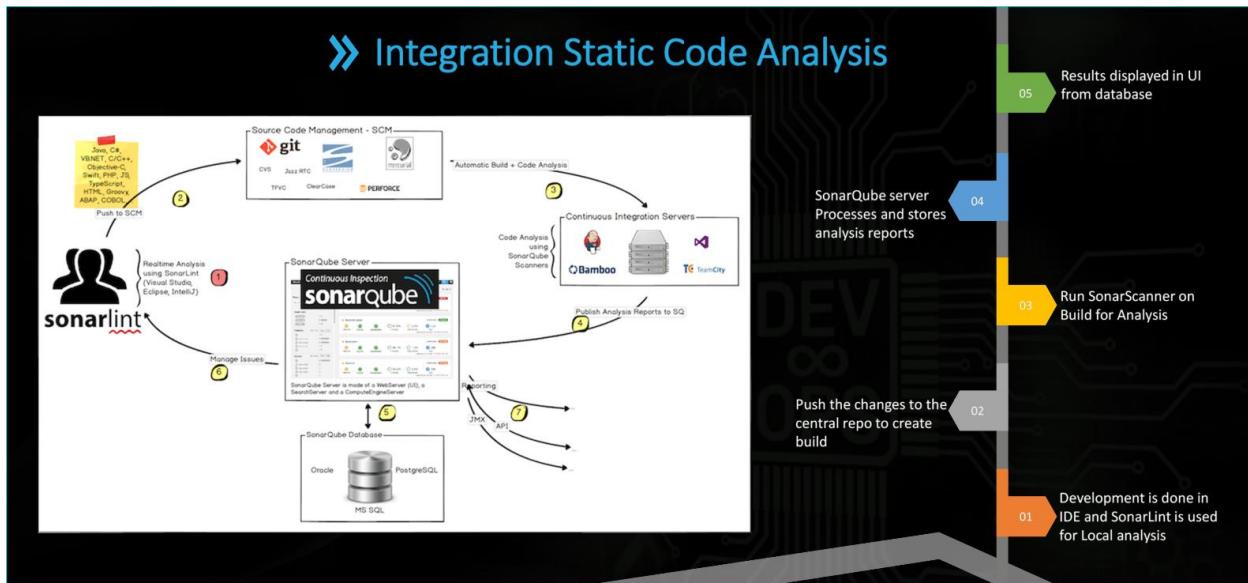
VULNERABILITIES

Application Security
Fix vulnerabilities that compromise your app, and learn AppSec along the way with Security Hotspots.

CODE SMELLS

Technical Debt
Make sure your codebase is clean and maintainable, to increase developer velocity!

Code Smells	258d (0)	11k (0)	5d (0)	133 (0)
Last 1 year ago				
Bugs & Vulnerabilities	622 (0)	46 (0)	11 (0)	2 (0)
Last 30 days started a month ago				
New Bugs	New Code Smells	New Vulnerabilities	New Bugs	New Code Smells



» Good Practices in SonarQube configuration

SonarQube Configuration: Good Practices

Fix issues before they exist – Configure SonarLint as an extension/plugin in IDE (IntelliJ, Eclipse and Visual Studio)

Integrate Sonar with your Build Server such as Jenkins, TeamCity.

Configure Additional Plug-ins to strengthen coding practices

» Good practices Sonar Qube Implementation

SonarQube Implementation : Good Practices

Enforce Quality Gates

Customize rules to quality profiles/ / Business Need/ Client Commitments

Monitor Graphs & Dashboards regularly

» Comparison with similar tools

Parameters	SonarQube	CAST	Appscan
License Cost	Commercial	Commercial	Commercial
Type of Analysis	SAST + DAST	SAST + DAST	SAST + DAST
Programming languages Supported	18 + Programming languages	Multiple Programming languages	18 + Programming languages
Levels	Enterprise Portfolio Level Analysis	Basic to Enterprise Portfolio Level Analysis based on Plan taken by client.	Enterprise Portfolio Level Analysis
Usage	Run at end of releases	Run at end of releases. AppScan has a strong Machine learning capability called Intelligent Finding Analytics (IFA). This IFA helps to reduce the false positives by 98%.	Run at end of releases
Run time	Few Hours	Time varies based on Code Base Size.	Few Hours



Integration –Storage



Code Commit into Version control System



Code review



Build Automation



Unit Testing



Static Code Analysis



Binary repository Manager

Attributes
Repository manager
Meta data and Storage of Artifacts

Benefits
Manage Dependencies
Easy Distribution



About Nexus



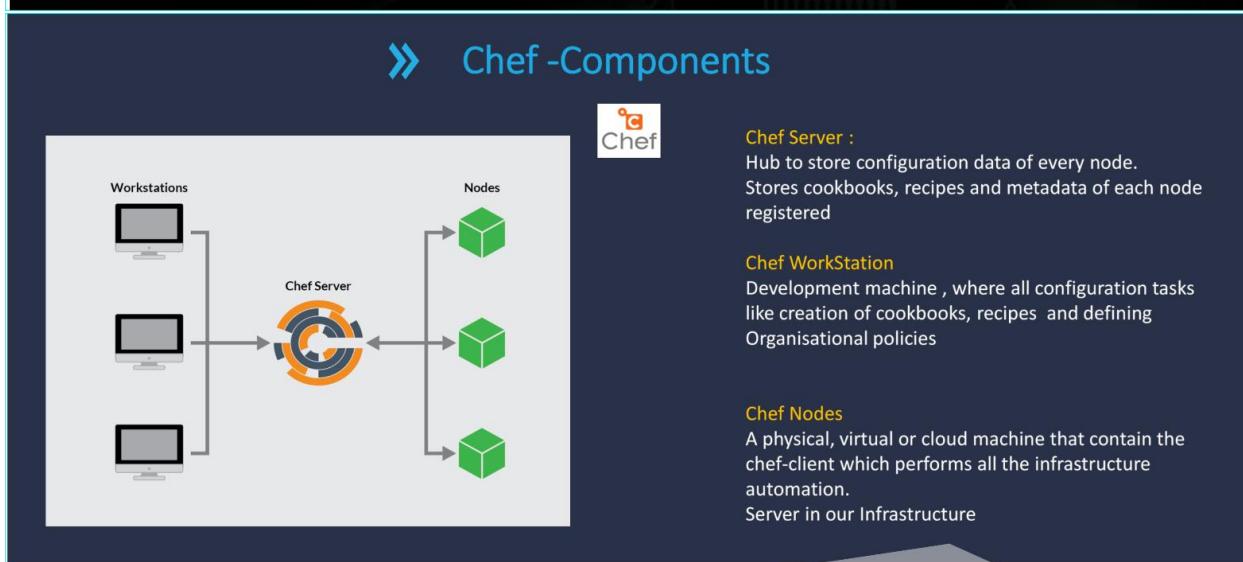
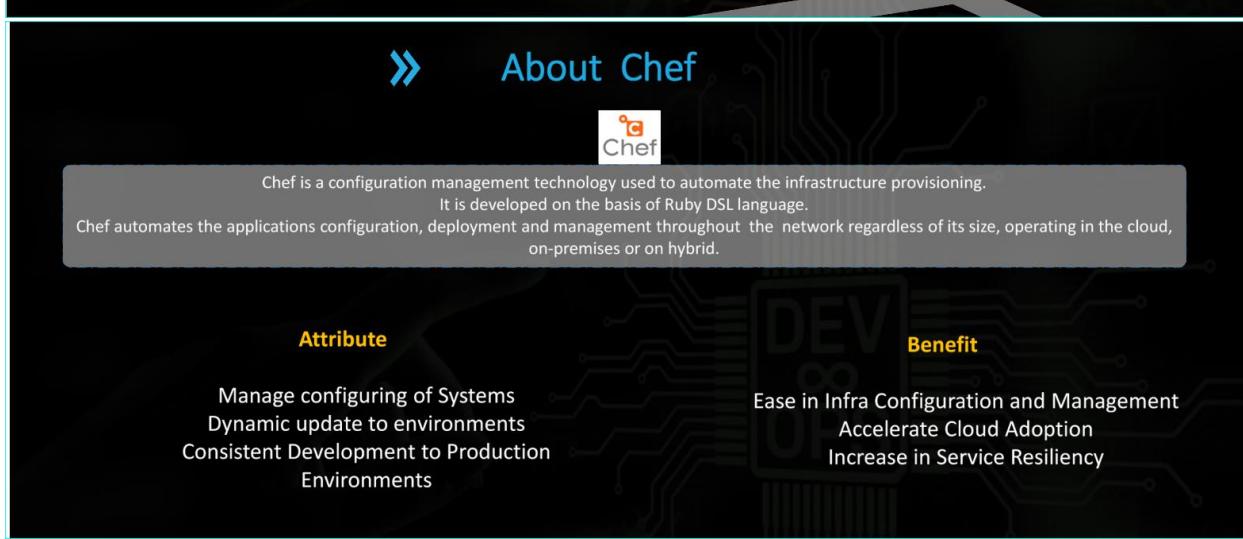
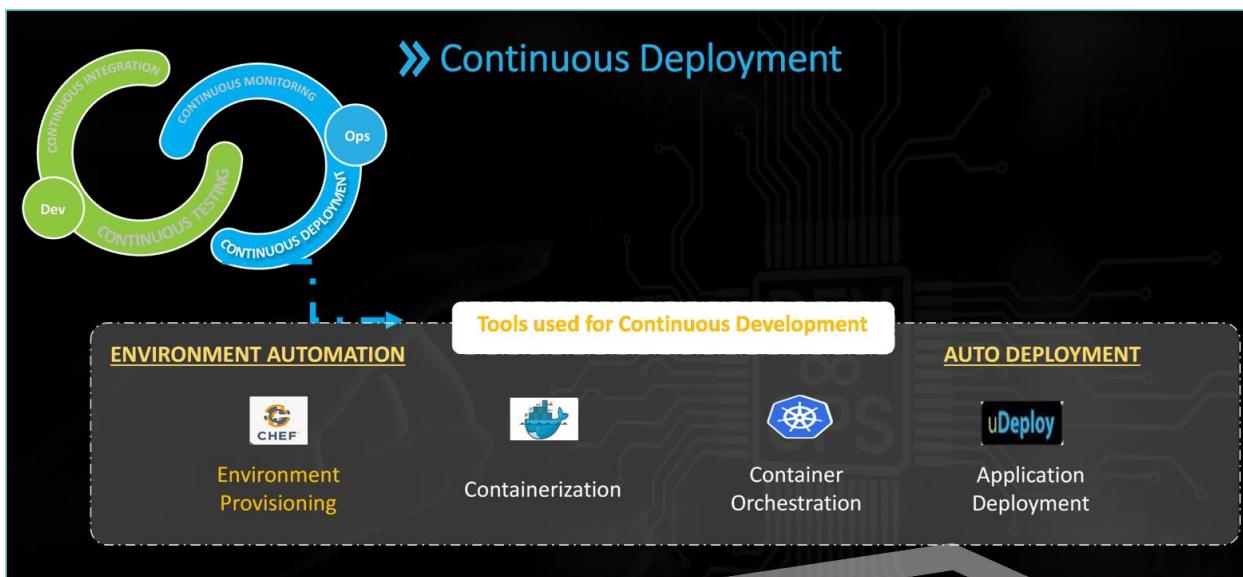
Capabilities of a Repository Manager

A repository manager can support the following use cases:

- allows you to manage binary software components through the software development life-cycle
- search and catalogue software components
- control component releases with rules and add automated notifications
- integrate with external security systems, such as LDAP or Atlassian Crowd
- manage component metadata
- control access to components and repositories
- display component dependencies
- browse component archive contents

» Comparison with similar tools

Parameters	Sona Type Nexus	Jfrog Artifactory	Apache Archiva
License	Open Source & Commercial	Open Source & Commercial	Open Source Apache 2.0
Support On-Premises & Cloud	Yes	Yes	yes
OS Support	Windows & Linux	Windows & Linux	Windows & Linux
Variants	Professional , Open source	Multiple like Enterprise, Cloud, Open Source, Professional	Open Source alone
Installation	easy	easy	easy



» Good practices of tool Implementation



Chef Implementation : Good Practices

Project creation and “readme driven development”

A sane build system with Rake

Continuous integration with Travis

TDD with Chefspec

Workflow with Spork

Verification with Minitest

» Comparison with similar tools

Parameters	Chef	Puppet	Ansible	Saltstack
License	Open Source	Open Source	Open Source	Open Source
Interoperability	High	High	High	High
Ease of Setup	Difficult	Difficult	Very easy	Difficult
Scalability	Very good	Very good	Very good	Very good
Configuration Language	DSL (Ruby)	DSL(Puppet DSL)	YAML(Python)	YAML(Python)

» Continuous Deployment

ENVIRONMENT AUTOMATION



Environment Provisioning



Containerization



Container Orchestration

AUTO DEPLOYMENT



Application Deployment



About Docker



Docker is a platform that provides containerization.

It allows for packaging of an application and its dependencies into a container, thereby, helping ease the development and accelerate the deployment of the software.

It helps maximize output by doing away with the need to replicate the local environment on each machine on which the solution is supposed to be tested.

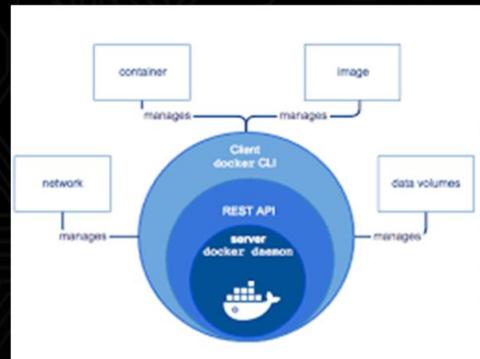
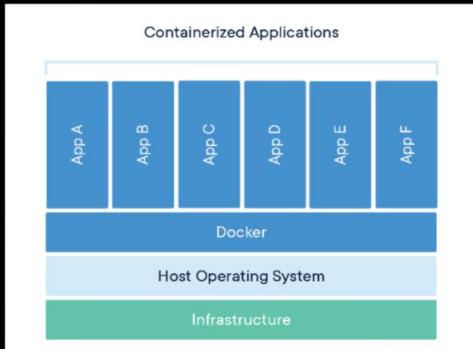
Attribute

- Virtualizes an operating system
- Applications can be distributed across a single host without requiring their own virtual machine
- Gives an app access to a single operating system kernel

Benefit

- Faster delivery of applications
- Consistent across multiple environments
- Deploy and scale easily

» Components



» Good practices of tool Implementation



Package a single application per container.

Properly handle PID 1, signal handling, and zombie processes.

Optimize for the Docker build cache.

Remove unnecessary tools

Build the smallest image possible

Properly tag your images.

Carefully consider whether to use a public image.

» Comparison with similar tools

Parameters	Docker Swarm	Kubernetes	OpenShift
Installation	Very Simple	Little Complex	Simple
Accessibility	Command Line Interface And third-party web based UI	Inbuilt Command Line Interface, API and Web based UI.	OpenShift offers Web Console, API and CLI for controlling and managing the entire stack.
Rollback	No inbuilt Rollback facility	Automatic Rollback	Automatic Rollback or trigger-based rollback
Scalability	High	High	High
Monitoring	In-Built Log Monitoring is not available(3 rd part tools extends capabilities)	Monitoring and Log Management are In-built	In-Built Log Monitoring/Alert management is not available(3 rd part tools GAP extends capabilities)
Licensing	Open Source , Commercial	Open Source (Enterprise level)	Commercial

» Continuous Deployment-Container Orchestration

ENVIRONMENT AUTOMATION



Environment Provisioning



Containerization



Container Orchestration

AUTO DEPLOYMENT



Application Deployment

» About Kubernetes



Kubernetes is a cluster and container management tool. It lets **you** deploy containers to clusters, meaning a network of virtual machines. It works with different containers, not just Docker.

The basic idea of **Kubernetes** is to further abstract machines, storage, and networks away from their physical implementation

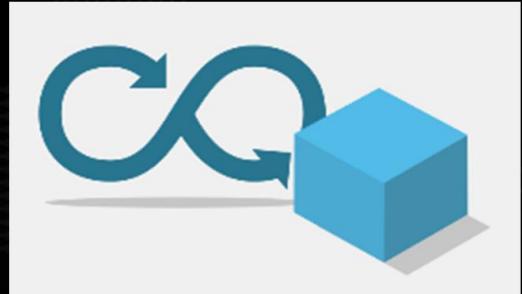
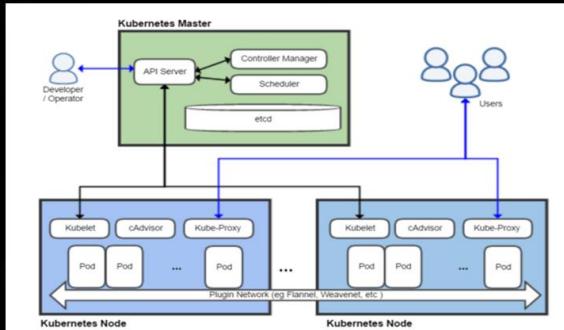
Attribute

- Triggered by just one action
- Steps are pre-defined, reproducible and predictable.
- Little or no human intervention
- Shows the deployment progress as it happens
- All steps are completed, or nothing happens.

Benefit

- Deployment of applications quickly and predictably
- Scaling of applications
- Seamless roll out new features
- Optimize hardware by using only the resources needed

» Continuous Deployment – Auto Deployment



» Best practices in Kubernetes Configuration



Use Kubernetes Namespaces for easier resource management.

Use readiness and liveness probes for health checks.

Keep control of your deployment with requests and limits.

Discover services running outside the cluster.

Decide whether to run databases on Kubernetes.

Understand Kubernetes termination practices.

» About UrbanCode Deploy



UrbanCode Deploy is an application release automation solution that combines robust visibility, traceability and auditing capabilities. It allows you to seamlessly deploy to distributed data centers, cloud and virtualized environments—on demand or on a schedule.

Attributes

Multi-tier application models

Easy process designer

Deploy to public, private and hybrid cloud

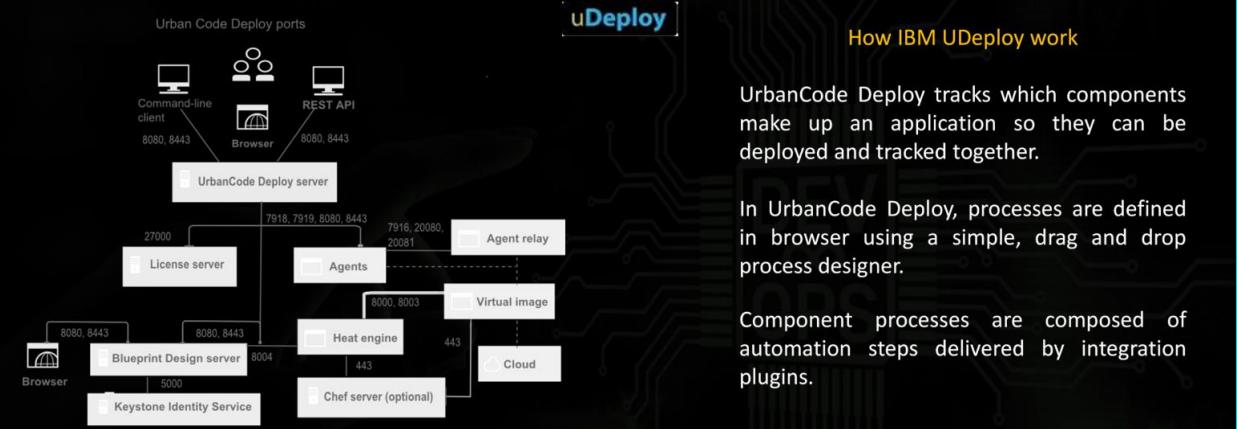
Track what is where: Inventory

Integrations replace custom scripting

Scalable distributed automation

Quality gates and approvals

» Continuous Deployment – UDeploy



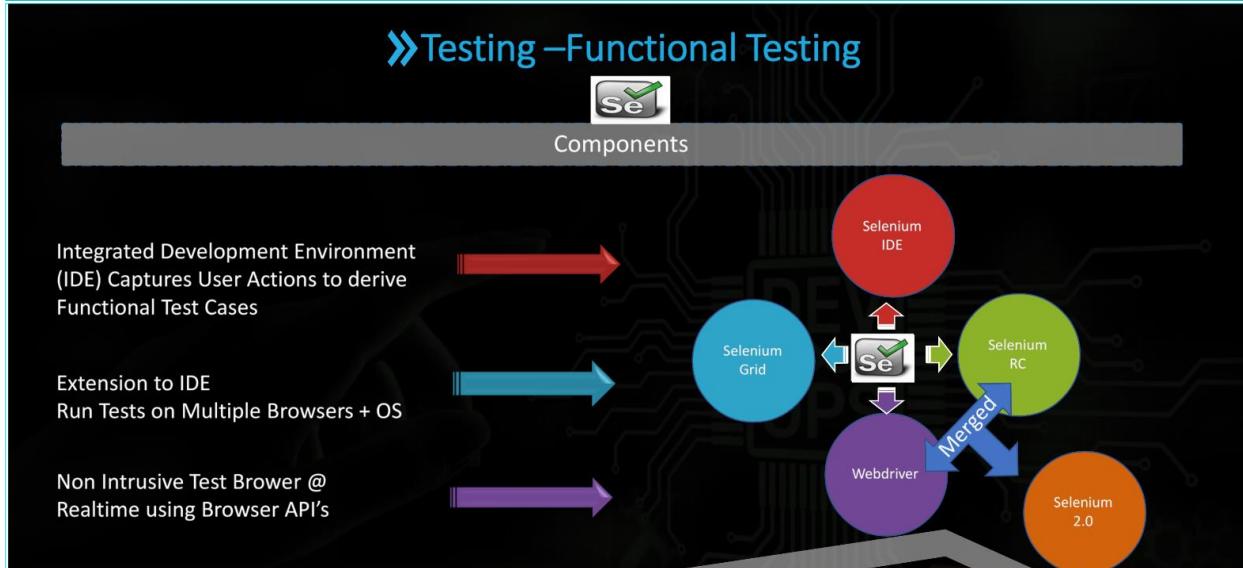
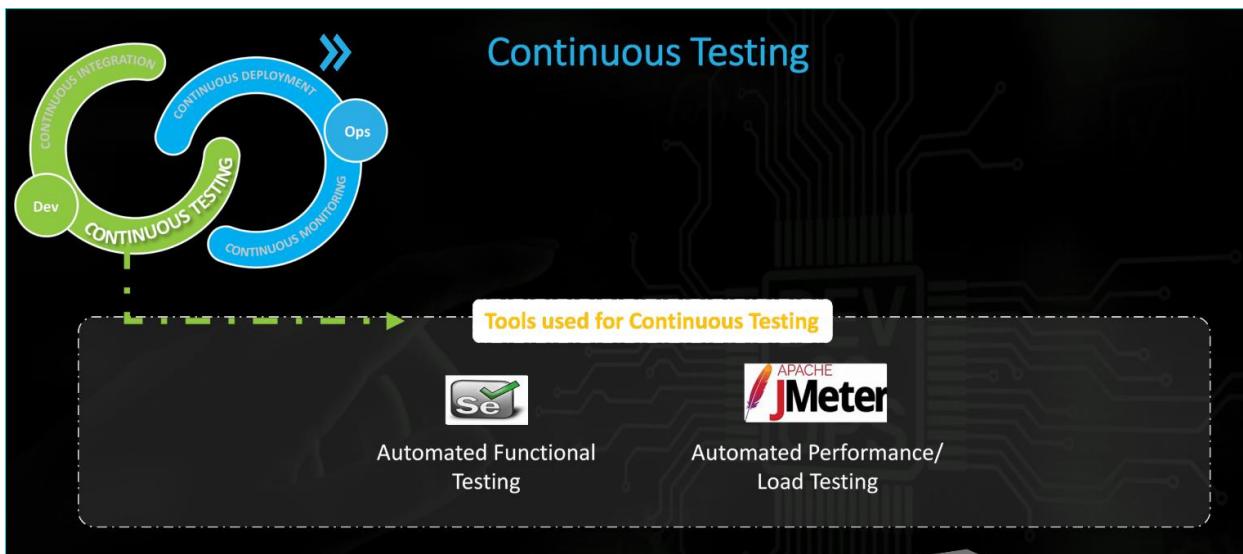
» Good practices of uDeploy Implementation

uDeploy Implementation

- Use the Graphical editor
- Reuse process templates
- Use Deploy Agents as Distributed workers
- Create Snapshots and reuse steps
- Use Inventory to track versions

» Comparison with similar tools

Parameter	IBM Udeploy	Octopus	Goode
License	Commercial	Commercial	Open Source
OS Support	Windows & Linux	Windows & Linux	Windows & Linux
Database Deployment	Yes	yes by using the integration of Red gate	yes to limited extent
Agent installation required for Deployment	Yes	Yes	Yes
Plugin support	yes	yes	yes



» Good practices of tool Implementation

Selenium Implementation : Good Practices

Use a HOOK to allow tests to bypass CAPTCHA

Connect to Social Media/Mail Pages Via APIs

Capture Page Title or H1 tag to ease Debug

Reduce Test Dependencies

Never execute Functional and Performance tests together in Selenium

» Comparison with similar tools

Parameters	Selenium	QTP	Test Complete
License	Open Source	Commercial	Commercial
Plugins	Highly Extensible	Limited Add-Ons	Extensible
Browsers	Can run tests across different browsers.	Can only run tests in Firefox, Internet Explorer and Chrome.	Can run tests across different browsers.
Operating System	Supports various operating systems.	Windows Only	Windows Only
Mobile Device Support	Supports mobile devices	QTP Supports Mobile app test automation (iOS & Android) using HP solution called - HP Mobile Center	Supports mobile devices
Multi Test	Can execute tests in parallel.	Can only execute in parallel but using Quality Center which is again a paid product.	Can execute tests in parallel
Languages	Java, C#, Ruby, Python	VB Script	VB Script, JS Script, Delphi, C# and C++

» About JMeter



JMeter is a software that can perform load test, performance-oriented business (functional) test, regression test, stress test, functional test . It is a Java application for load and performance testing.

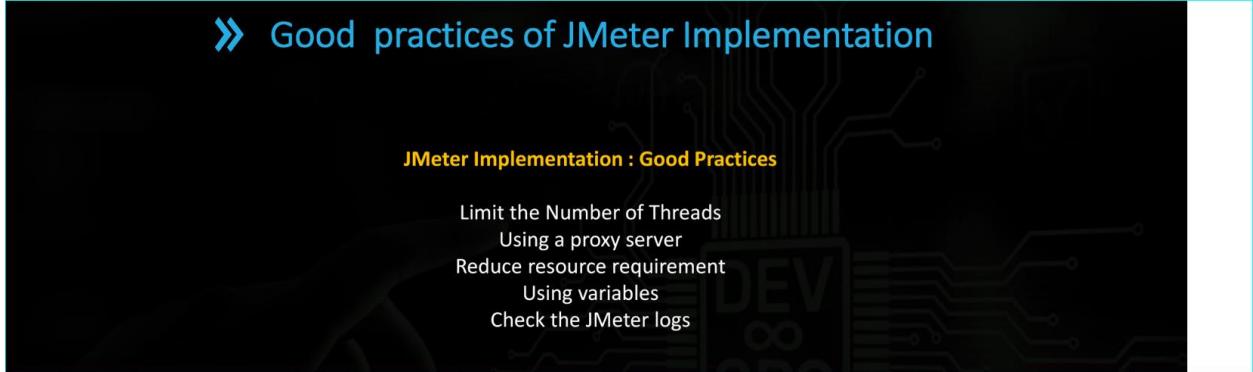
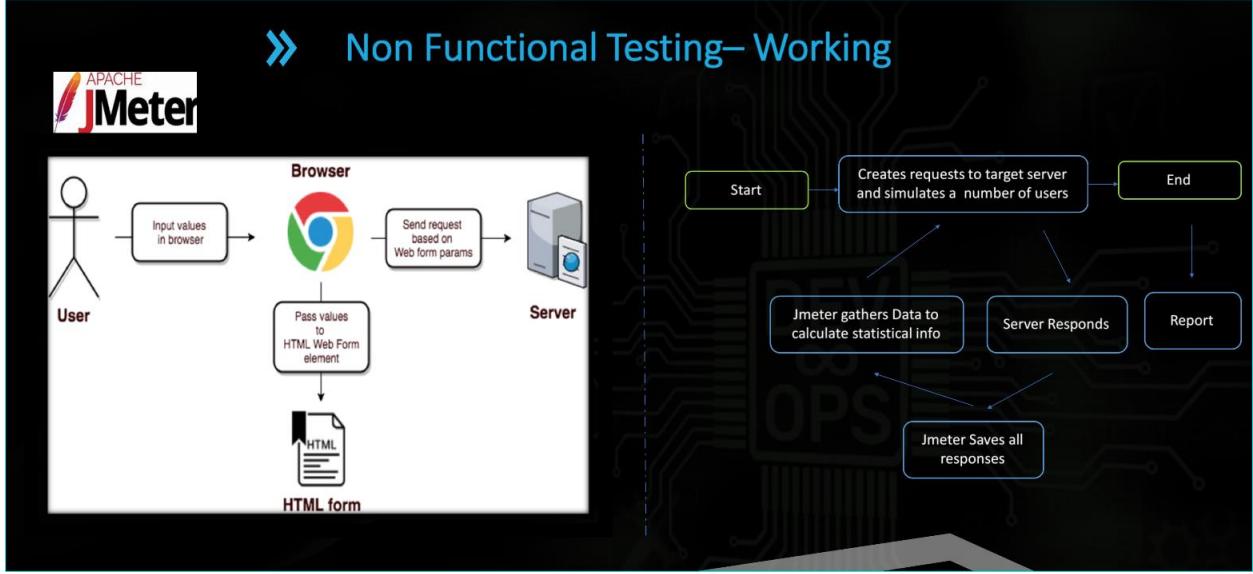
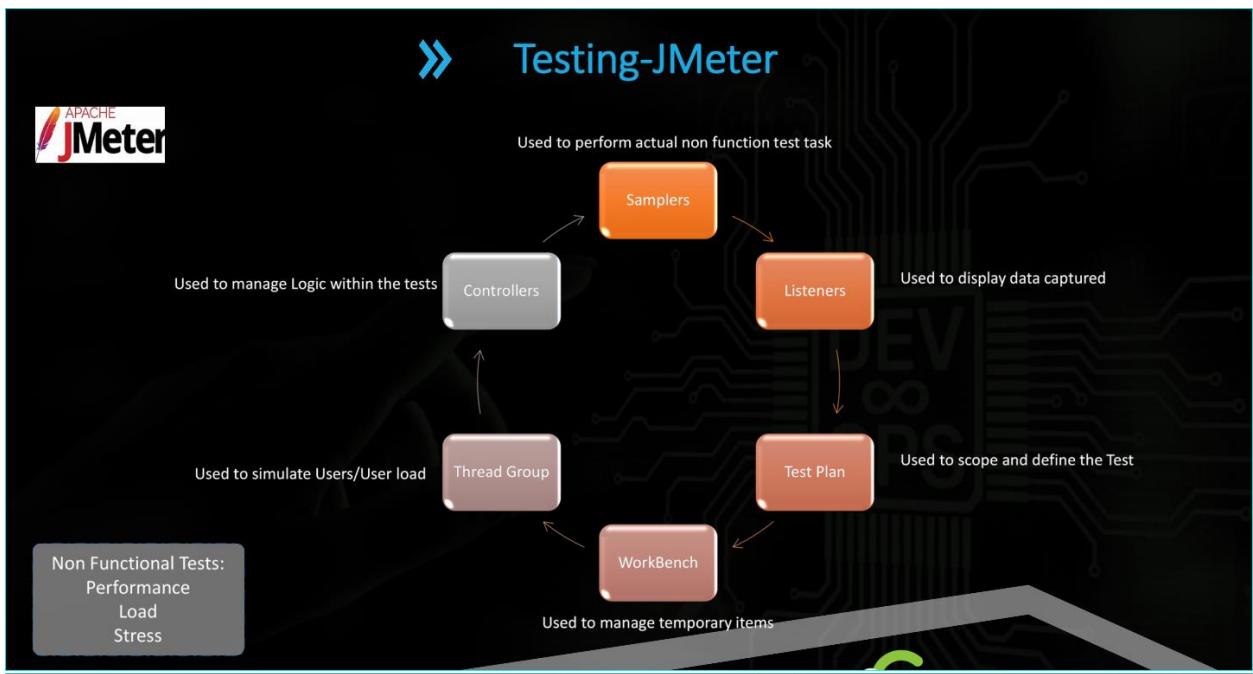
Jmeter, as seen is a good non functional web based application tester.

Attribute

Open Source - FreeWare
Highlights Performance Issues.
Understand system Operation under top Load and Resource Overload
Statistical Analysis

Benefit

Conduct Load and Performance Tests on different server types
Regression Tests
Internally built Simulator
Varied Load Tester
Distributed Testing Features



» Comparison with similar tools

Parameters	Jmeter	HP Load runner	Rational Perf. Tester
License	Installation Based	Based on Number of Users	Enterprise
Cost	Free	Commercial	Commercial
Load Generation Capability	Unlimited	Limited	Unlimited
Proficiency	Less Technical Proficiency	Highly Developed and Complex	Highly Developed and Complex
Ease of Use	Good	Very Good	Very Good
Platform compatibility	Windows, Mac and all UNIX based systems	Windows operating system or can be used as a cloud solution.	Windows, Mac and Linux AIX.

» Continuous Monitoring



► Tool used for Continuous Monitoring



Monitoring

» About Nagios



Nagios is a free and open source computer software application that monitors systems, networks and infrastructure.
Nagios offers monitoring and alerting services for servers, switches, applications and services.

Nagios is used for

- Network Monitoring
- Application Monitoring
- Infrastructure Monitoring

Attribute

Server-agent architecture
Uses Process Schedulers as trigger
Notifications
GUI updates

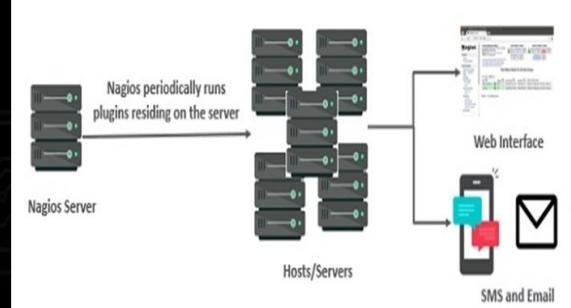
Benefit

Health check & monitoring system
Increased Application, Server Availability
Quick detection of network Outages
Customisable Reports and Dashboards

» About Nagios

Capabilities

Universal Monitoring
Efficient Alert Notification
Web dashboards
Issue escalation
Distributed Monitoring and Scalability
Reporting
External Application Integration



» Best practices of Nagios Configuration

- Use Folder Watch wizard to monitor temp files
 - Check User Account Expiry
 - Check Root mailbox size
 - Check Disk free space
- Set right Date and time zone

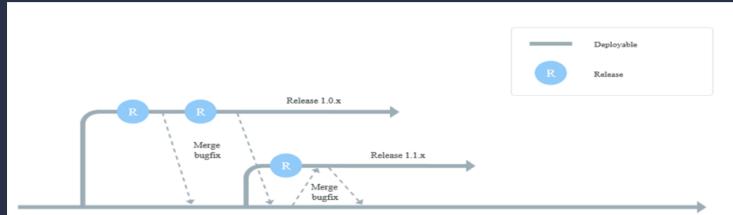
» Comparison with similar tools

Parameters	Nagios	Zabbix	Microsoft SCOM
License Cost	Free	Free	Commercial
Mater OS	Linux	Linux	Windows
Agent	Required	Required	Required
Database	Required	Required	Required (Only MS-SQL)
Reporting Plugin	Grafana	Internal	Internal



Trunk Based Development

Trunk based development avoids complexity of merging from different branches

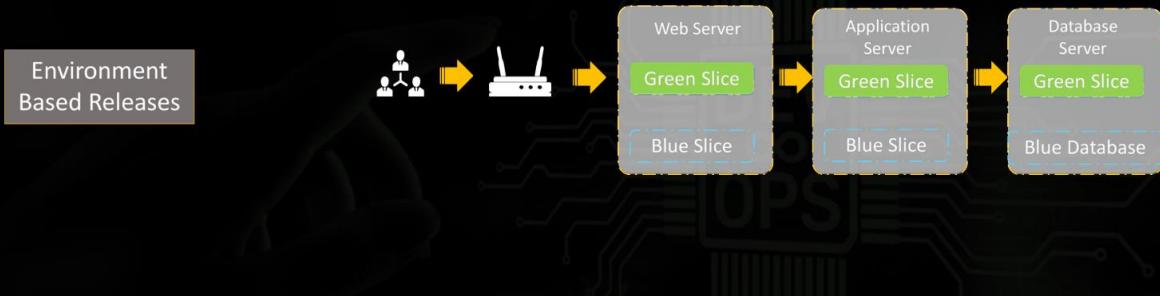


Companies like Google, Facebook use Monorepos which are trunk based development strategies



Blue Green Deployment

Release on Demand - Decouple release from Deployment: Blue Green Deployments



Canary releases & Feature Toggles

Release on Demand - Decouple release from Deployment-Feature Toggles for Canary launches

Application Based Releases





Security Operations

Code Inspection for independent unit of code can be automated with DevOps and assess code for potential vulnerability.
Tools Used: SonarQube, Fortify DevInspect, Veracode Greenlight

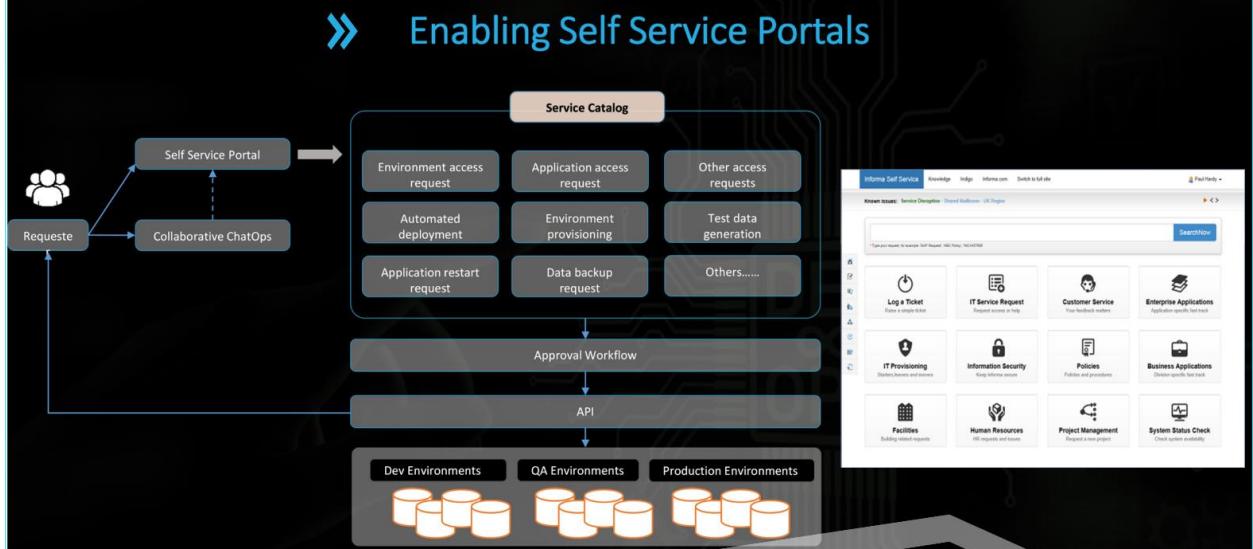
Dynamic Application Scanning can be integrated with DevOps to assess application/infra for runtime vulnerabilities. This scan will be performed post whole application integration.
Tool used : IBM AppScan Standard (AppSec), Web Inspect (AppSec), QualysGuard (Infra – Servers/FW/IDS etc.)



Automated Remediation

Attributes of Automated Remediation

- Retry Failed Operations
- Circuit Breaker
- Isolate Critical Resources
- Fail Over
- Automated Server recycling
- Throttle clients





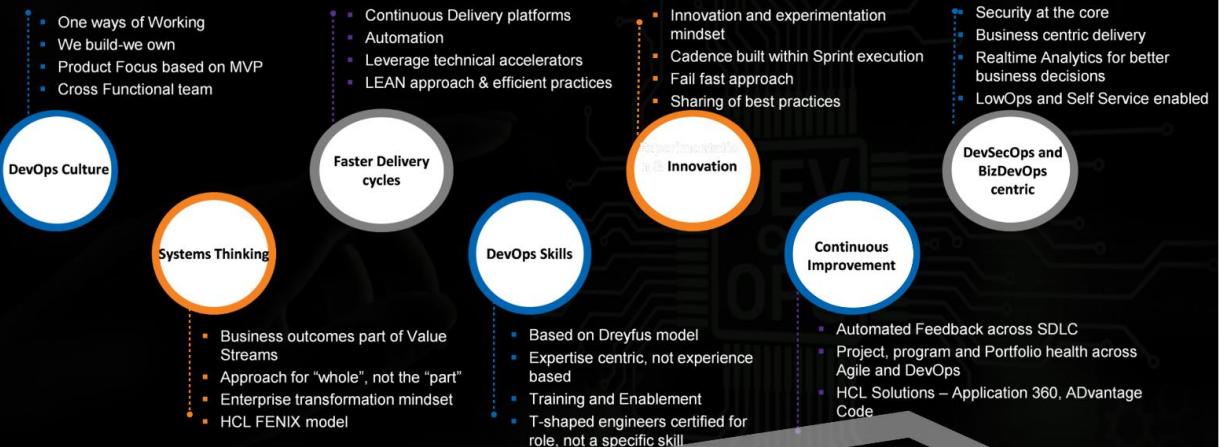
Choice of tools

Tools used from Planning to Monitoring

SDLC area	Tools	SDLC area	Tools
Agile planning	Redmine, Rational CLM, TFS, VSTS, HP Agile Manager, Jira, Confluence, Rally, VersionOne	Source Control	Git, SVN, Perforce, Rational Clearcase, TFS, Bitbucket, Accurev
SDLC area	Tools	SDLC area	Tools
Build Management	Ant, Maven, Gradle, Rational RTC, BuildForge, MSBuild	Continuous Integration	Jenkins, Rational RTC, TFS, VSTS, HP ALM, Bamboo, Teamcity, Shippable
SDLC area	Tools	SDLC area	Tools
IaaS	Chef, Puppet, Ansible, Saltstack, Terraform	Containers and container management	Docker, RKT, LXC, Kubernetes, Docker Swarm
SDLC area	Tools	SDLC area	Tools
Continuous Release and deployment	Go CD, Octopus Deploy, IBM Urelease, IBM Udeploy, InRelease, HP Cedar, HP OO, CA RA, XLDeploy	Code Quality	Junit, SonarQube, IBM Appscan, FxCop, Crucible, FishEye, CAST, Resharper
SDLC area	Tools	SDLC area	Tools
Continuous quality and compliance	SoapUI, Selenium, Rational Test Workbench, HP UFT, HP SV, Zephyr, CA LISA, CA Pathfinder, TOSCA, Blazemeter, Jmeter	Application and Infrastructure Monitoring	Nagios, Tivoli, HP SiteScope, CA APM, Zabbix, Dynatrace, NewRelic, AppDynamics



DevOps offered at HCL



DevOps Essentials

