

Pivotal.

Open.
Agile.
Cloud-Ready.



Continuous Delivery Fundamentals

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Agenda

- Definitions
- Value of Going Fast
- Benefits Continuous Integration & Delivery
- CD Pipeline + Platform
- Source Code Repository: Git with GitLab
- CI/CD: CloudBees Jenkins
- Artifact Repository: Artifactory by JFrog
- Summary

Definitions

Continuous Integration

- Merging dev work with mainline trunk constantly to test changes independently and with other changes
- Build server automated unit tests

Continuous Delivery

- Delivery of code to an environment (UAT, STG, PROD) once the dev feels the code is ready to ship.
- Deliver to user base for non-automated testing (biz logic)

Continuous Deployment

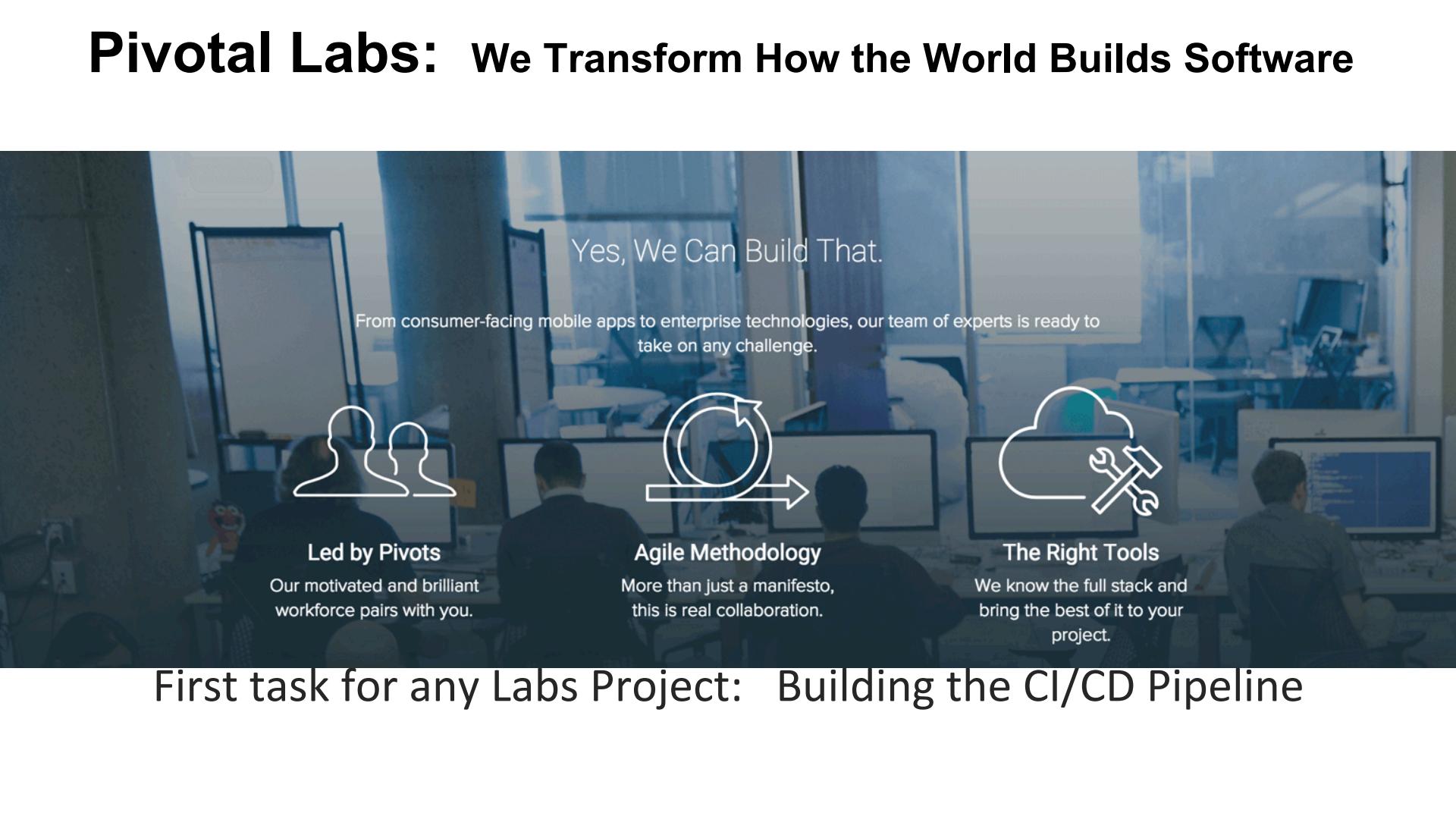
- Deployment or release of code to Prod as soon as ready
- Prod branch is always stable & deployable.

→ Does your organization engage in these practices?

→ What tools do you use?

The Value of Going Fast

Pivotal Labs: We Transform How the World Builds Software



Yes, We Can Build That.

From consumer-facing mobile apps to enterprise technologies, our team of experts is ready to take on any challenge.



Led by Pivots

Our motivated and brilliant workforce pairs with you.



Agile Methodology

More than just a manifesto, this is real collaboration.

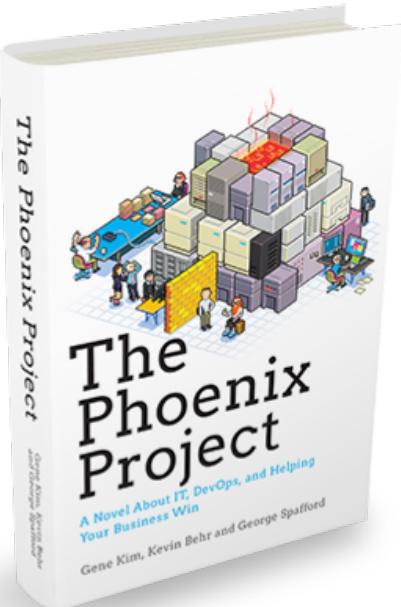


The Right Tools

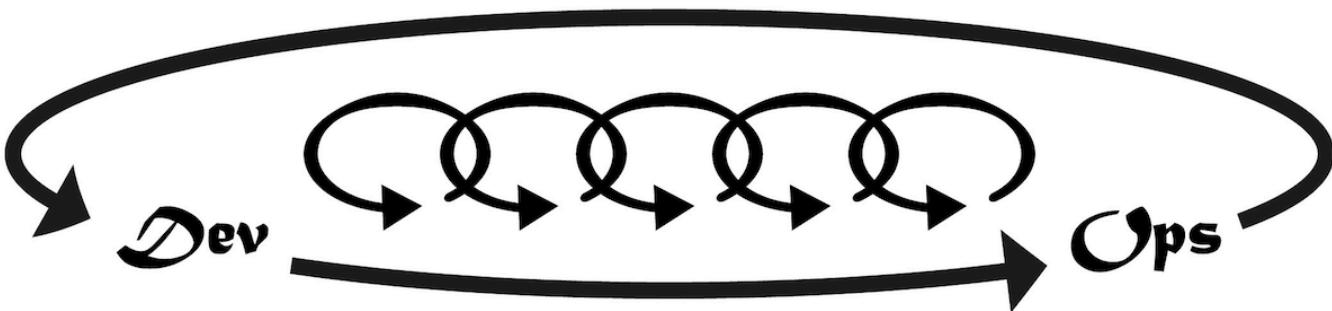
We know the full stack and bring the best of it to your project.

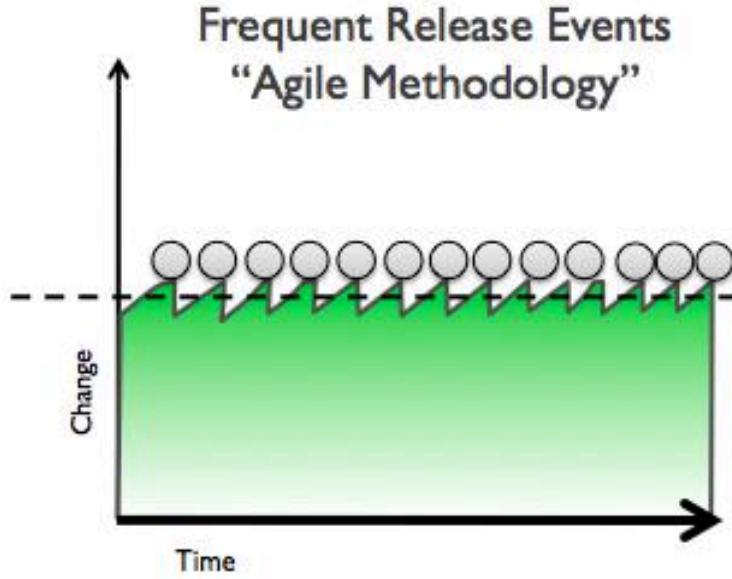
First task for any Labs Project: Building the CI/CD Pipeline

The Three Ways, according to Gene Kim

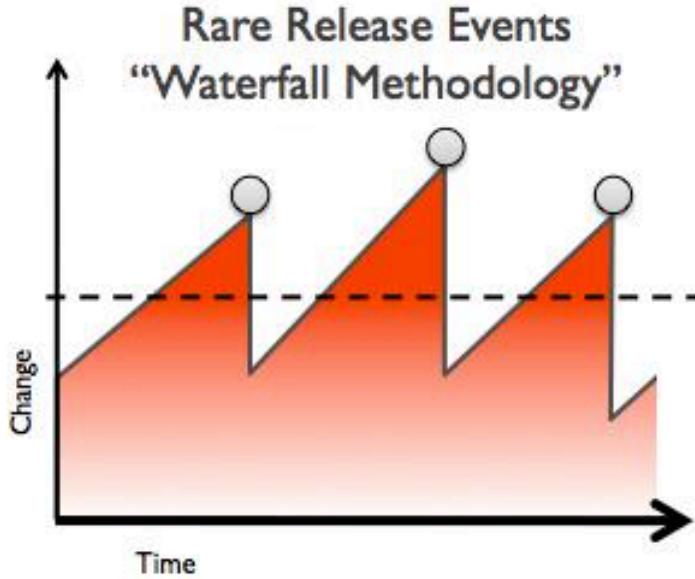


- Flow
- Feedback
- Continual Experimentation and Learning





Smoothen Effort
Less Risk



Effort Peaks
High Risk

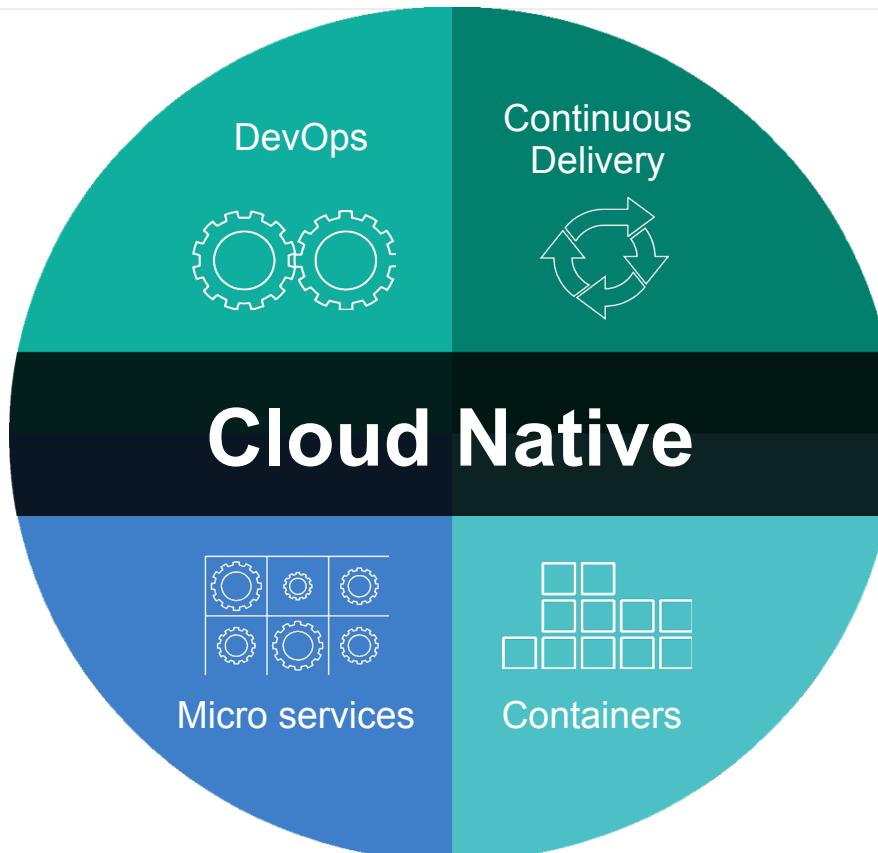
Benefits of Continuous Integration & Delivery

Continuous Integration



Continuous Integration is a software development practice where members of a team integrate their work frequently, usually each person integrates at least daily - leading to multiple integrations per day. Each integration is verified by an automated build (including test) to detect integration errors as quickly as possible.

Continuous Delivery is one pillar of Cloud Native



The Business Case for Continuous Delivery

- Faster reaction times and time to market
- Reduced risk
- Exposed inefficiencies and costs
- Flexible release options

<https://www.atlassian.com/continuous-delivery/business-case-for-continuous-delivery/>

You're doing Continuous Delivery when



- Your software is deployable throughout its lifecycle
- Your team prioritizes keeping the software deployable over working on new features
- Anybody can get fast, automated feedback on the production readiness of their systems any time somebody makes a change to them
- You can perform push-button deployments of any version of the software to any environment on demand

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CD Pipeline + Platform

Continuous Integration & Delivery

Deliver High Quality Software, Faster and Continuously From Idea to Production

AUTOMATION.

Integrate tools and automate processes from testing to builds and deployment

SPEED.

Release more frequently with smaller bits will reduce complexity and improve time-to-market

QUALITY.

Reduce feedback loop using test-driven development to surface problems sooner and be responsive

AGILITY.

Push updates on regular basis with no downtime to improve customer experience and time to market

Build Pipeline Operations

Commit Code Change

Automate Build & Test
(Unit Test, Static Code Analysis)

Store Binaries & Build Artifacts

Automated Integration Testing

Acceptance, Performance & Load

Zero Downtime Upgrade to Production

Tool Chain



GitLab



Jenkins

artifactory



Pivotal CF
Development



Pivotal CF
Test + UAT + Staging



Pivotal CF
Production

Distributed revision control and source code management. Collaborative software development

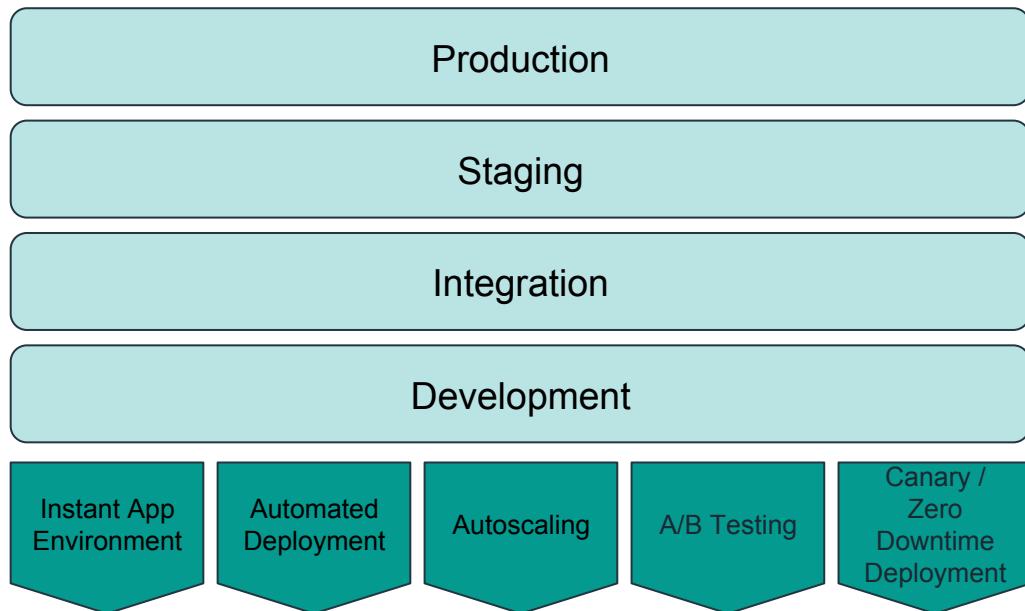
Build and test software projects continuously and incrementally. Hundreds of compatible plugins

Share binaries and manage distributions. Manage artifact lifecycle. Avoid license violations

Develop, test, QA and production on the same platform. Simple, developer friendly commands and APIs. Operational benefits for every app. Built-in ecosystem services. Deploy, operate and scale on any IAAS

Platform Support for CD Processes

- Baseline environments consistent
- Inject environment-specific config and external dependencies
- Consistent API across environments and operations
- Promote apps with same process
- Support for advanced operations





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Source Code Repository: Git with GitLab



What is GitLab for Pivotal CF?

- Source control product using git
- Includes git repository management, code reviews, issue tracking, wikis and much more
- Provides a managed solution, including automated deployment, configuration, scaling and upgrade



Benefits of GitLab for Pivotal CF

For developers

- Access to a managed git repository
- Powerful web interface that supports the developer workflow
- Intuitive pull requests, code review and commenting functionality
- Supports inner sourcing

For cloud operators

- Push button deployment of a managed git solution
- Automated upgrades of software components and GitLab through Ops Manager, with persisted data and configuration
- Not required to be an expert in Git to cater for Day 2 operations



Features

- Based upon GitLab Enterprise edition
- Highly Available web-tier out of the box
- Utilises external MySQL & Redis components - which we recommend to be Highly Available
- Utilises either the internal single node NFS server or an external solution
- Registered URL for the web-ui with Cloud Foundry
- Git connection via HTTPS using the registered URL
 - SSH access can be enabled by the operator with some additional setup



Useful Links

- Documentation - <http://docs.pivotal.io/gitlab/>
- GitLab Documentation - <http://doc.gitlab.com/ee/>
- Pivotal Network Download -
<https://network.pivotal.io/products/p-gitlab>



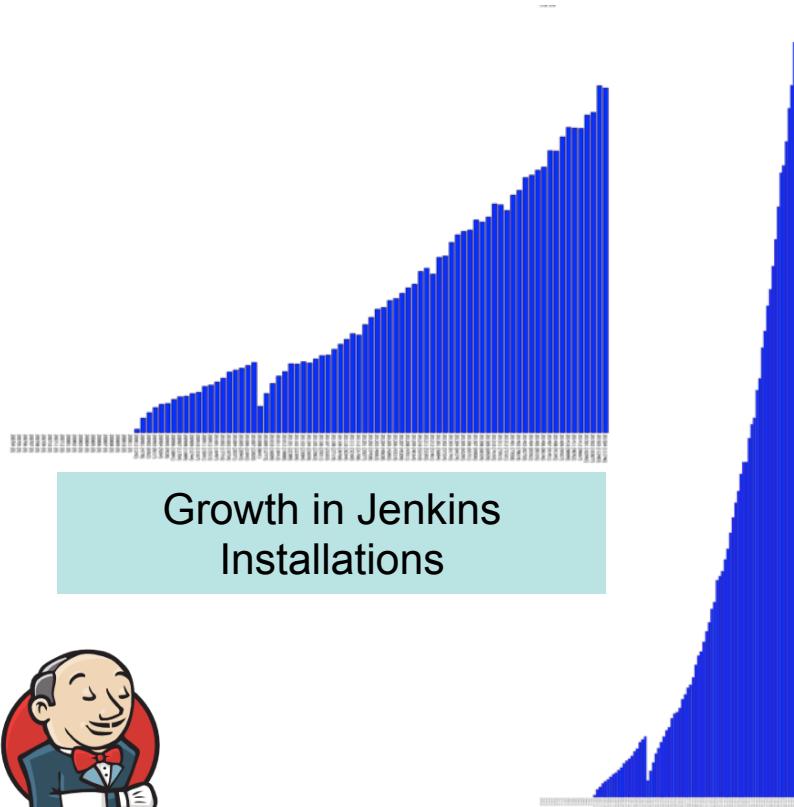
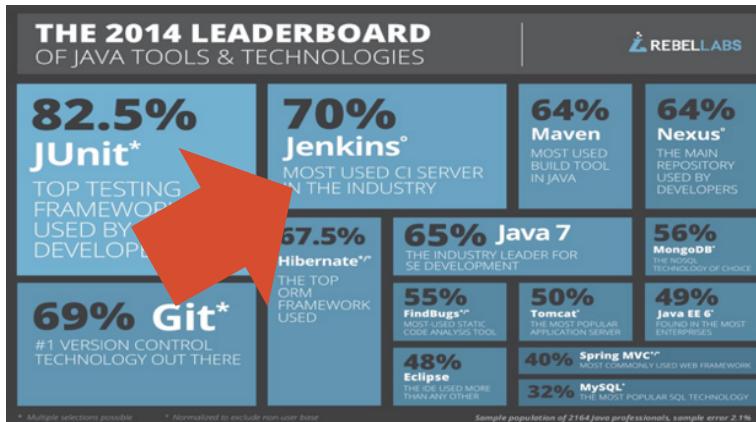
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CI/CD: CloudBees Jenkins



Meet Jenkins

- #1 Continuous Integration and CI tool
- Java web application
- MIT-licensed, 8 years old
- 500+ releases



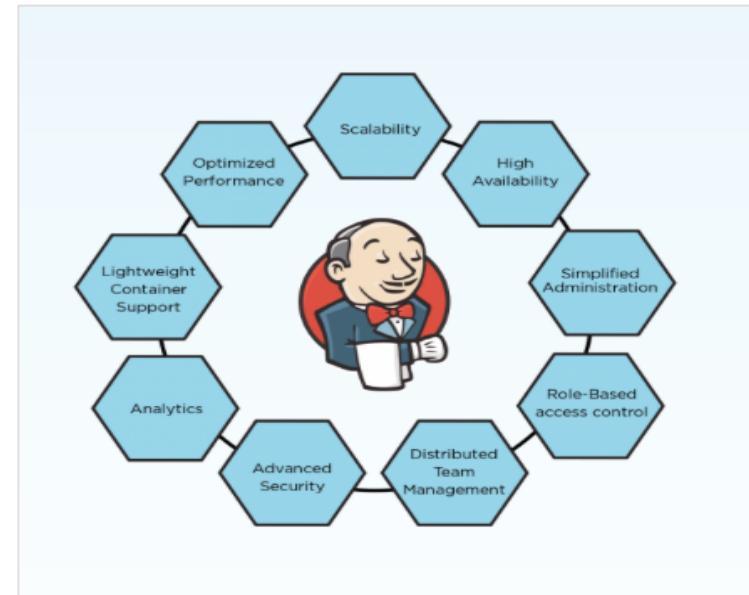


CloudBees Jenkins Platform

The CloudBees Jenkins Platform is the industry's most proven, fully featured technology platform for implementing continuous integration (CI) and continuous delivery (CD).

Includes

- The core open source Jenkins technology (Long Term Support version).
- Advanced enterprise features developed by CloudBees.
- Professional technical support for Jenkins and all open source community Jenkins plugins.





CloudBees Jenkins Platform for Pivotal CF

Enterprise-grade

- One click install and scale CloudBees Jenkins with Pivotal Ops Manager
- Build apps using Jenkins on PCF Elastic Runtime build packs for Java, node and Ruby
- Maven and Gradle pre-configured for Java apps
- Integrated authentication with Pivotal CF's UAA to provide single sign-on
- Support for role-based authentication and authorization

Automation

- Quickly provisions instances of configured services for use in development, testing, and staging
- Deploy applications directly from CloudBees Jenkins to PCF
- Single channel to install and download CloudBees Jenkins Platform via PCF

Container Support

- Docker-enabled slaves on CJP 15.05 for Pivotal Cloud Foundry- a game changer for Jenkins admins and for dev teams

Enterprise-Only – No OSS Support

- Most of these features are not available with OSS CF or OSS Jenkins!



Useful Links

- Documentation -
<http://docs.pivotal.io/cloudbees/Jenkins.html>
- Jenkins Documentation -
<http://documentation.cloudbees.com/docs/platform-intro/index.html>
- Pivotal Network Download -
<https://network.pivotal.io/products/cloudbees>



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Artifact Repository: Artifactory by JFrog



What is JFrog Artifactory for Pivotal CF?

- JFrog is the only company providing a complete platform for automated software package management from development to distribution.
- Advanced repository manager
- Powerful enterprise features and fine grained permissions
- Reliability - As a local proxy to the outside world, Artifactory guarantees consistent access to the components needed by your build tools.
- Efficiency - Remote artifacts are cached locally for reuse, so that you don't have to download them over and over again.
- Security - Advanced security features give you control over who can access your artifacts, and where they can deploy them.
- Stability - Supports large load bursts with extremely high concurrency and unmatched data integrity.
- Automation - Automate all aspects of artifact management using a powerful REST API.



Benefits of JFrog for Pivotal Cloud Foundry

For developers

- Access to a powerful artifactory repository
- Internal & Private Docker Registry access
- Powerful web interface that supports the developer workflow

For cloud operators

- Push button deployment of a managed artifact repository solution
- Automated upgrades of software components and JFrog Artifactory through Ops Manager, with persisted data and configuration
- Not required to be an expert in JFrog Artifactory to cater for Day 2 operations



Features

- Highly Available web-tier out of the box
- Utilises an external MySQL which we recommend to be Highly Available
- Utilises either the internal single node NFS server or an external solution
- Based upon JFrog Artifactory Enterprise edition
- Registered URL for the web-ui & Docker Registries with Cloud Foundry



Docker Registry

JFrog Artifactory provides a built in Docker Registry, which has the following features:

- Acts a secure & private repository
- Supports V1 & V2 Docker APIs
- Can provide secure and consistent access to remote images by caching them locally
- Work needs to be completed to ensure this fully works with Diego

<https://www.jfrog.com/confluence/display/RTF/Docker+Repositories>



Licensing

- Customer can obtain a trial licence [here](#) - 30 day free trial
- Or buy a real licence [here](#)
- Customer must buy an Enterprise licence, as the product operates in HA mode only
- A licence for each of the two nodes is required
- The licence must be input during the installation of the tile in OpsManager
- The customer agrees to the JFrog Artifactory license when they agree to the EULA on PivNet
- All licences are direct between the customer & JFrog



Useful Links

- Documentation - <http://docs.pivotal.io/jfrog/>
- GitLab Documentation -
<https://www.jfrog.com/confluence/pages/viewpage.action?pageId=46107472>
- Pivotal Network Download -
<https://network.pivotal.io/products/p-jfrog-artifactory>

Summary

Major Points

- Evolutionary forces rule software development. The most competitive techniques will survive as their practitioners thrive.
- Cloud Native implies and Platform supports...
 - CI/CD
 - Microservices
 - DevOps
- PCF + Git + Jenkins + Artifactory
 - ⇒ World-Class Open Source CI/CD Pipeline
 - ⇒ Seamlessly integrates into PCF Developer & Operator Experiences

Common Questions

What's Spinnaker?

Spinnaker helps codify the process of reliably deploying artifacts to the cloud, leveraging industry best practices out-of-the-box. Spinnaker supports multiple cloud platforms, including Cloud Foundry, Amazon AWS and Google Cloud Platform and comes from Netflix.

What's Concourse?

Concourse is a powerful tool for building elaborate, custom build pipelines with many dependencies and stages. Concourse could be used for CI/CD, but for simple use cases it is arguably less “user-friendly” than Jenkins.

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