



CI CD with Jenkins Workshop





Somkiat Puisungnoen

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**[https://github.com/up1/
workshop-ci-cd-with-jenkins](https://github.com/up1/workshop-ci-cd-with-jenkins)**



Continuous Integration

Continuous Delivery/Deployment



Why CI/CD ?



Pipeline with Jenkins 101

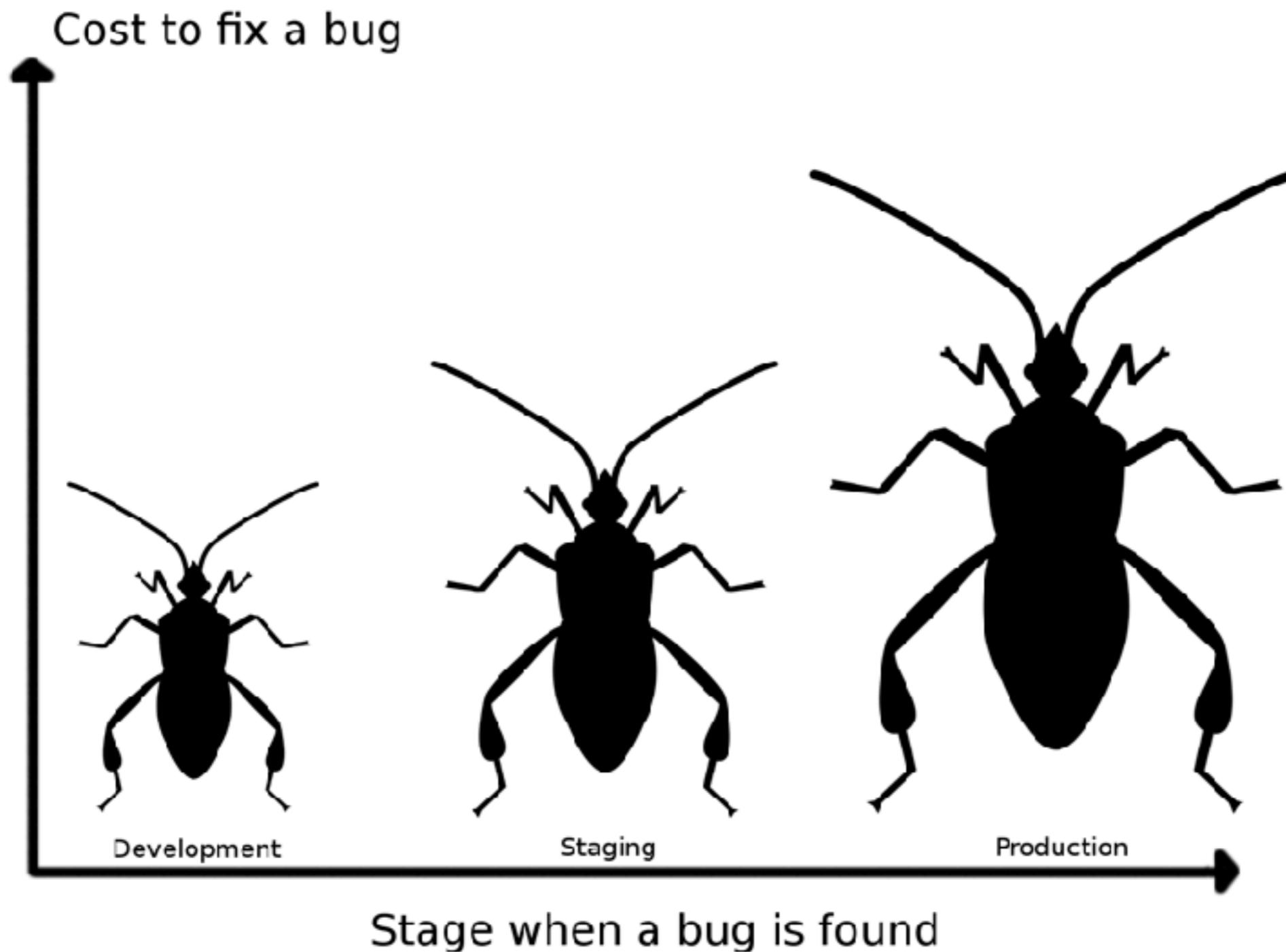


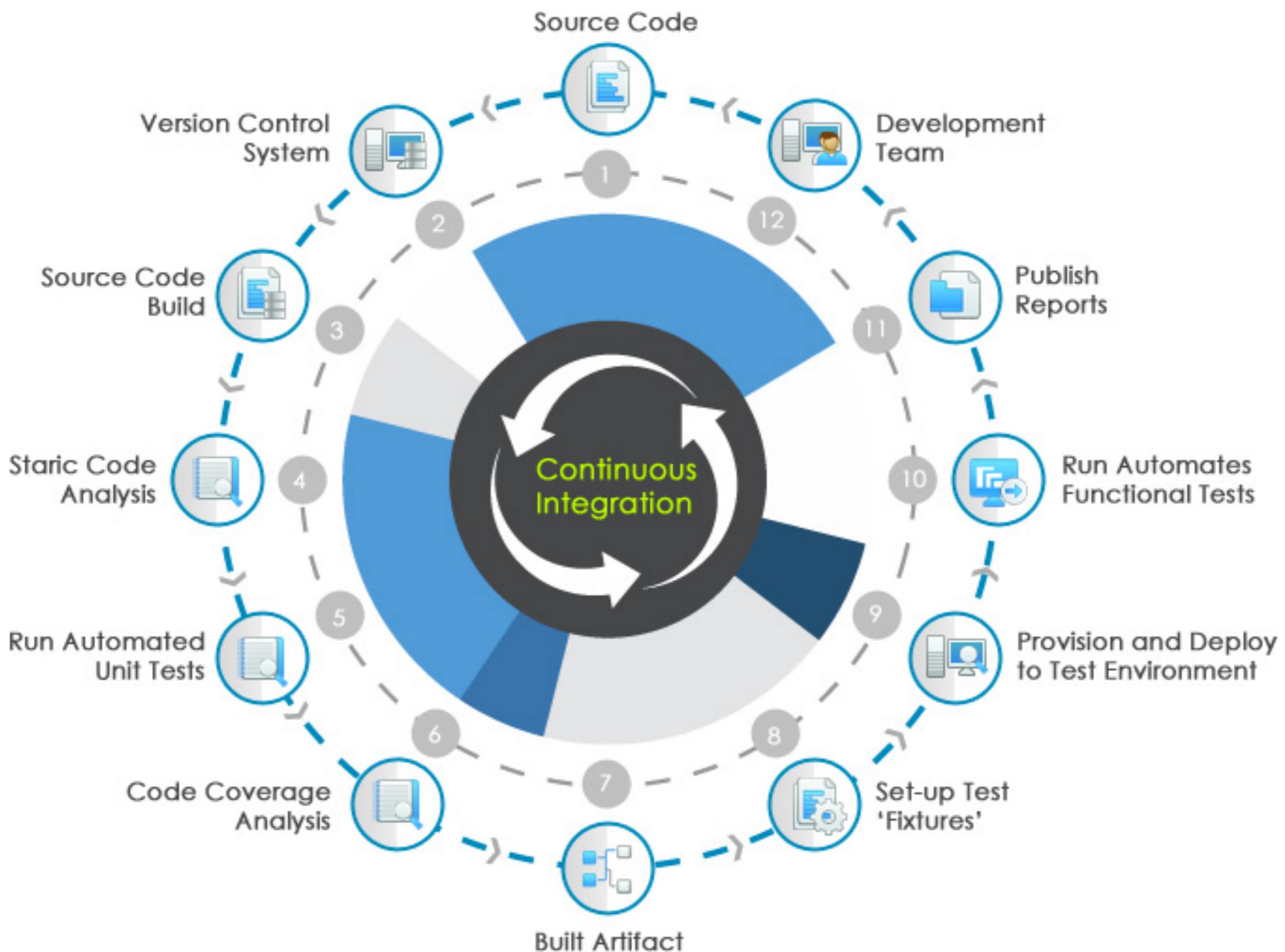
The cost of integration

1. Merging the code
2. Duplicate changes
3. Test again again !!
4. Fixing bugs
5. Impact on stability



The cost of integration







Jenkins

Bamboo



TeamCity

> goTM



Hudson





Jenkins

Bamboo

CI is about what people do
not about what tools they use



Visual Studio



Team Foundation Server

Hudson



Travis

wercker

circleci



Continuous Integration

Discipline to integrate frequently



Continuous Integration

Strive to make **small change**



Continuous Integration

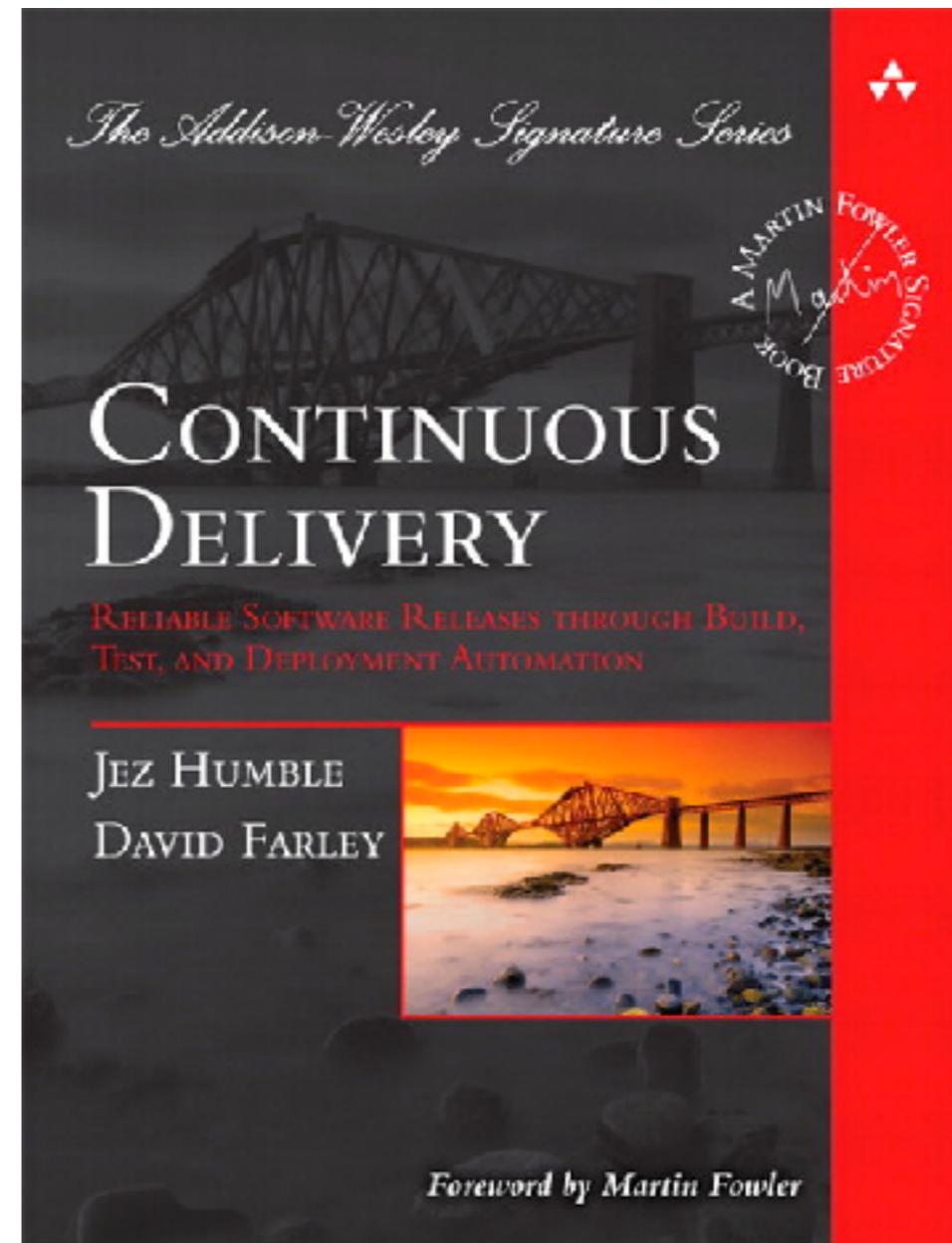
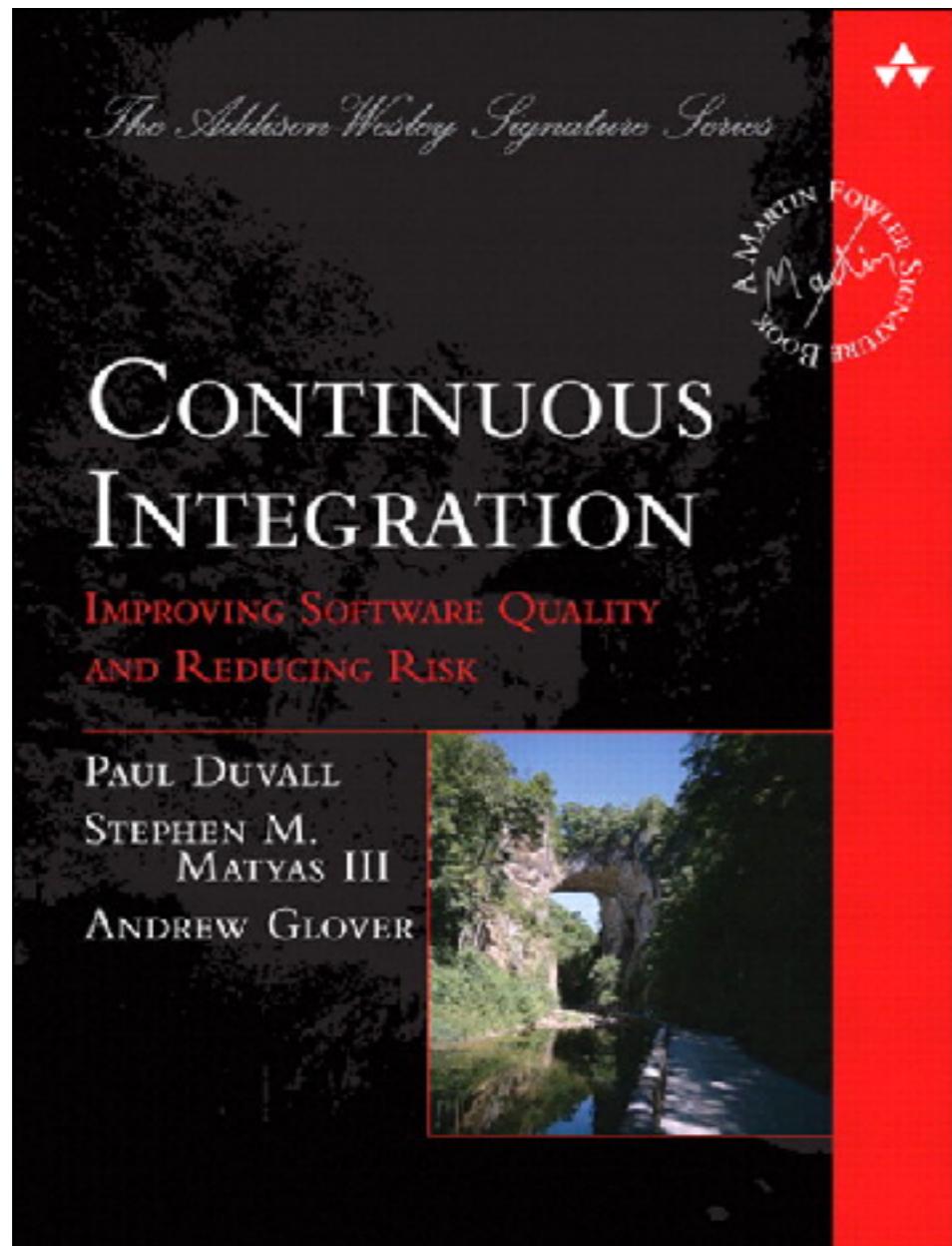
Strive for **fast feedback**



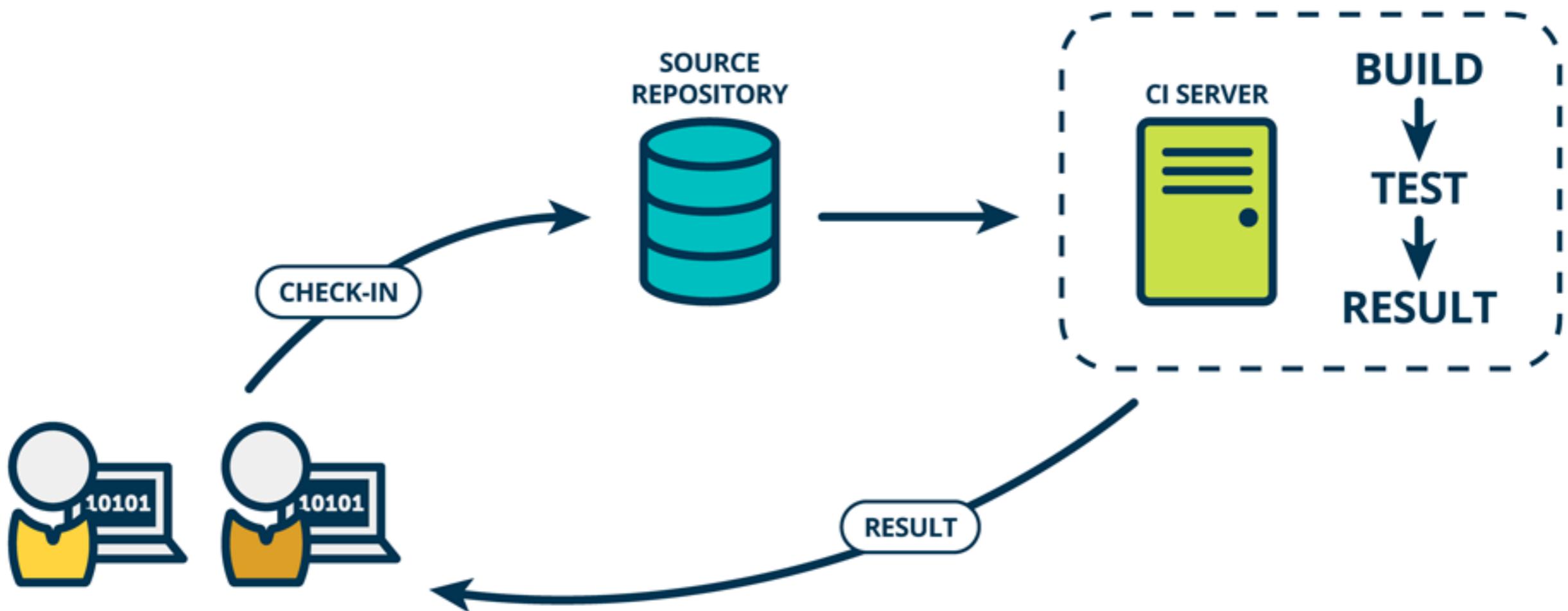
Practices of Continuous Integration



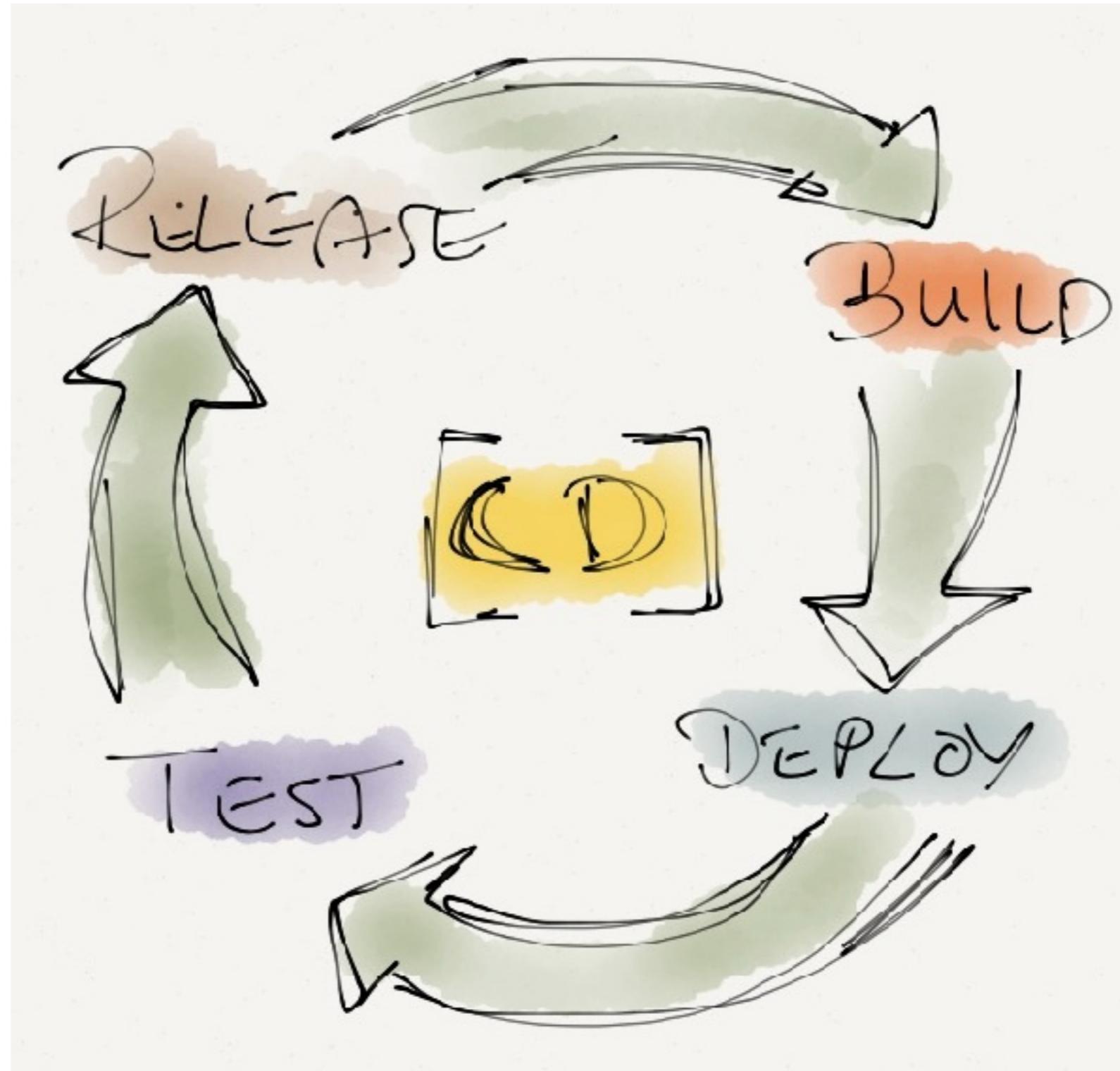
Improve quality and reduce risk



Continuous Integration



CD ?



CD ?

CONTINUOUS DELIVERY



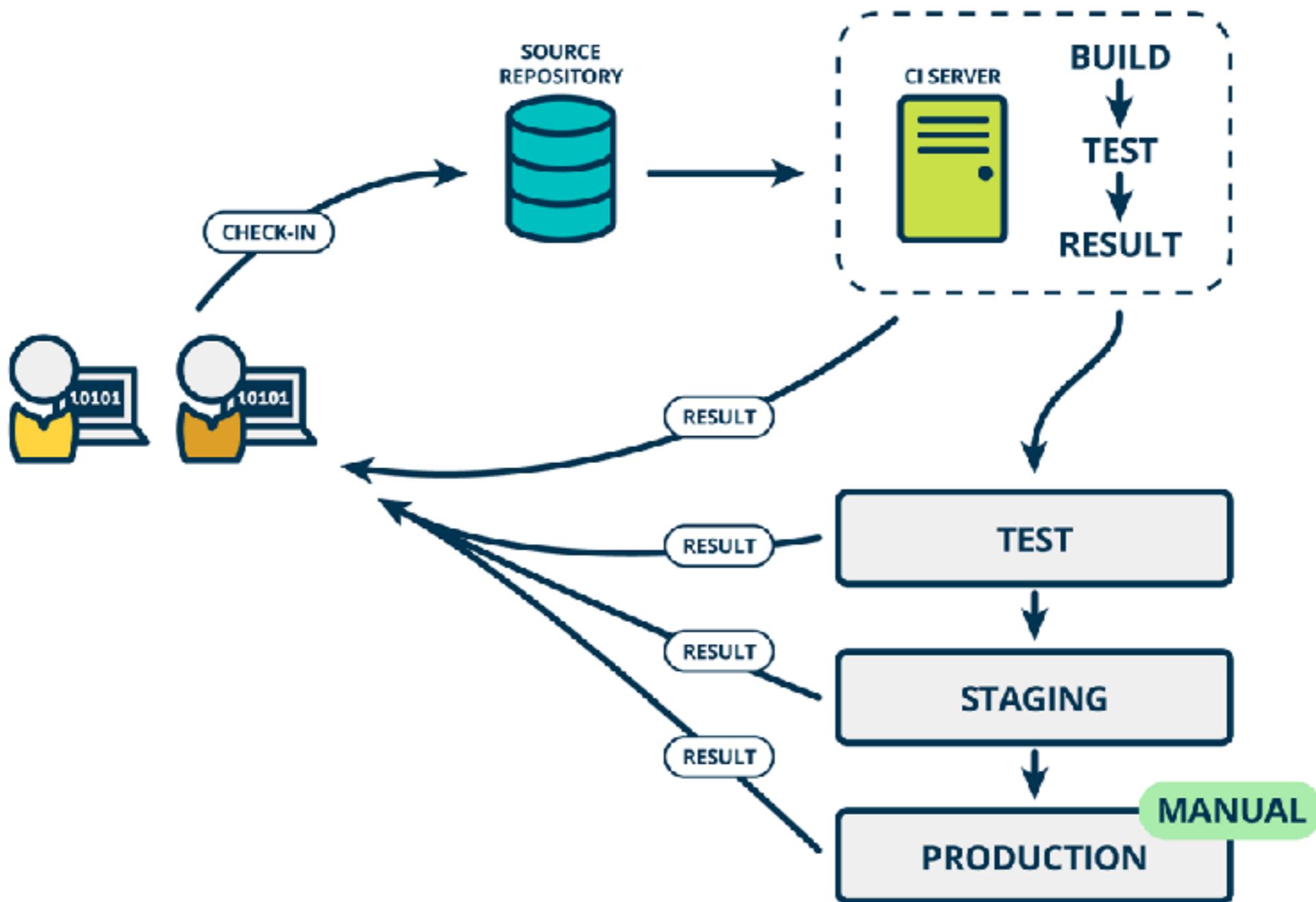
CONTINUOUS DEPLOYMENT



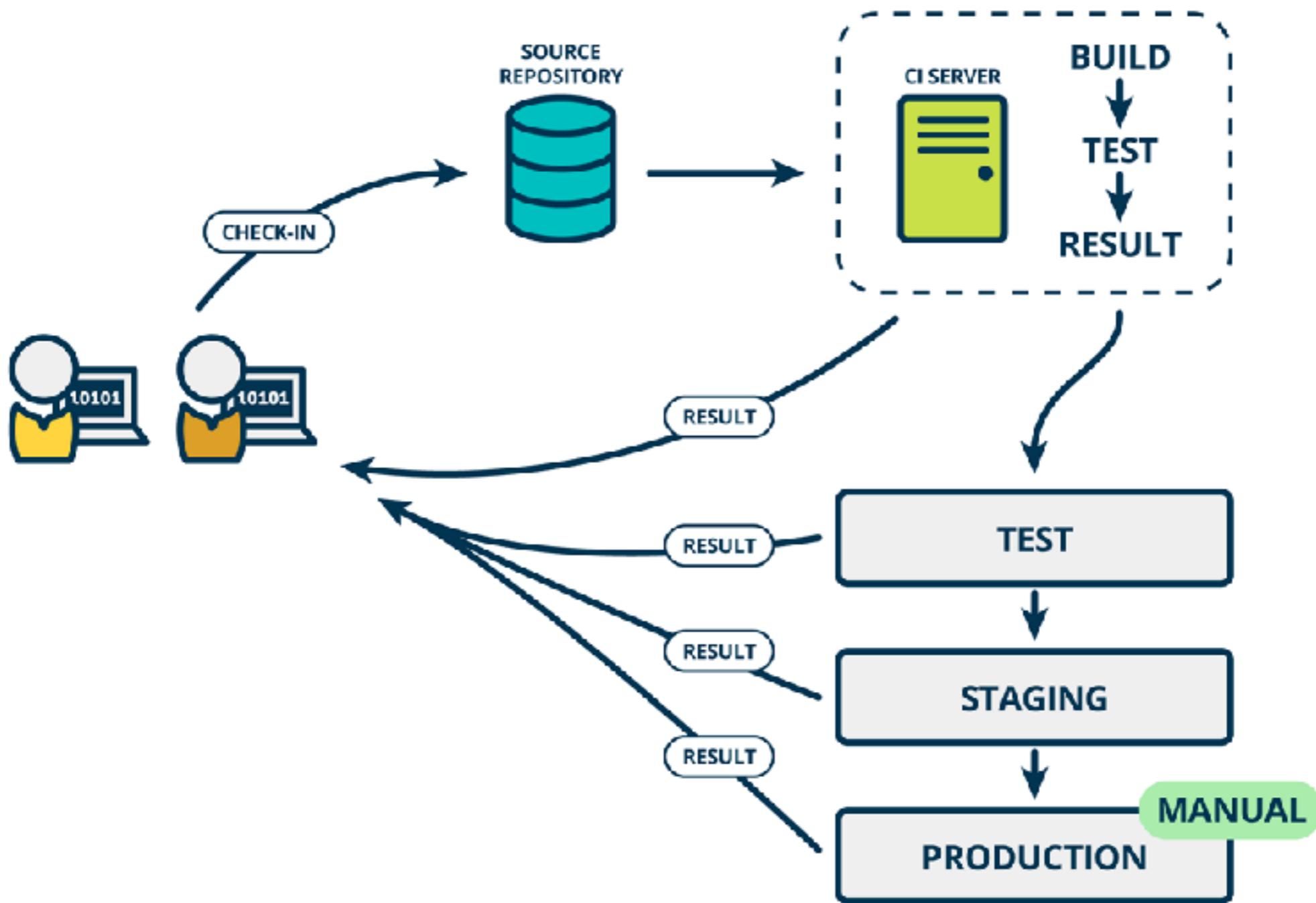
<http://blog.crisp.se/2013/02/05/yassalsundman/continuous-delivery-vs-continuous-deployment>



Continuous Delivery



Rise of DevOps



Continuous Integration

is a Software development practices



Practice 1

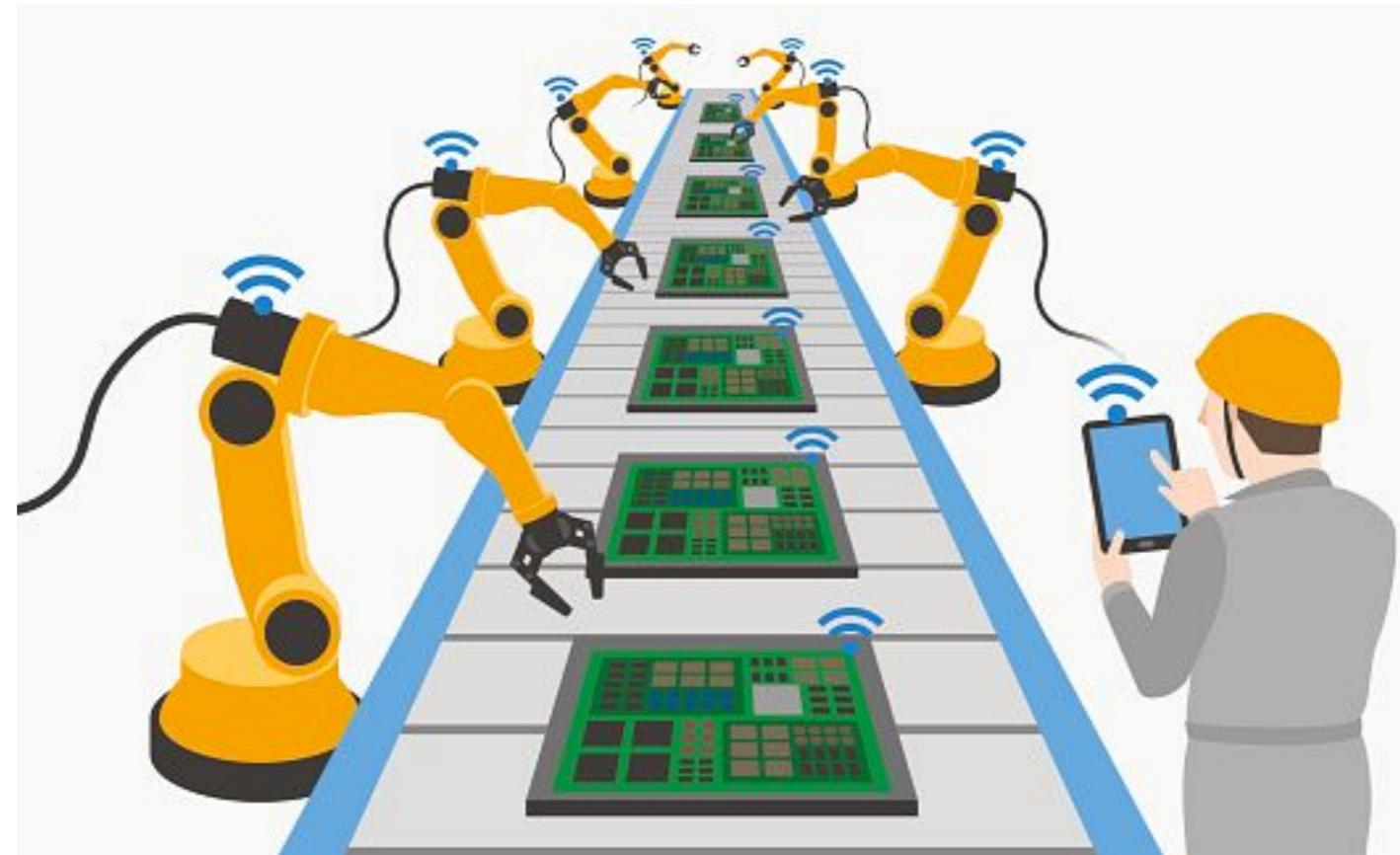
Maintain a single source repository

In general, you should store in source control
everything you need to build anything



Practice 2

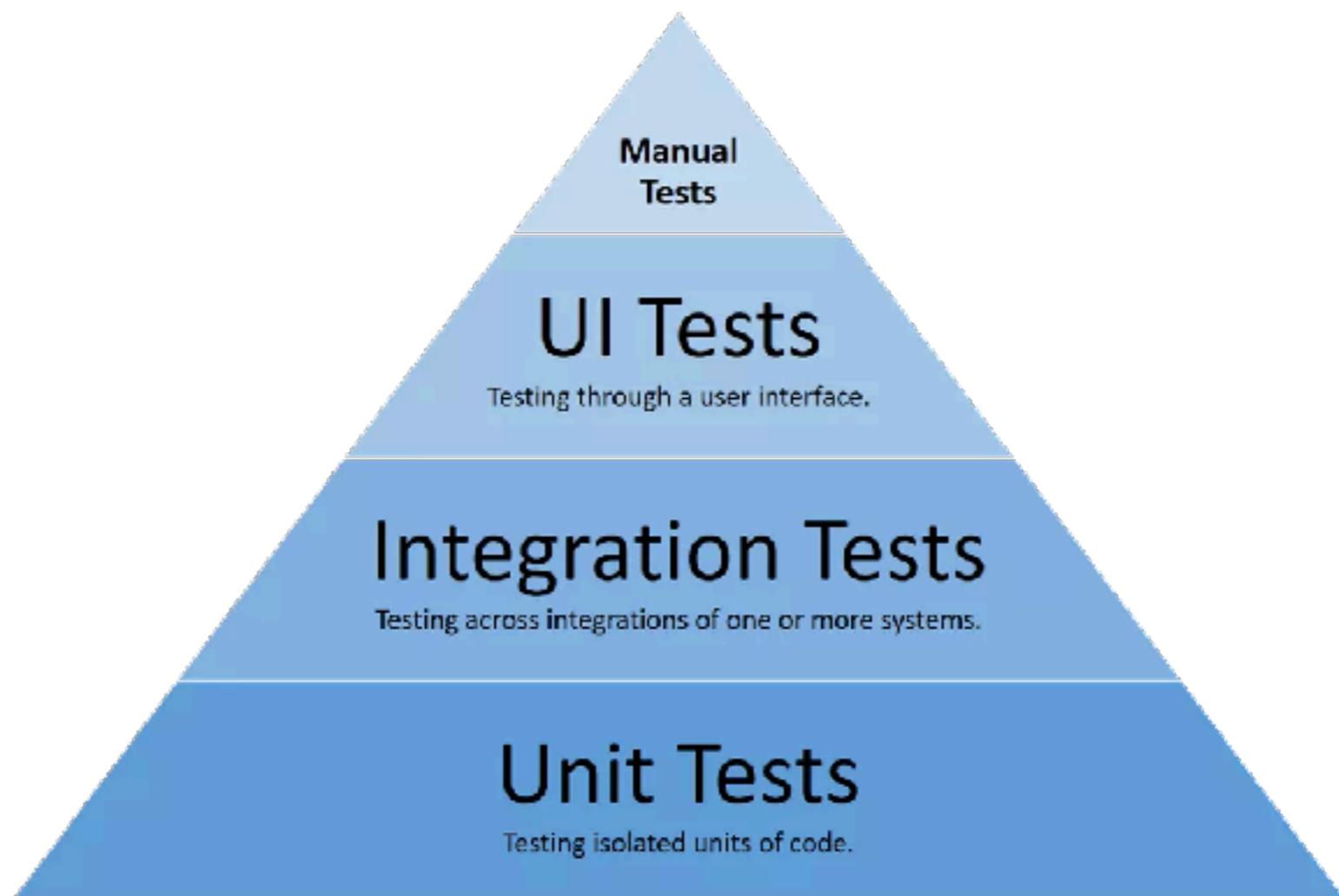
Automated the build
Automated environment for builds



Practice 3

Make your build **self-testing**

Build process => compile, linking and **testing**

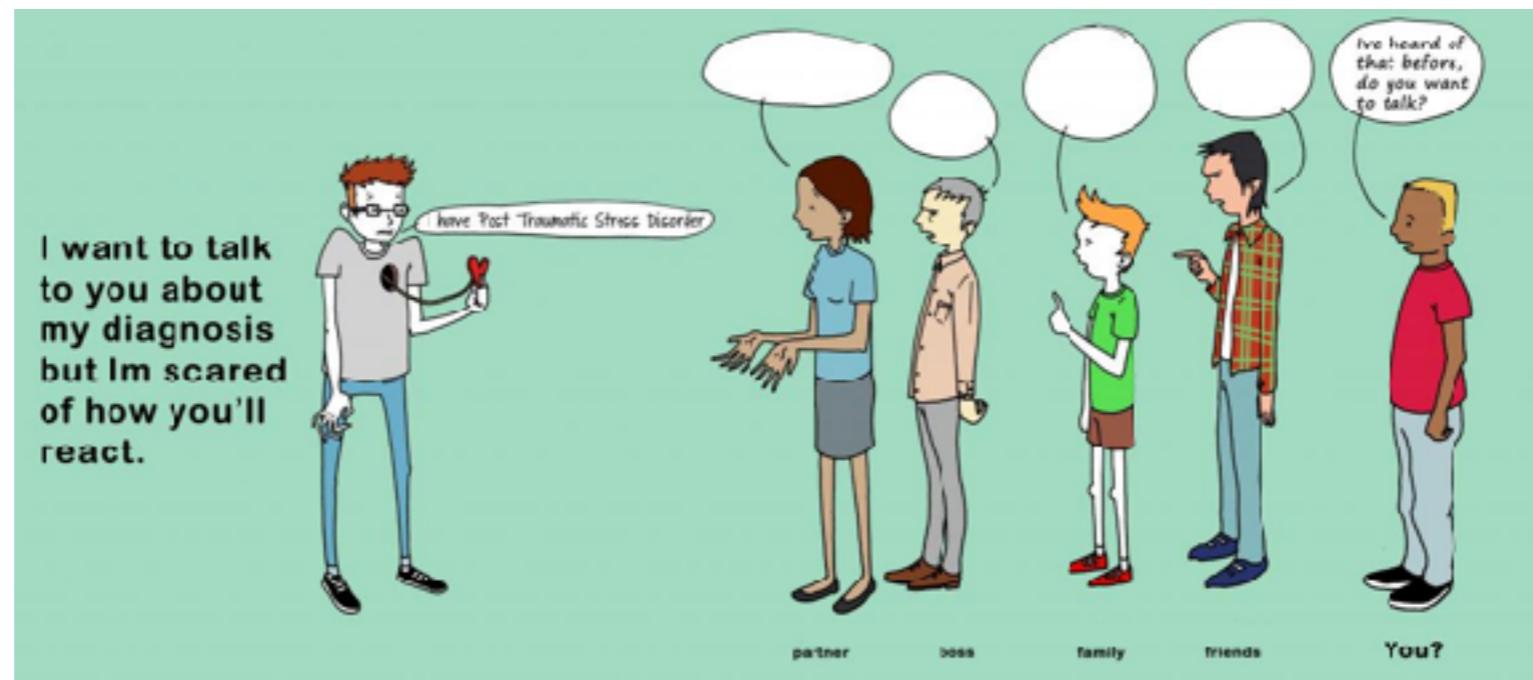


Practice 4

Everyone commits to the mainline everyday

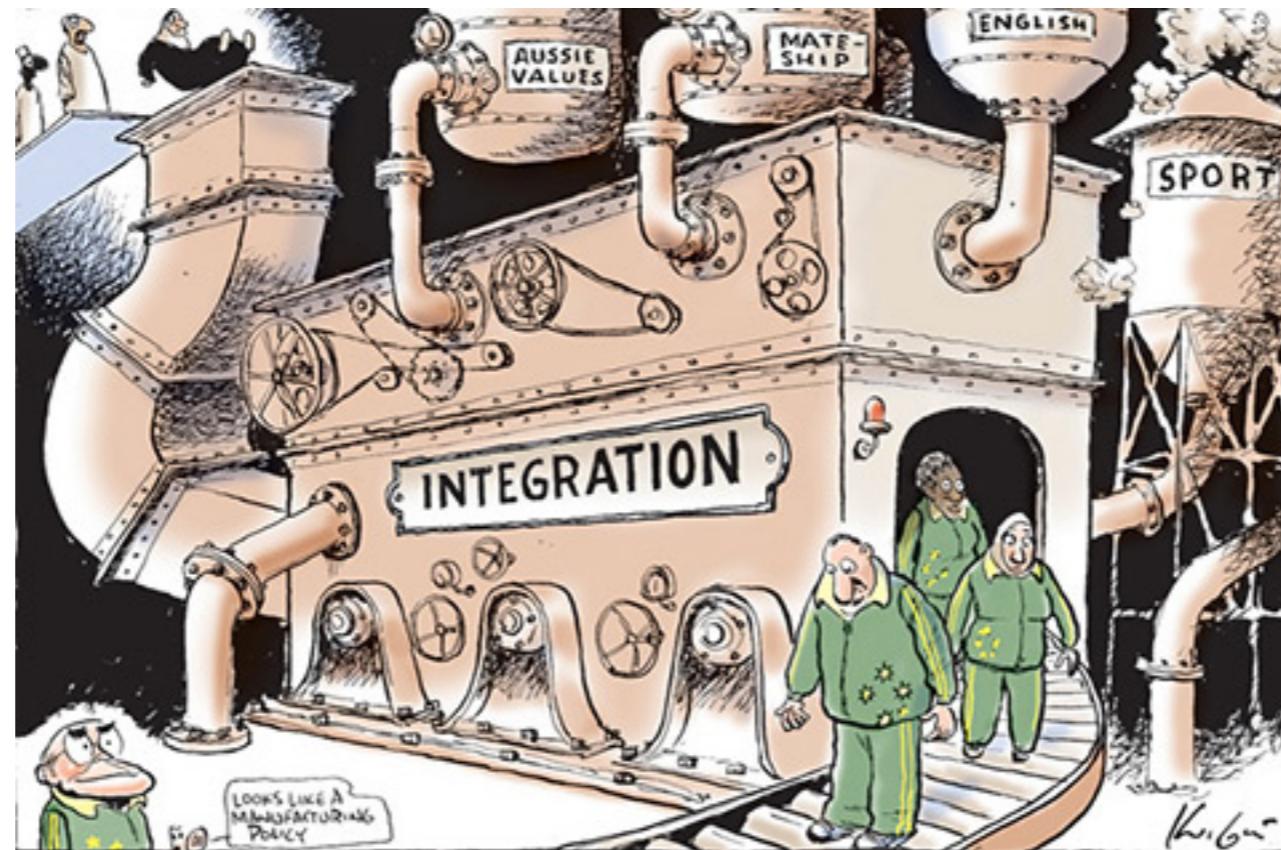
Integration is about communication

Integration allows developers to tell other developers



Practice 5

Every commits should build the mainline on an
Integration machine



Practice 6

Fix broken builds immediately

**“Nobody has a higher priority task than
fixing the build”**



Practice 7

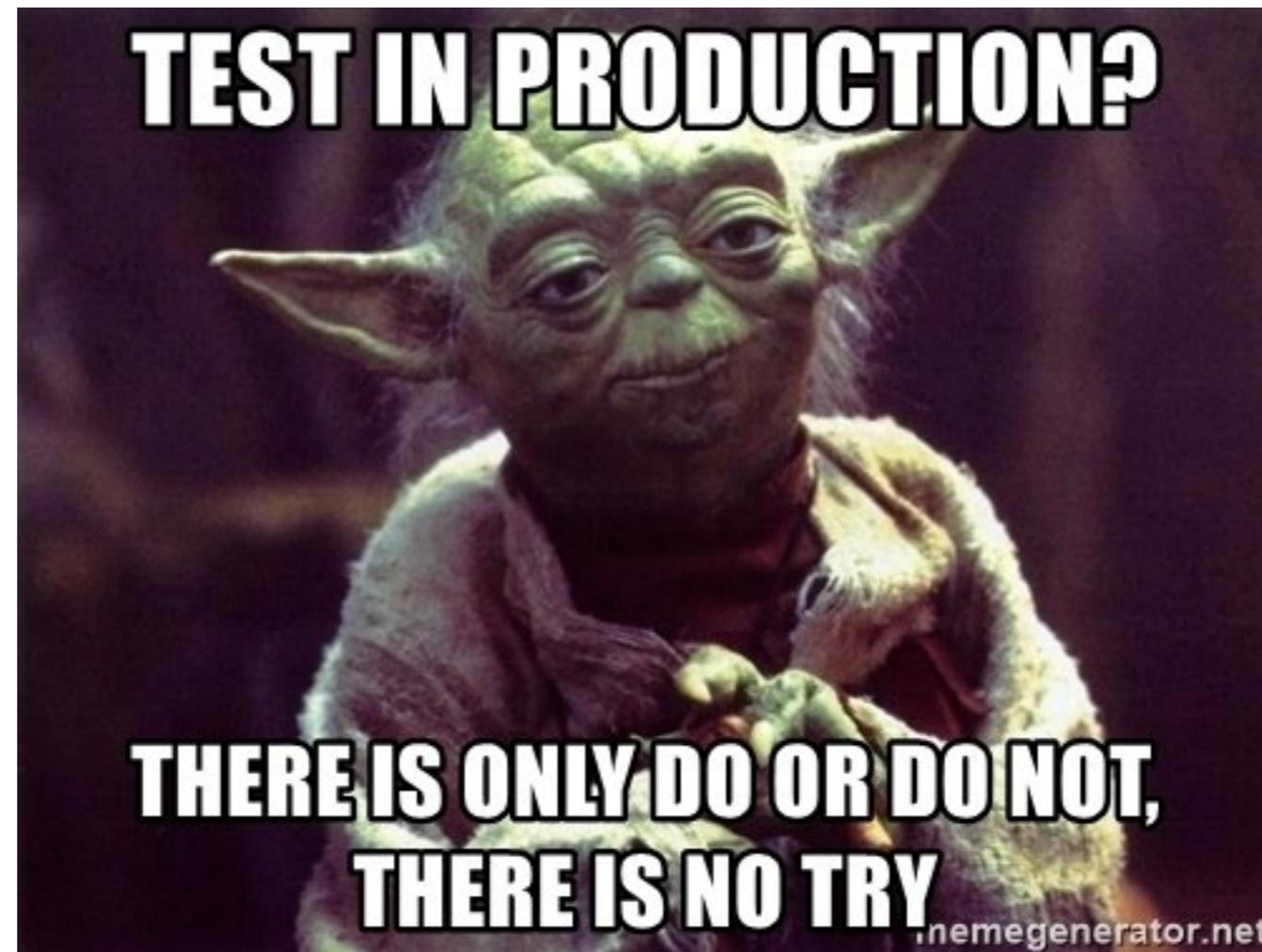
Keep the build **fast**

Continuous Integration is to provide rapid feedback



Practice 8

Test in clone of the **Production** environment



Practice 9

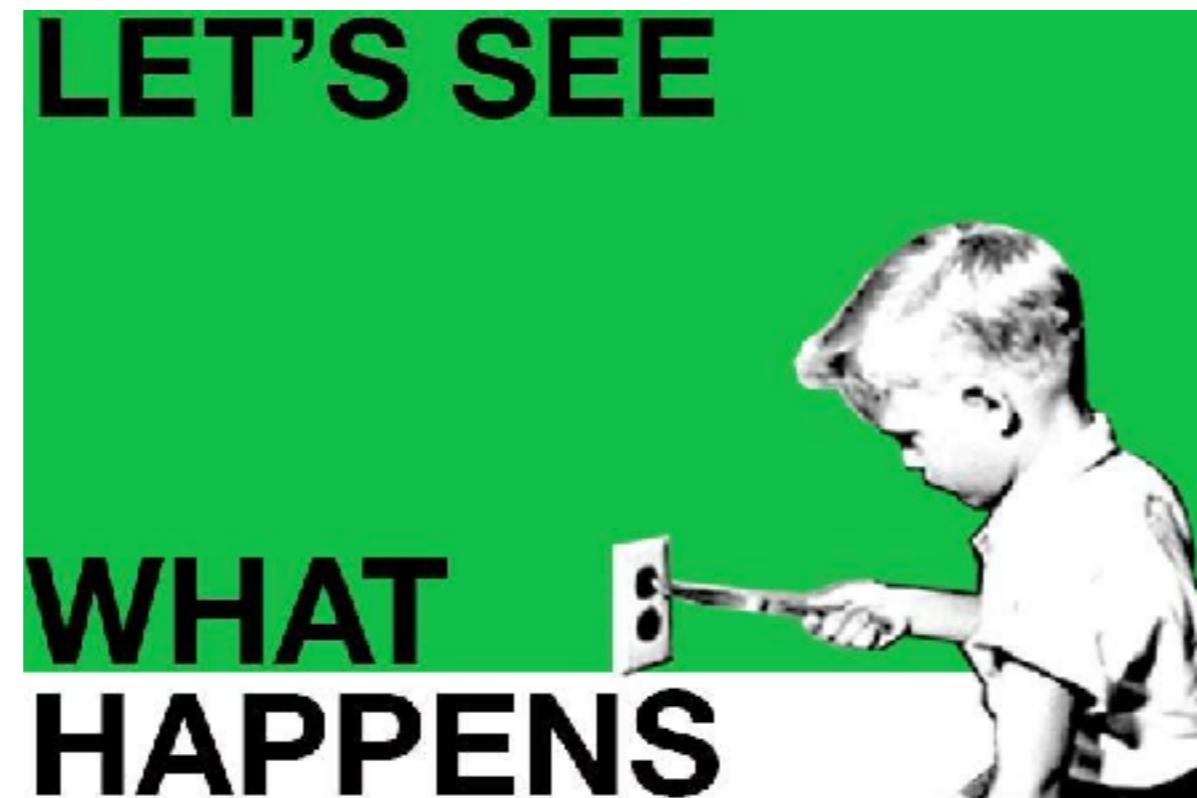
Make it easy for anyone to get
the latest executable

Make sure well known place where people can find



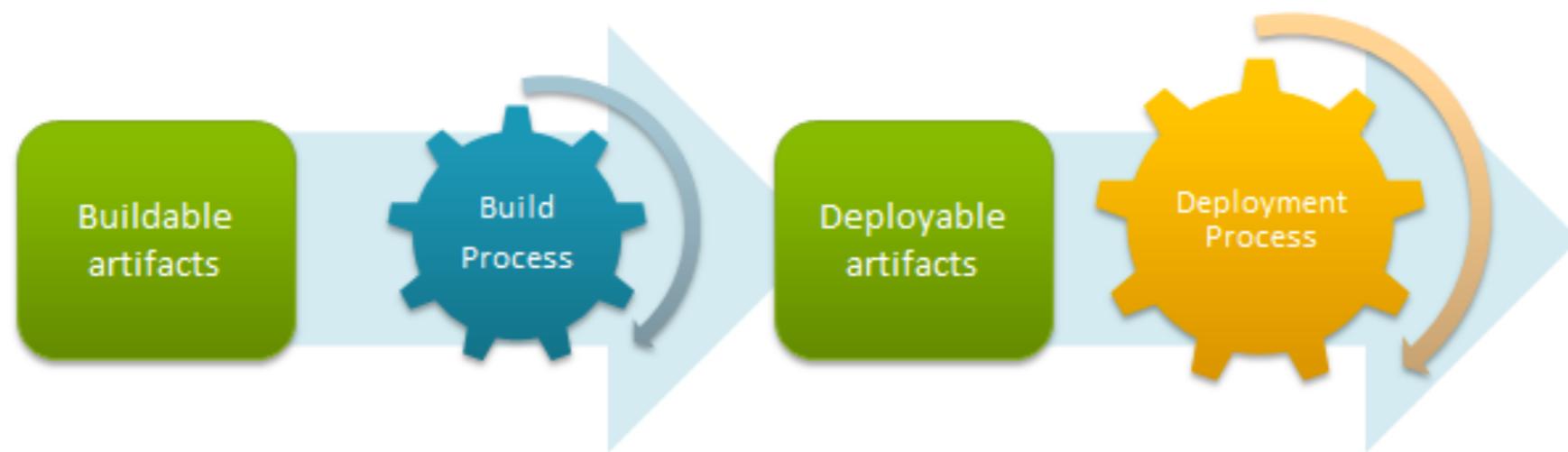
Practice 10

Everyone can see what's happening
Easier to see the state of the system and changes
Show the good information



Practice 11

Automated deployment



Continuous Delivery



Continuous Delivery

Use version control for all production artifacts

Automate your deployment process

Implement continuous integration (CI)

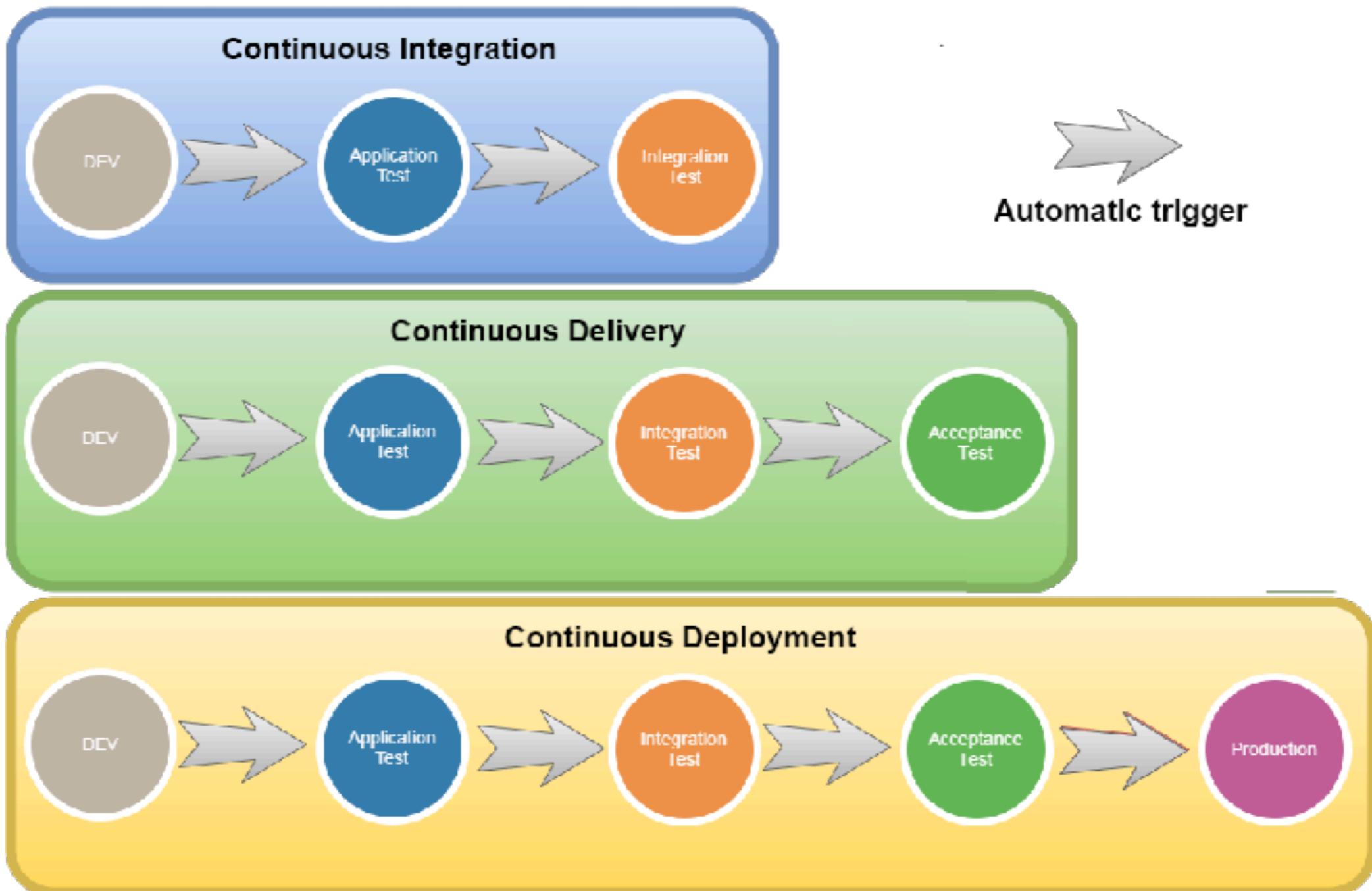
Use trunk-based development methods

Implement test automation

Support test data management

Integrate security into software development process





Let's start with Jenkins



Application and framework to manage and monitor
the executable of **repeated tasks**



Jenkins

<https://jenkins.io/>



Topics

Pipeline as a Code in Jenkins
Integration with GitLab
Scripted vs Declarative pipeline
Write and Run pipeline





Setup Jenkins



Working with Docker

Docker image

Blue Ocean plugins

Master and slave of Jenkins



Create first job



Create first job

Freestyle job Pipeline as a Code

Enter an item name

* This field cannot be empty, please enter a valid name

 **Freestyle project**
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.

 **Pipeline**
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.



Freestyle job



Freestyle Job

Configure with web UI
Changes are not tracked
Separated jobs for each step in pipeline
Manual process



Freestyle Job

Working with Credentials with Docker
Deploy to target servers



Create credentials

Manage Jenkins -> Security -> Manage Credentials

Security



Configure Global Security
Secure Jenkins; define who is allowed to access/use the system.



Manage Users
Create/delete/modify users that can log in to this Jenkins



Manage Credentials
Configure credentials



Configure Credential Providers
Configure the credential providers and types



In-process Script Approval
Allows a Jenkins administrator to review proposed scripts (written e.g. in Groovy) which run inside the Jenkins process and so could bypass security restrictions.



Create credentials

Manage Jenkins -> Security -> Manage Credentials

The screenshot shows a 'Create credentials' dialog box. The 'Kind' field is set to 'Username with password'. The 'Scope' field is set to 'Global (Jenkins, nodes, items, all child items, etc)'. The 'Username' field is empty. The 'Password' field is empty. The 'ID' field is empty. The 'Description' field is empty. A checkbox labeled 'Treat username as secret' is unchecked. At the bottom is a blue 'OK' button.



Use credentials in job

Build Environment -> User secret text or file

The screenshot shows the 'Build Environment' configuration page in Jenkins. Under the 'Bindings' section, the 'Use secret text(s) or file(s)' checkbox is selected. The 'Bindings' panel contains a 'Username and password (separated)' section with 'Username Variable' set to 'USER' and 'Password Variable' set to 'PASSWORD'. Below this, under 'Credentials', the 'Specific credentials' radio button is selected, and a dropdown menu shows an item 'somkiat*****'. A button to 'Add' more credentials is also present. At the bottom of the panel, there is a checkbox for 'Abort the build if it's stuck'.



Use in build process

Build

Execute shell

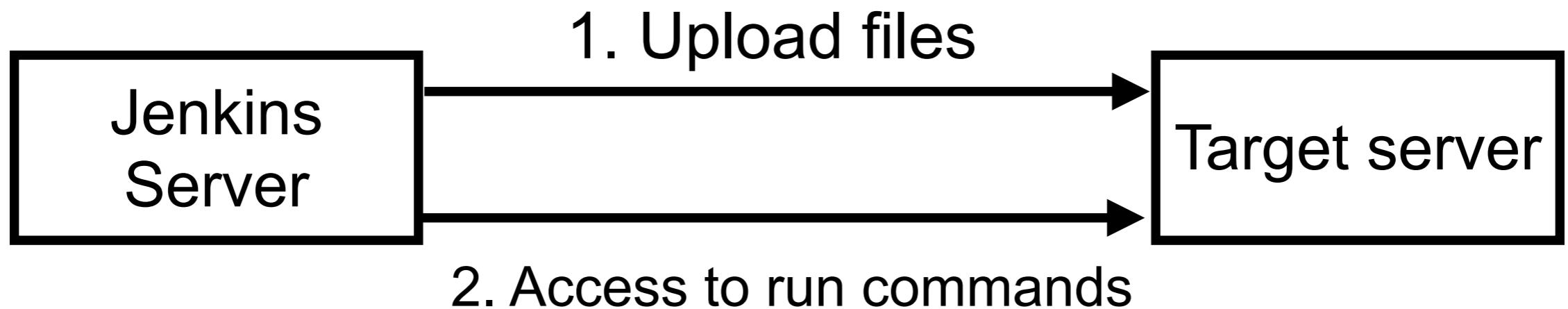
Command

```
echo $PASSWORD | docker login -u $USER --password-stdin  
docker push somkiat/abc
```

[See the list of available environment variables](#)



Deploy to target server



Publish Over SSH

The screenshot shows the Jenkins plugin marketplace interface. At the top, there is a search bar containing the text "publish over". Below the search bar, there are four tabs: "Updates", "Available" (which is selected), "Installed", and "Advanced". A dark header bar contains the text "Install ↑" and "Name". The main content area displays two plugin cards:

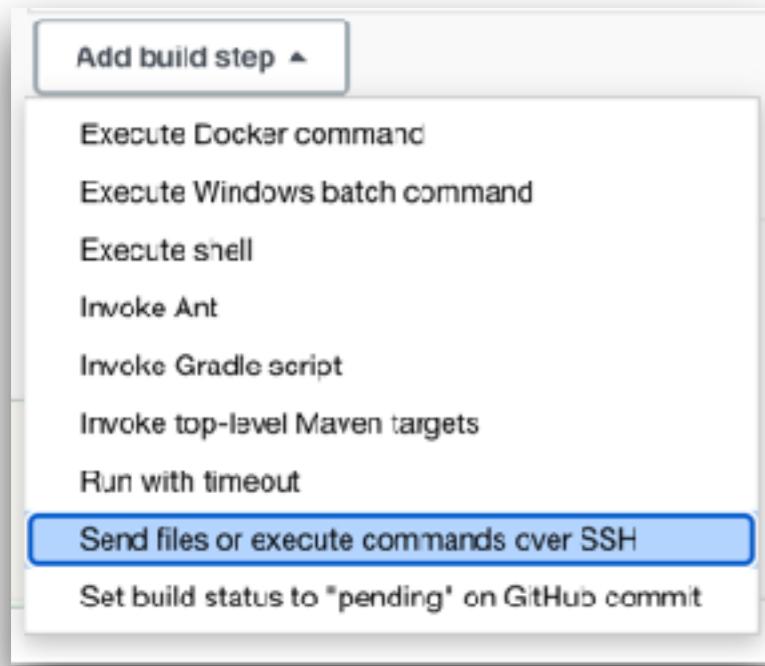
- Infrastructure plugin for Publish Over X**: This card has an unchecked checkbox next to it. The description below the checkbox reads: "Send build artifacts somewhere."
- Publish Over SSH**: This card has a checked checkbox next to it. The description below the checkbox reads: "Send build artifacts over SSH". Below this description is a yellow callout box containing the text: "This plugin is up for adoption! We are looking for new maintainers. Visit our [Adopt a Plugin](#) initiative for more information."

<https://plugins.jenkins.io/publish-over-ssh/>



Publish Over SSH

Add in build steps



The screenshot shows the Jenkins 'Add build step' dialog. On the left, a sidebar lists various build steps: Execute Docker command, Execute Windows batch command, Execute shell, Invoke Ant, Invoke Gradle script, Invoke top-level Maven targets, Run with timeout, Send files or execute commands over SSH (which is highlighted with a blue selection bar), and Set build status to "pending" on GitHub commit.

The main panel is titled 'Send files or execute commands over SSH'. It contains sections for 'SSH Publishers' (with a 'Name' field), 'Transfers' (with 'Transfer Set', 'Source files' (which has a red error message: 'Either Source files, Exec command or both must be supplied'), 'Remove prefix', 'Remote directory', and 'Exec command' fields), and two additional 'Either Source files, Exec command or both must be supplied' error messages at the bottom.



Config SSH Server

Manage Jenkins -> Config System -> Add SSH

SSH Servers

SSH Server

Name	<input type="text"/>	?
Hostname	<input type="text"/>	?
Username	<input type="text"/>	?
Remote Directory	<input type="text"/>	?



Pipeline as a Code



Pipeline as a Code

Configure with code

Changes are tracked by SCM

Easy to import/export

Parameterized and reuse

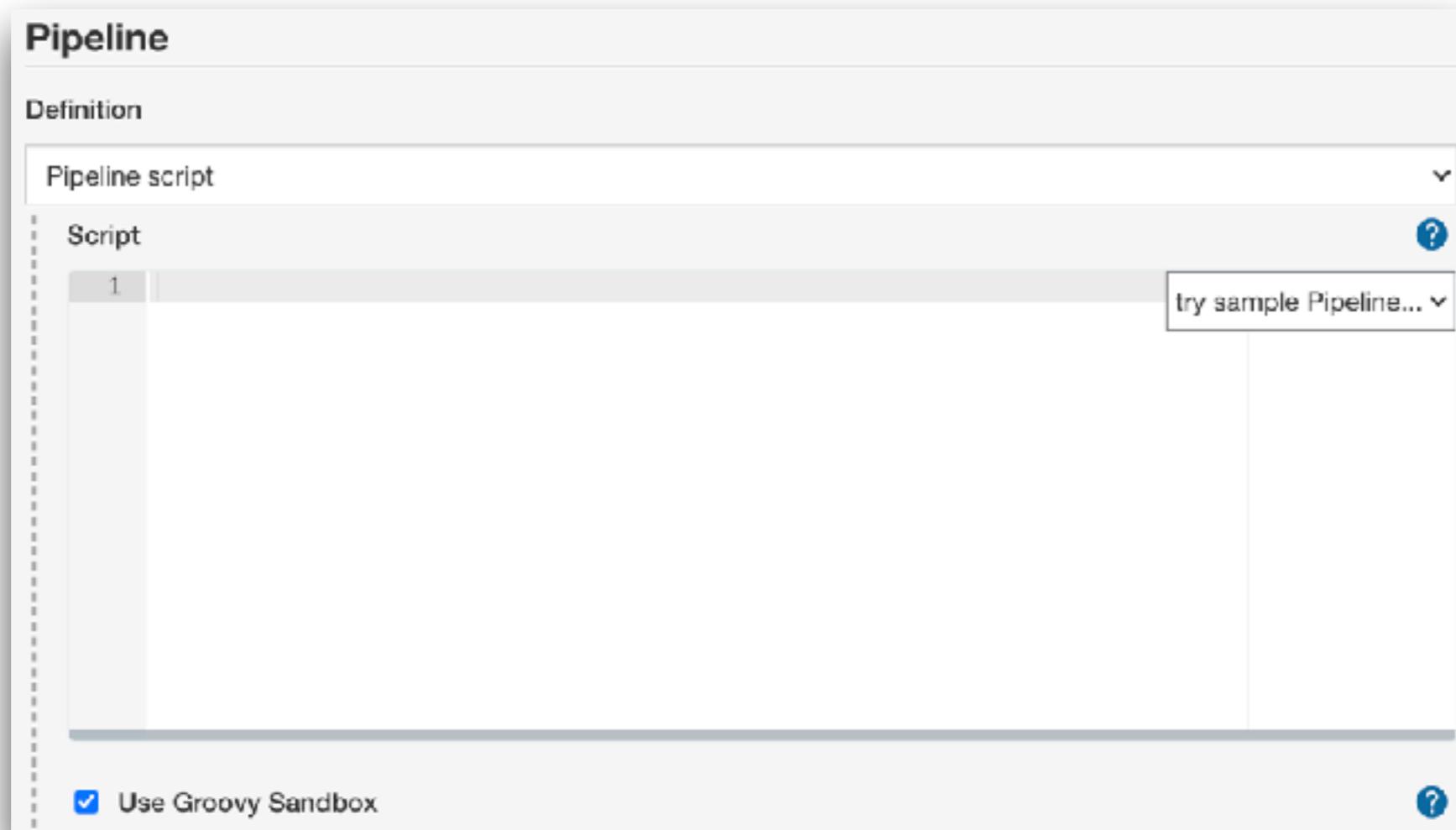
Auto generate

<https://www.jenkins.io/doc/book/pipeline/syntax/>



Types of pipeline as a code

Scripted pipeline (Groovy)
Declarative pipeline (New)



Scripted pipeline

```
node('worker_node1') {  
    stage('Source') {  
        git "  
    }  
    stage('Build') {  
        sh ""  
    }  
}
```

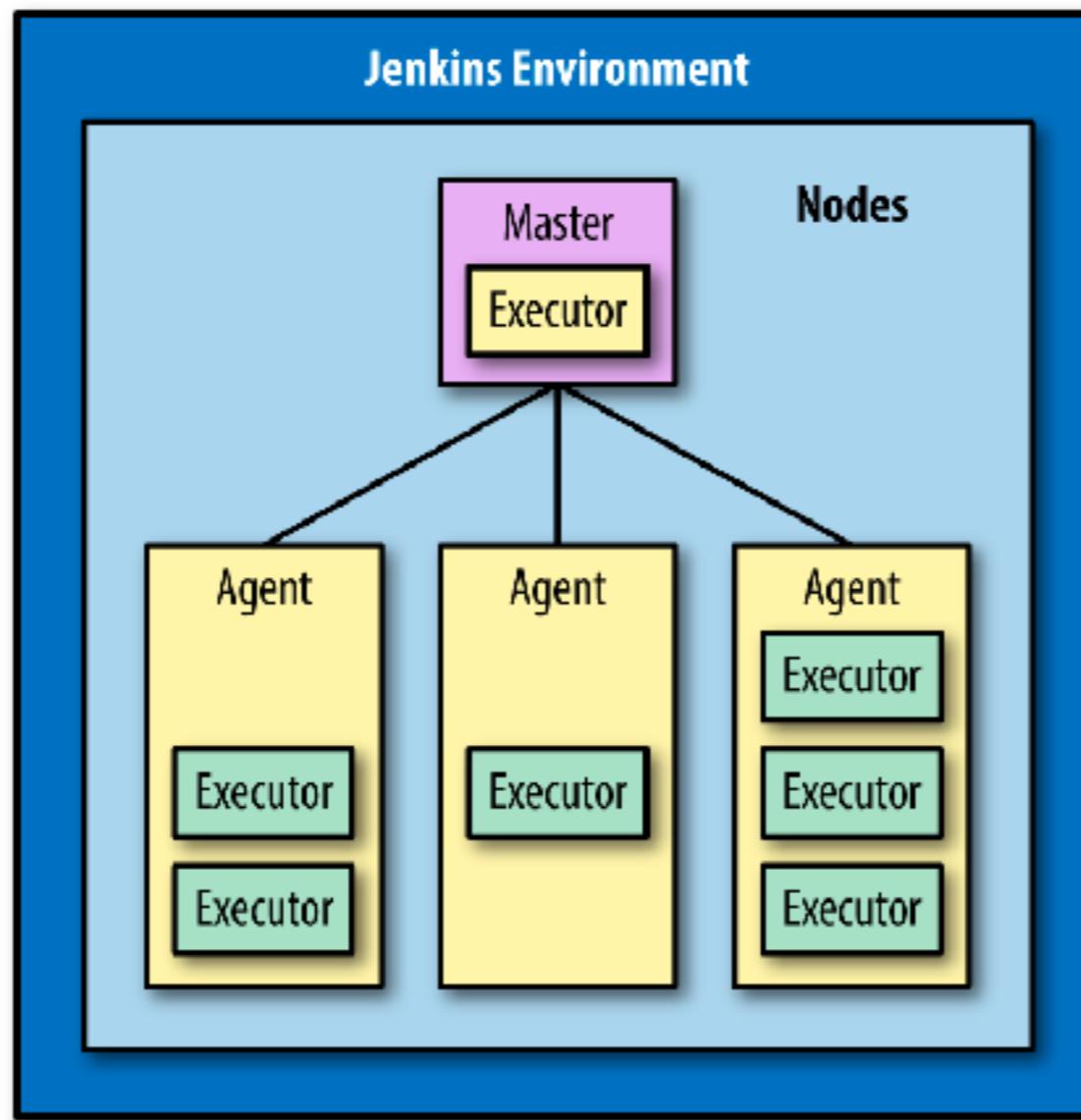
Declarative pipeline

```
pipeline {  
    agent {label 'worker_node1'}  
    stages {  
        stage('Source') {  
            steps {  
                git "  
            }  
        }  
        stage('Build') {  
            steps {  
                sh ""  
            }  
        }  
    }  
}
```



Basic of Jenkins

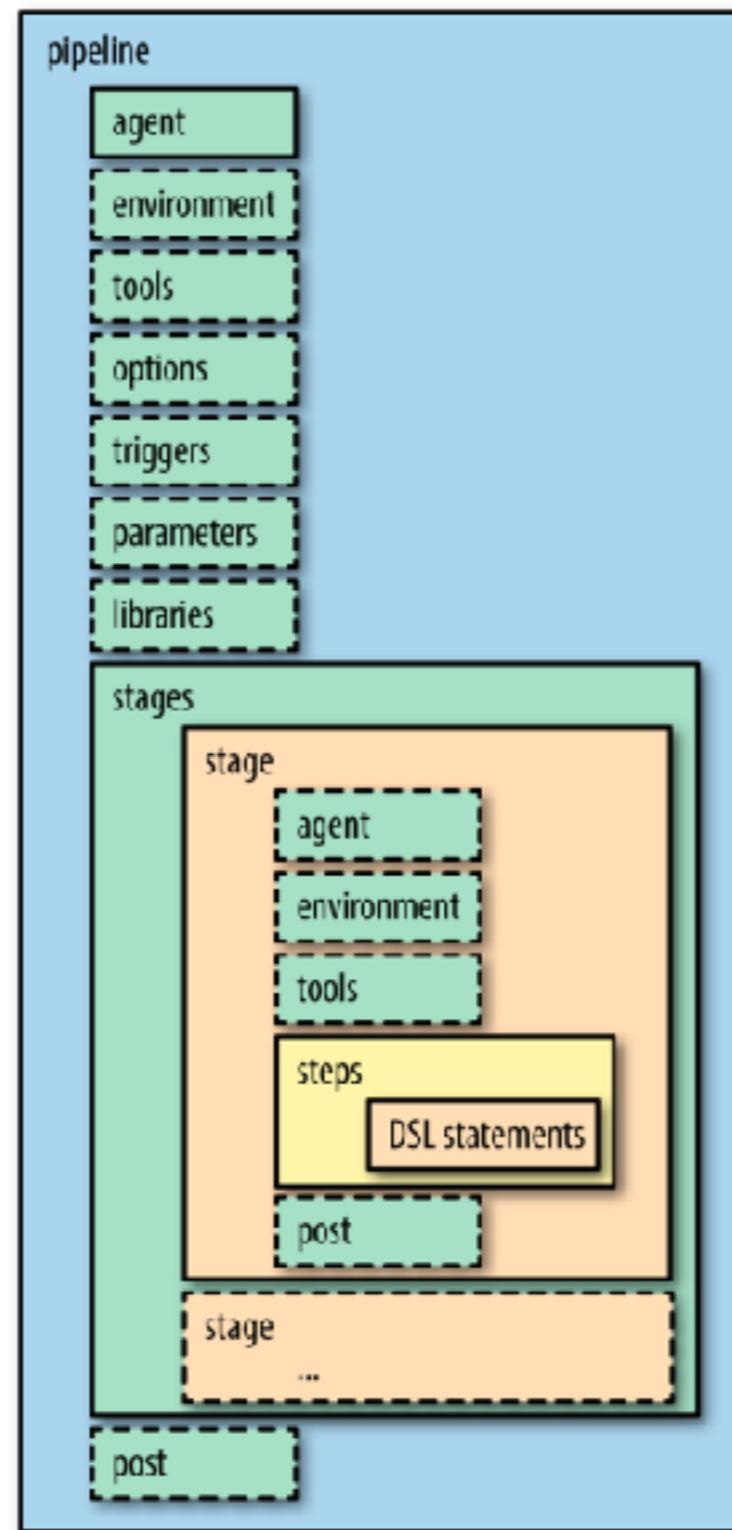
Master, Node, Agent and Executor



Create pipeline with Declarative pipeline



Declarative pipeline structure



Create Pipeline

Basic flow

Parallel pipeline

Alert and notification

Approve before deploy



Hello pipeline

```
pipeline {  
    agent any  
  
    stages {  
        stage('Hello') {  
            steps {  
                echo 'Hello World'  
            }  
        }  
    }  
}
```



Agent

```
pipeline {  
    agent any  
    Target of Node/Agent of Jenkins  
    stages {  
        stage('Hello') {  
            steps {  
                echo 'Hello World'  
            }  
        }  
    }  
}
```



Stages -> stage

```
pipeline {  
    agent any  
  
    stages {  
        stage('Hello') {  
            steps {  
                echo 'Hello World'  
            }  
        }  
    }  
}
```

Group of Works/Jobs



Steps

```
pipeline {  
    agent any  
  
    stages {  
        stage('Hello') {  
            steps {  
                echo 'Hello World'  
            }  
        }  
    }  
}
```

Lowest level of function in Jenkins DSL
Can be used with Groovy commands



Stages -> Steps -> Post

```
stages {  
    stage('name1') {  
        steps {  
            ...  
        }  
        post {  
            ...  
        }  
    }  
    post {  
        ...  
    }  
}
```



Stages -> Steps -> Post

```
stages {  
    stage('name1') {  
        steps {  
            ...  
        }  
        post {  
            ...  
        }  
    }  
}  
post {  
    ...  
}
```



Post-conditions

Always
Success
Changed
Aborted
Failure
Unstable

...

<https://www.jenkins.io/doc/book/pipeline/syntax/#post>



Post-conditions

Condition name	Description
always	Always execute the steps in the block
changed	If the current build's status is different from the previous build's status
success	If the current build was successful
failure	If the current build failed
unstable	If the current build's status was unstable (test failure)

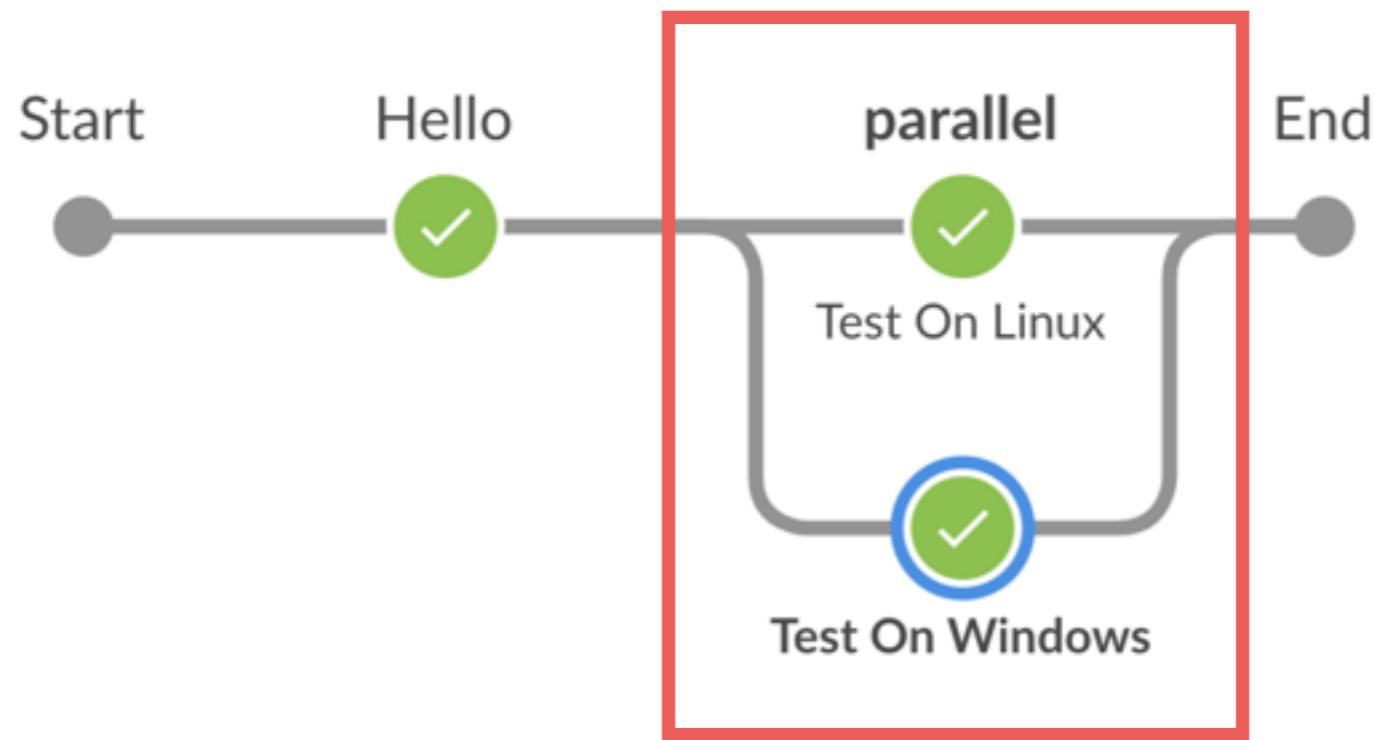
<https://www.jenkins.io/doc/book/pipeline/syntax/#post>



Parallel stages



Parallel stages

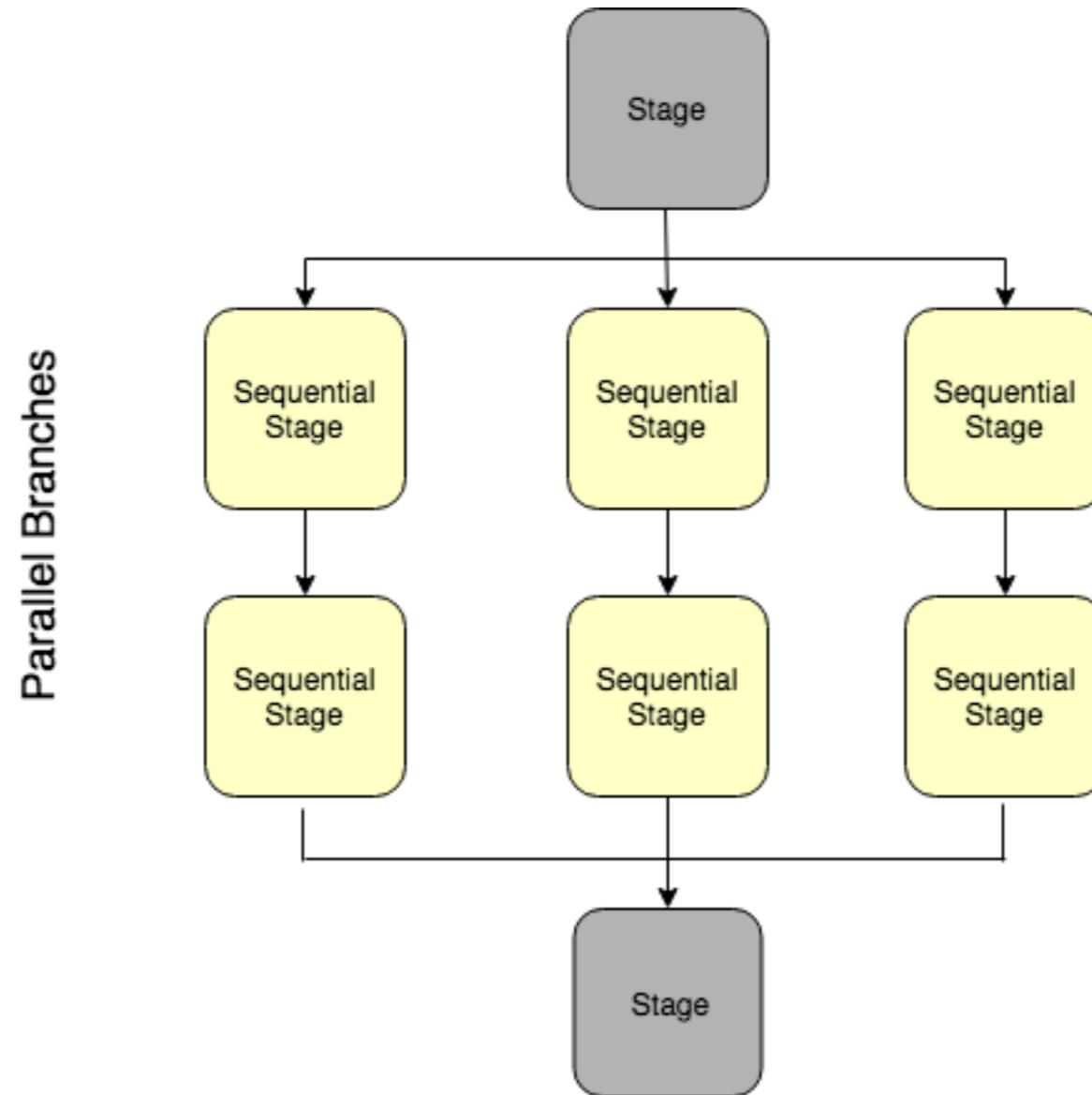


Parallel stages

```
stage('parallel') {  
    parallel {  
        stage('Test On Windows') {  
            steps {  
                echo "Test On Windows"  
            }  
        }  
        stage('Test On Linux') {  
            steps {  
                echo "Test On Linux"  
            }  
        }  
    }  
}
```



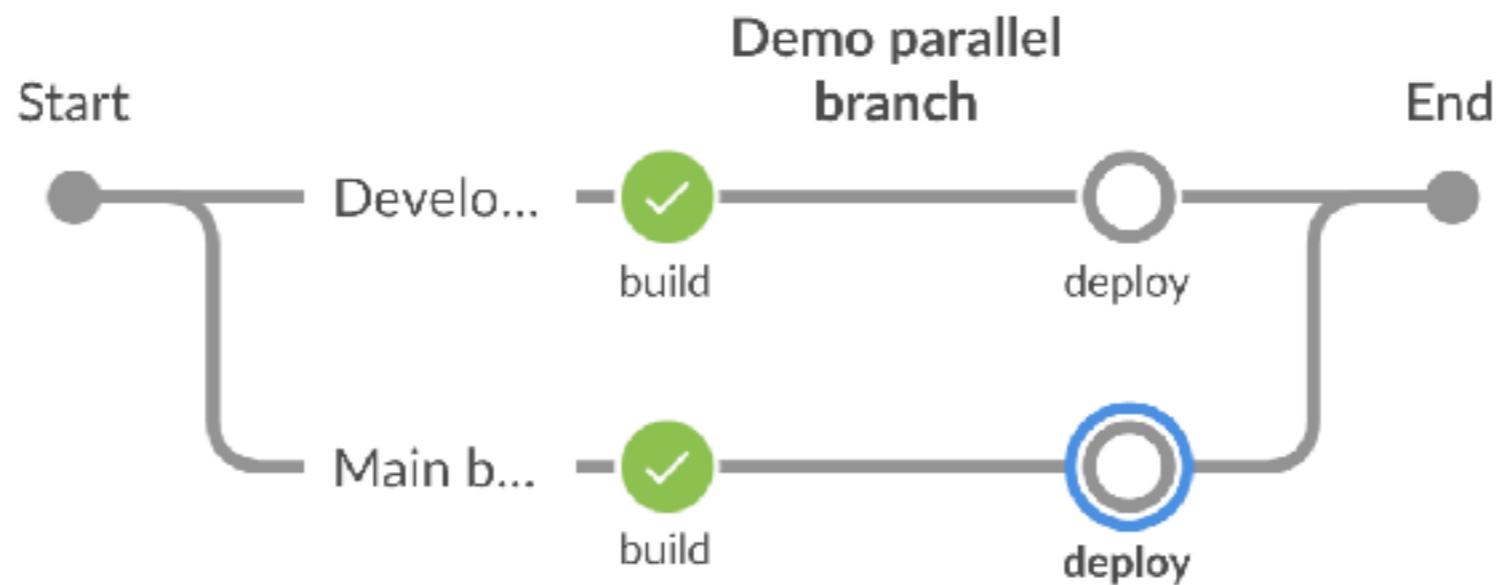
Parallel branches



<https://www.jenkins.io/blog/2018/07/02/whats-new-declarative-pipeline-13x-sequential-stages/>



Parallel branches



Parallel branches

```
pipeline {  
    agent none  
  
    stages {  
        stage("Demo parallel branch") {  
            parallel {  
                stage("Main branch") {  
                    ....  
                }  
                ....  
            }  
            stage("Develop branch") {  
                ....  
            }  
        }  
    }  
}
```

Pipeline for main branch



Parallel branches

```
pipeline {  
    agent none  
  
    stages {  
        stage("Demo parallel branch") {  
            parallel {  
                stage("Main branch") {  
                    ....  
                }  
                stage("Develop branch") {  
                    ....  
                }  
            }  
        }  
    }  
}
```

Pipeline for develop branch



Conditions with when

Branch
Environment
Equals
Expression
Tag

...

<https://www.jenkins.io/doc/book/pipeline/syntax/#when>



Conditionals :: main branch

```
stages {  
    stage("build") {  
        steps {  
            echo "build in main"  
        }  
    }  
    stage("deploy") {  
        when {  
            branch "main"  
        }  
        steps {  
            echo "deploy for master"  
        }  
    }  
}
```

Working with conditions



Working with Environment variables



Use environment variables

Define for all stages

Define for specific stages/steps

Support plain text, user/pass and credential

<https://www.jenkins.io/doc/book/pipeline/syntax/#environment>



Use environment variables

```
pipeline {  
    agent any  
  
    environment {  
        field = 'some'  
    }  
    stages {  
  
    }  
}
```

Global env for all



Use environment variables

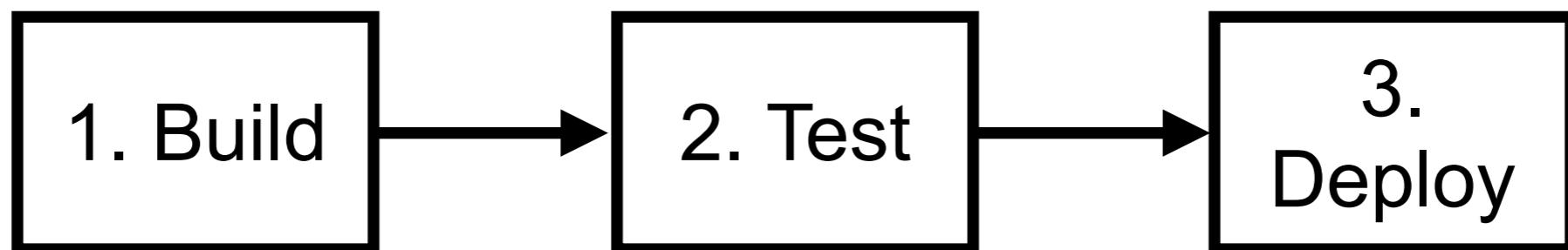
```
stages {  
    stage ('Preparation') {  
  
        environment {  
            JENKINS_PATH = sh(script: 'pwd', , returnStdout: true).trim()  
        }  
  
        steps {  
            echo "Hello world"  
            echo "PATH=${JENKINS_PATH}"  
            sh 'echo "JP=$JENKINS_PATH"'  
        }  
    }  
}
```



Pipeline parameters



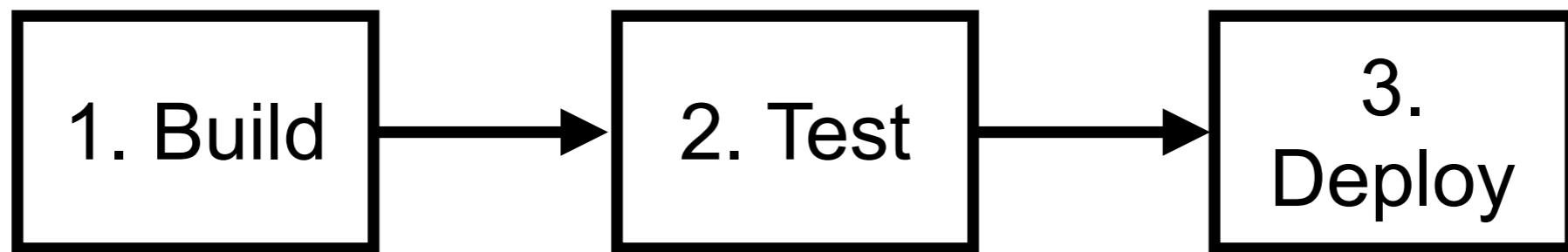
Parameters of pipeline



Branch ?

Tag ?

Version ?



Configure job/item in UI

This project is parameterized ?

String Parameter X ?

Name ?
PERSON

Default Value ?
Mr Jenkins

Description ?
Who should I say hello to?

[Plain text] [Preview](#)

Trim the string ?



Parameters directive

List of parameters that provide when trigger the pipeline

String, text (multiple line), boolean
Choice, password

...

<https://www.jenkins.io/doc/book/pipeline/syntax/#parameters>



Use parameters directive

```
pipeline {  
    agent any  
  
    parameters {  
        string(name: 'PERSON', defaultValue: 'Mr Jenkins', description: 'Who should I say hello to?')  
  
        booleanParam(name: 'TOGGLE', defaultValue: true, description: 'Toggle this value')  
  
        choice(name: 'CHOICE', choices: ['One', 'Two', 'Three'], description: 'Pick something')  
  
        password(name: 'PASSWORD', defaultValue: 'SECRET', description: 'Enter a password')  
    }  
}
```



Example

Dashboard > demo-param >

- [Back to Dashboard](#)
- [Status](#)
- [Changes](#)
- [Build with Parameters](#)
- [Configure](#)
- [Delete Pipeline](#)
- [Full Stage View](#)
- [Open Blue Ocean](#)
- [Rename](#)
- [Pipeline Syntax](#)

Pipeline demo-param

This build requires parameters:

PERSON

Mr Jenkins
Who should I say hello to?

BIOGRAPHY

Enter some information about the person

TOGGLE
Toggle this value

CHOICE

One
Pick something

PASSWORD

 Concealed
Enter a password



Example

Dashboard > demo-param >

- Back to Dashboard
- Status
- Changes
- Build with Parameters
- Configure
- Delete Pipeline
- Full Stage View
- Open Blue Ocean
- Rename
- Pipeline Syntax

Build History trend ▾

find
#1 Aug 25, 2021, 9:51 AM

[Atom feed for all](#) [Atom feed for failures](#)

Pipeline demo-param

This build requires parameters:

PERSON

Who should I say hello to?

BIOGRAPHY

Enter some information about the person

TOGGLE
Toggle this value

CHOICE

Pick something

PASSWORD
 Concealed

Enter a password

Build

Change Password



Git parameter plugin

Git Parameter

Documentation

Releases

Issues

Dependencies

Older versions of this plugin may not be safe to use. Please review the following warnings before using an older version:

- [Stored XSS vulnerability](#)
- [Multiple stored XSS vulnerabilities](#)

Adds ability to choose branches, tags or revisions from git repository configured in project.

Plugin Info

This plugin allows you to assign git branch, tag, pull request or revision number as parameter in your builds.

<https://plugins.jenkins.io/git-parameter/>



Notification in pipeline



Notification

Both success and failure

Email
LINE
Slack
Sound

...

<https://www.jenkins.io/doc/book/pipeline/syntax/#when>



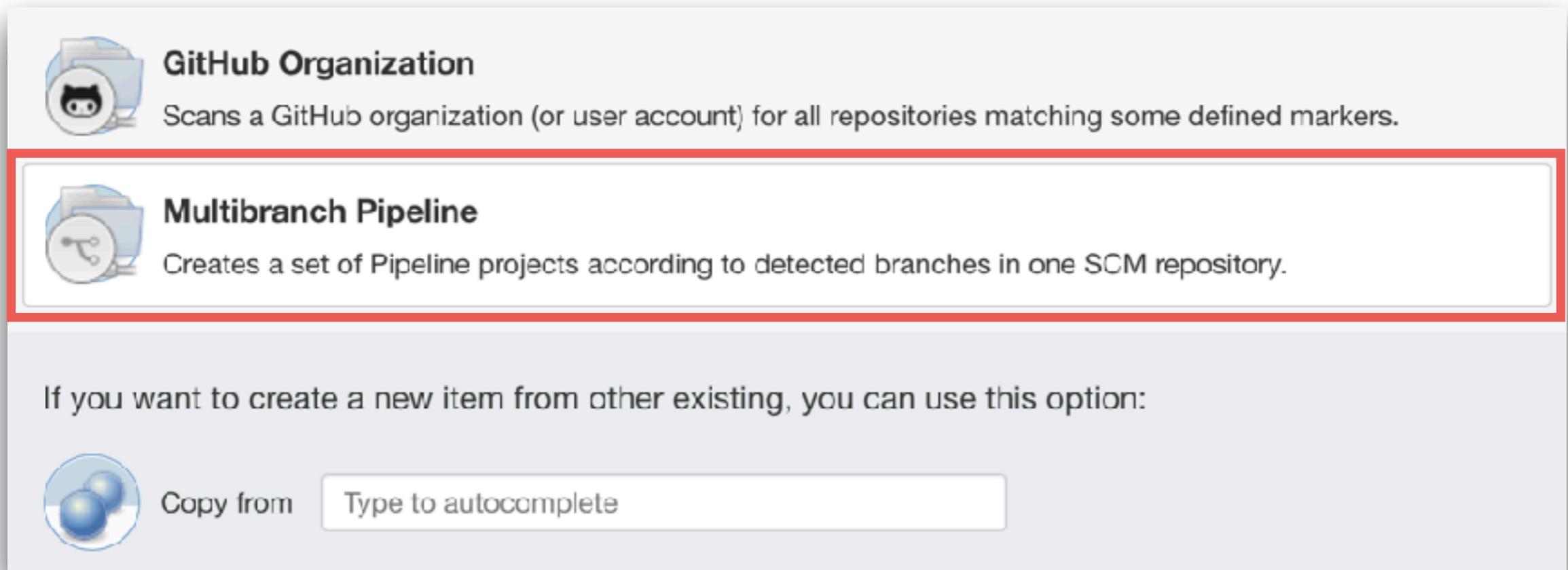
Multi-branch pipeline

<https://www.jenkins.io/doc/book/pipeline/multibranch/>



Multi-branches pipeline

Create new item/job



The screenshot shows the Jenkins 'Create New Item' screen. It lists several options:

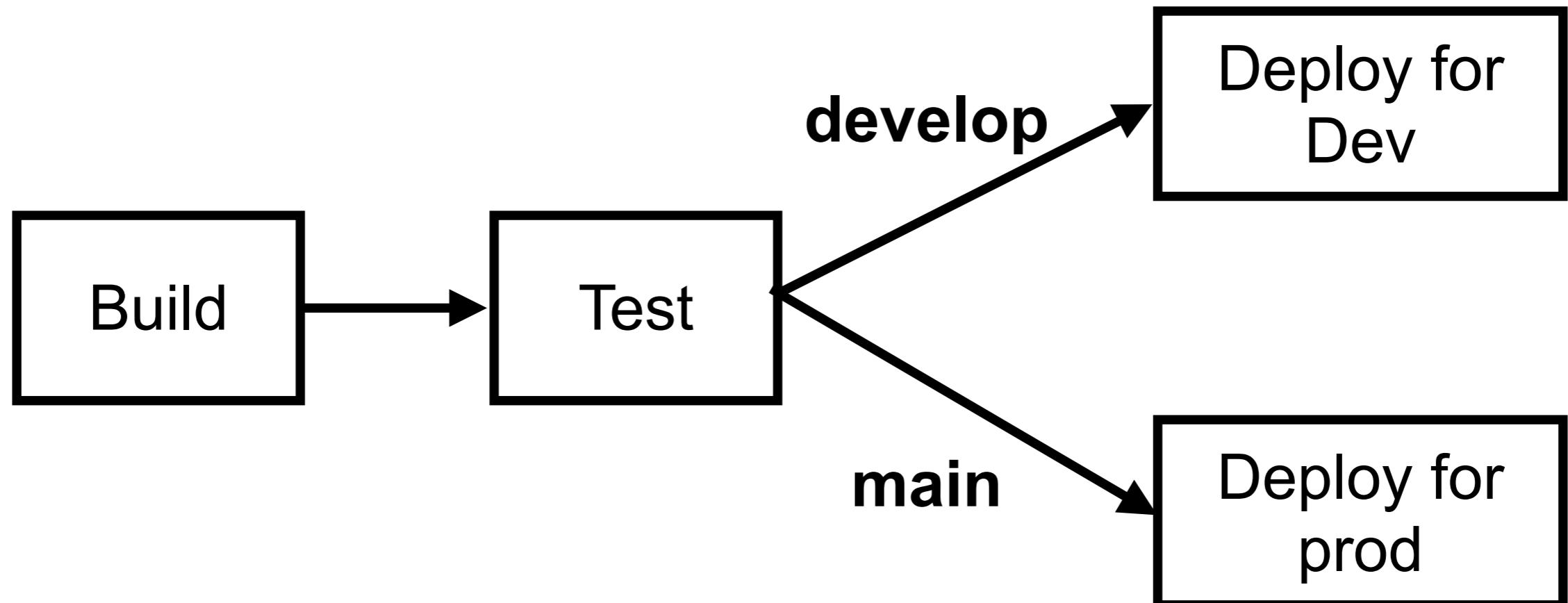
- GitHub Organization**: Scans a GitHub organization (or user account) for all repositories matching some defined markers.
- Multibranch Pipeline**: Creates a set of Pipeline projects according to detected branches in one SCM repository. This option is highlighted with a red border.

If you want to create a new item from other existing, you can use this option:

Copy from



Write pipeline with multi-branch



<https://www.jenkins.io/doc/tutorials/build-a-multibranch-pipeline-project/>



Write pipeline with multi-branch

```
stages {  
    stage("build") {  
        steps {  
            echo "build in main"  
        }  
    }  
}  
  
stage("deploy") {  
    when {  
        branch "main"  
    }  
    steps {  
        echo "deploy for master"  
    }  
}
```

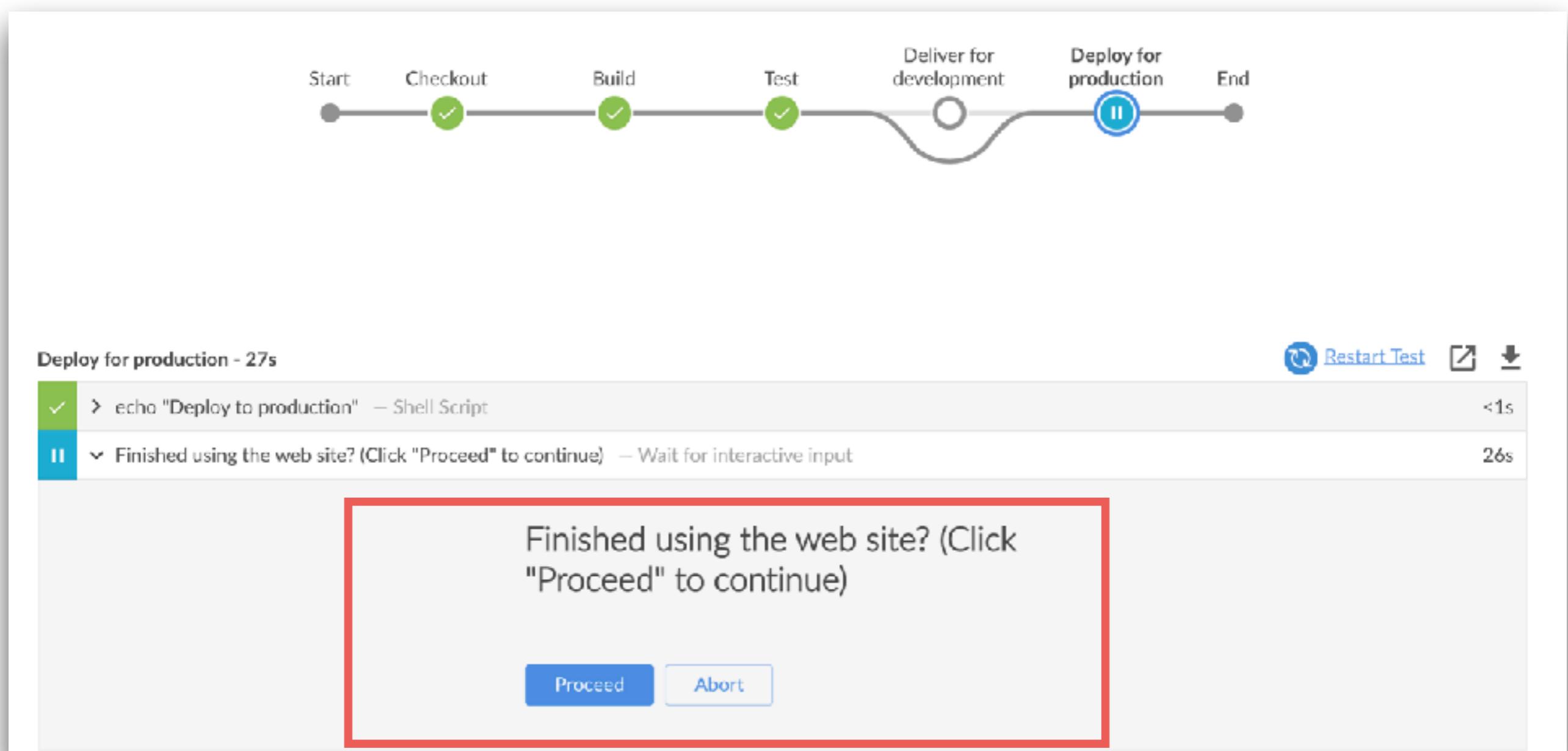
Execute when in main branch only



Approve or not ?



Approve or not ?



Approve or not ?

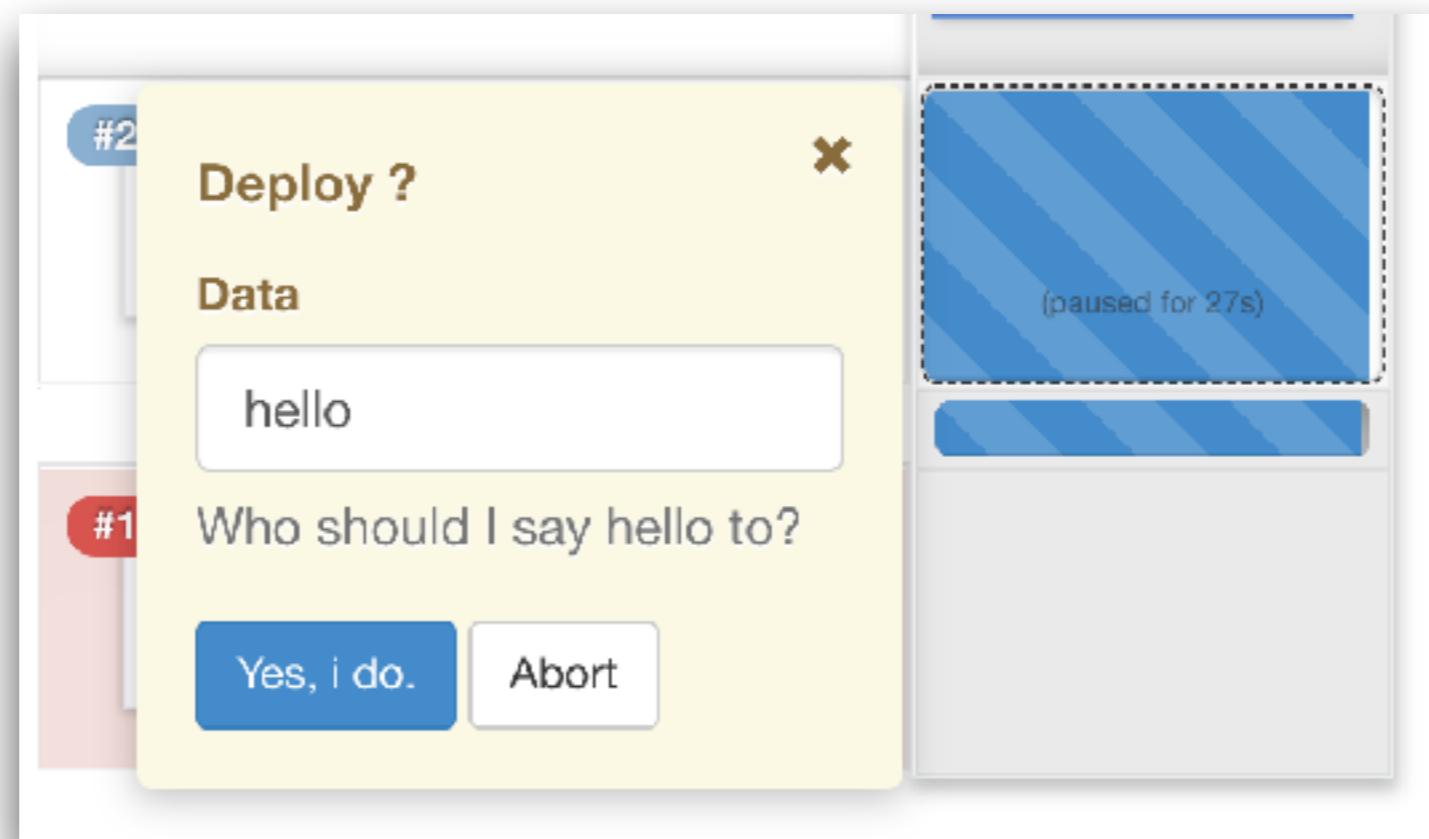
```
stage('Deliver for development') {  
    when {  
        branch 'develop'  
    }  
    steps {  
        sh 'echo "Deploy to development"  
  
        input message: 'Deploy ? (Click "Proceed" to continue')  
        sh 'echo "Deploy to development passed"'  
    }  
}
```

<https://www.jenkins.io/doc/book/pipeline/syntax/#input>



Working with input directive

Show prompt for input



<https://www.jenkins.io/doc/book/pipeline/syntax/#input>



Working with input directive

Show prompt for input

```
stage("build") {  
    input {  
        message "Deploy ?"  
        ok "Yes, i do."  
        submitter "Somkiat.p"  
        parameters {  
            string( name: 'Data', defaultValue: 'hello',  
                   description: 'Who should I say hello to?')  
        }  
    }  
    steps {  
        echo "Hello, ${Data}."  
    }  
}
```

<https://www.jenkins.io/doc/book/pipeline/syntax/#input>



Manage credential in Jenkins



Manage credential

Username and Password

Secret text

Secret file

SSH username with private key

Certificate

Docker host certificate authentication

<https://www.jenkins.io/doc/book/using/using-credentials/>



Manage credential

Manage Jenkins -> Manage Credentials

The screenshot shows the Jenkins 'Manage Jenkins' configuration page. A red circle labeled '1' highlights the 'Manage Jenkins' sidebar item, which is currently selected and highlighted in grey. A red box surrounds the 'Manage Jenkins' sidebar. Another red circle labeled '2' highlights the 'Manage Credentials' link under the 'Security' section, which is also surrounded by a red box.

Manage Jenkins

- My Views
- Lockable Resources
- Open Blue Ocean
- New View

Build Queue
No builds in the queue.

Build Executor Status
1 Idle

Configure System
Configure global settings and paths.

Global Tool Configuration
Configure tools, their locations and automatic installers.

Manage Plugins
Add, remove, disable or enable plugins that can extend the functionality of Jenkins.

Manage Nodes and Clouds
Add, remove, control and monitor the various nodes that Jenkins runs jobs on.

Security

- Configure Global Security**
Secure Jenkins; define who is allowed to access/use the system.
- Configure Credential Providers**
Configure the credential providers and types

Manage Credentials
Configure credentials

Manage Users
Create/delete/modify users that can log in to this Jenkins



Create credentials

Global credential

By pipeline/job/item

By Jenkins's user

<https://www.jenkins.io/doc/book/using/using-credentials/>



Types of credential

The screenshot shows the Jenkins Global credentials (unrestricted) configuration page. The 'Kind' dropdown menu is open, displaying several options: 'Username with password' (selected), 'GitHub App', 'SSH Username with private key', 'Secret file', 'Secret text', and 'Certificate'. A red box highlights this dropdown menu. Below it, there are fields for 'Username' (empty), 'Password' (empty), and 'ID' (empty). There is also a checkbox for 'Treat username as secret' which is unchecked.

Dashboard > Credentials > System > Global credentials (unrestricted)

Back to credential domains

Add Credentials

Kind

- ✓ Username with password
- GitHub App
- SSH Username with private key
- Secret file
- Secret text
- Certificate

Username

Treat username as secret

Password

ID

OK



Example of Docker login

```
$docker login -u <user> -p <password>
```

```
stages {  
    stage('Push to docker hub') {  
        steps {  
            withCredentials(  
                [usernamePassword(credentialsId: 'docker_login',  
                    passwordVariable: 'PASSWORD',  
                    usernameVariable: 'USERNAME')]) {  
  
                    sh 'echo "$PASSWORD" | docker login -u "$USERNAME" --password-stdin'  
                }  
            }  
        }  
    }  
}
```



Example of Git login

\$git pull origin main

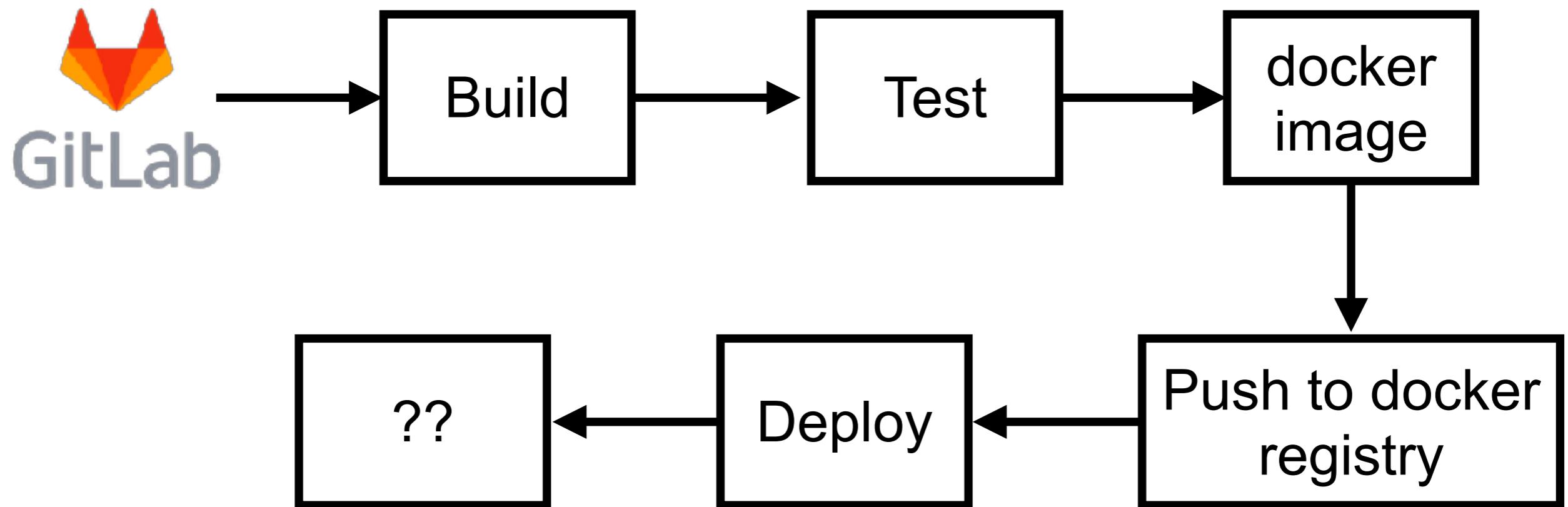
```
stages {  
    stage('Push to docker hub') {  
        steps {  
            withCredentials(  
                [usernamePassword(credentialsId: 'docker_login',  
                    passwordVariable: 'PASSWORD',  
                    usernameVariable: 'USERNAME')]) {  
  
                    sh 'echo "$PASSWORD" | docker login -u "$USERNAME" --password-stdin'  
                }  
            }  
        }  
    }  
}
```



Pipeline workshop



Pipeline workshop



Security in Jenkins



Security in Jenkins

Username/password

Access controls

Role-bases authorization

Other plugins

<https://www.jenkins.io/doc/book/security/>



Role-based Authorization Strategy

Role-based Authorization Strategy

Documentation [Releases](#) [Issues](#) [Dependencies](#)

[chat on gitter](#) [plugin v3.2.0](#) [changelog role-strategy-3.2.0](#) installs 70k

About this plugin

The Role Strategy plugin is meant to be used from [Jenkins](#) to add a new role-based mechanism to manage users' permissions. Supported features

- Creating **global roles**, such as admin, job creator, anonymous, etc., allowing to set Overall, Agent, Job, Run, View and SCM permissions on a global basis.
- Creating **project roles**, allowing to set only Job and Run permissions on a project basis.
- Creating **agent roles**, allowing to set node-related permissions.
- Assigning these roles to users and user groups
- Extending role and permissions matching via [Macro extensions](#)

<https://plugins.jenkins.io/role-strategy/>



Role-based Authorization Strategy

The screenshot shows the Jenkins plugin marketplace interface. At the top, there are four tabs: 'Updates' (white), 'Available' (dark grey, selected), 'Installed' (white), and 'Advanced' (white). Below the tabs, there are two buttons: 'Install ↑' (white) and 'Name' (dark grey). The main content area displays the 'Role-based Authorization Strategy' plugin. It includes a checkbox, two categories ('Security' and 'Authentication and User Management'), a brief description ('Enables user authorization using a Role-Based strategy. Roles can be defined glo...'), and three action buttons: 'Install without restart' (blue), 'Download now and install after restart' (blue), and 'Update information' (light blue).

<https://plugins.jenkins.io/role-strategy/>



Role-based Authorization Strategy

Global roles

Project roles

Agent roles

Assign roles to users and groups

<https://plugins.jenkins.io/role-strategy/>



Role-based Authorization Strategy

Global roles

Project roles

Agent roles

Assign roles to users and groups

<https://plugins.jenkins.io/role-strategy/>



Working with Role-based

Manage Jenkins -> Configure global security

Authorization

- Anyone can do anything
- Legacy mode
- Logged-in users can do anything
- Matrix-based security
- Project-based Matrix Authorization Strategy
- Role-Based Strategy



Create a new user

Manage Jenkins -> Manage Users

Create User

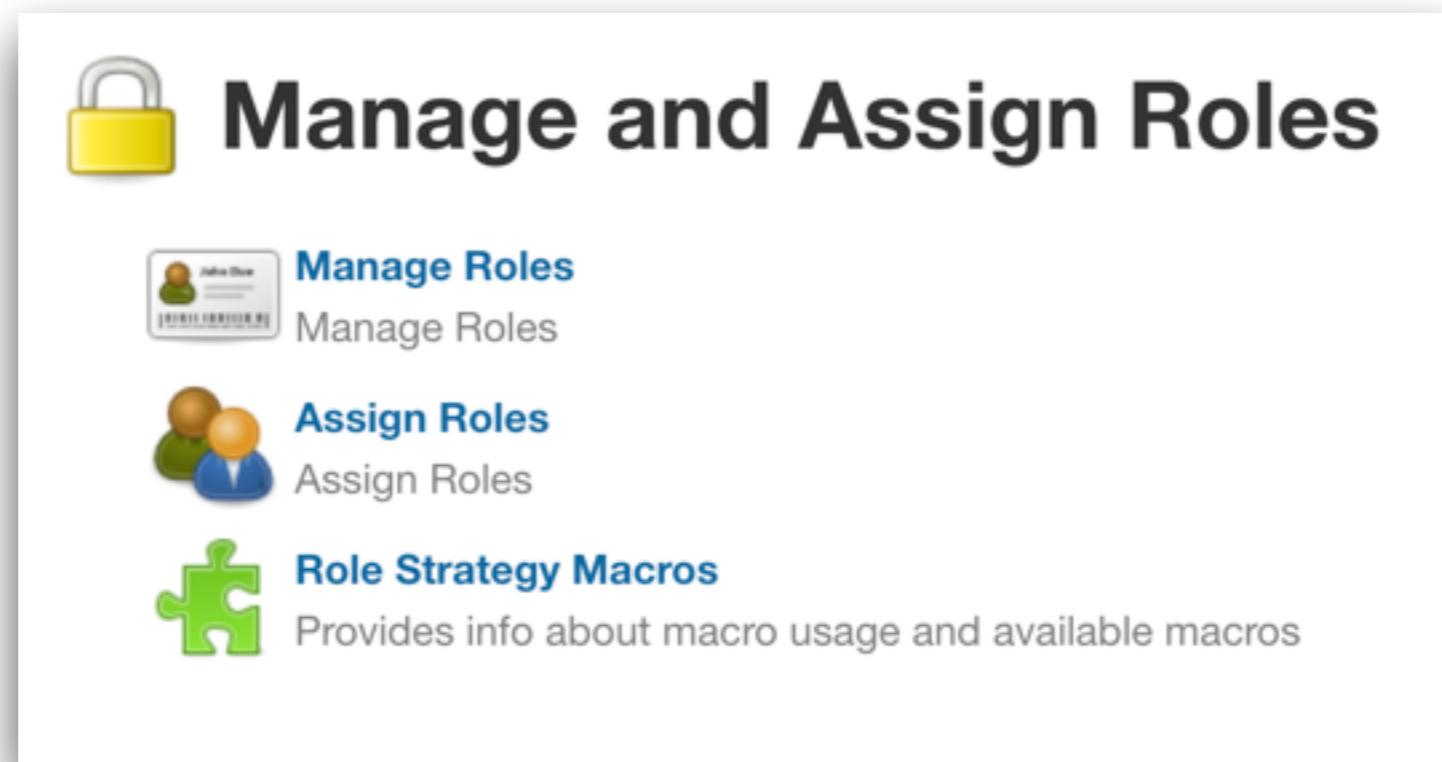
Username:	<input type="text" value="demo"/>
Password:	<input type="password" value="...."/>
Confirm password:	<input type="password" value="...."/>
Full name:	<input type="text" value="demo"/>
E-mail address:	<input type="text" value="admin@admin.com"/>

Create User



Create a new role

Manage Jenkins -> Manage and assign roles



Create a new role

Add new role = general



Manage Roles

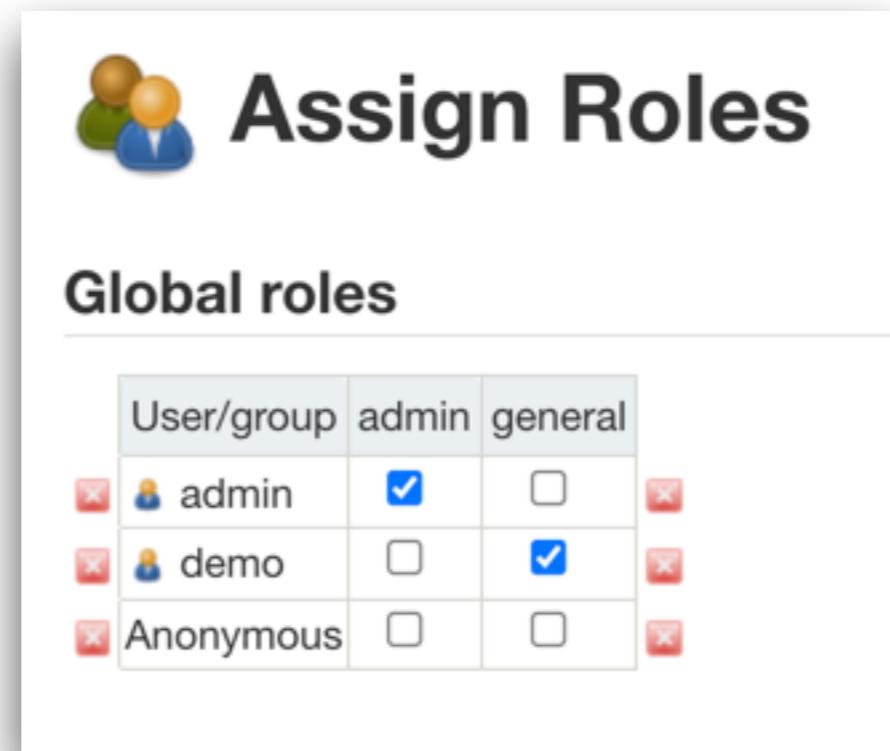
Global roles

Role	Overall		Credentials				Agent								Job							
	Administer	Read	Create	Delete	Manage	Update	View	Build	Configure	Connect	Creates	Delete	Disconnect	Provision	Build	Cancel	Configure	Create	Delete	Discover	Move	Read
admin	<input checked="" type="checkbox"/>																					
general	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



Assign roles to users

Add to global roles



The screenshot shows the Jenkins 'Assign Roles' configuration page. At the top, there's a logo of three stylized human figures and the title 'Assign Roles'. Below that, a section titled 'Global roles' contains a table for assigning roles to users and groups. The table has columns for 'User/group', 'admin', and 'general'. The rows represent 'admin', 'demo', and 'Anonymous' entries. Checkmarks indicate which roles are assigned to each user.

User/group	admin	general
admin	<input checked="" type="checkbox"/>	<input type="checkbox"/>
demo	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Anonymous	<input type="checkbox"/>	<input type="checkbox"/>



**Log out
and Login with new user**



Gitlab Authentication plugin



Gitlab Authentication plugin

Gitlab Authentication

Documentation

Releases

Issues

Dependencies

The GitLab Authentication Plugin provides a means of using GitLab for authentication and authorization to secure Jenkins. GitLab Enterprise is also supported.

Setup

Before configuring the plugin you must create a GitLab application registration. In the Scopes section mark api.

the authorization callback URL takes a specific value. It must be <http://myserver.example.com:8080/securityRealm/finishLogin> where myserver.example.com:8080 is the location of the Jenkins server.

The Client ID and the Client Secret will be used to configure the Jenkins Security Realm. Keep the page open to the application registration so this information can be copied to your Jenkins configuration.

<https://plugins.jenkins.io/gitlab-oauth/>

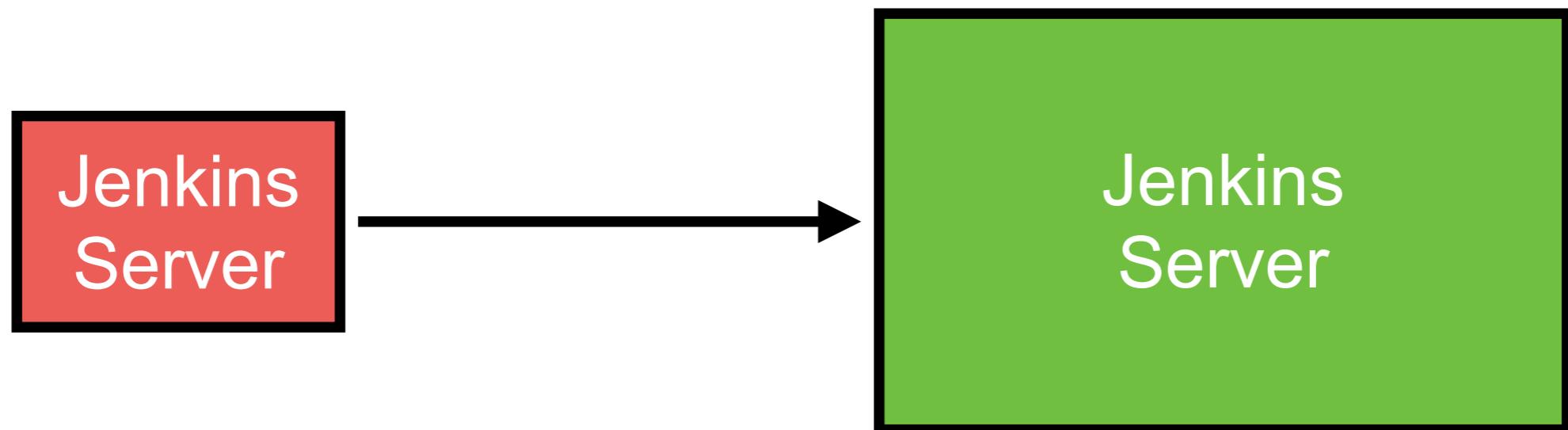


Scale Jenkins



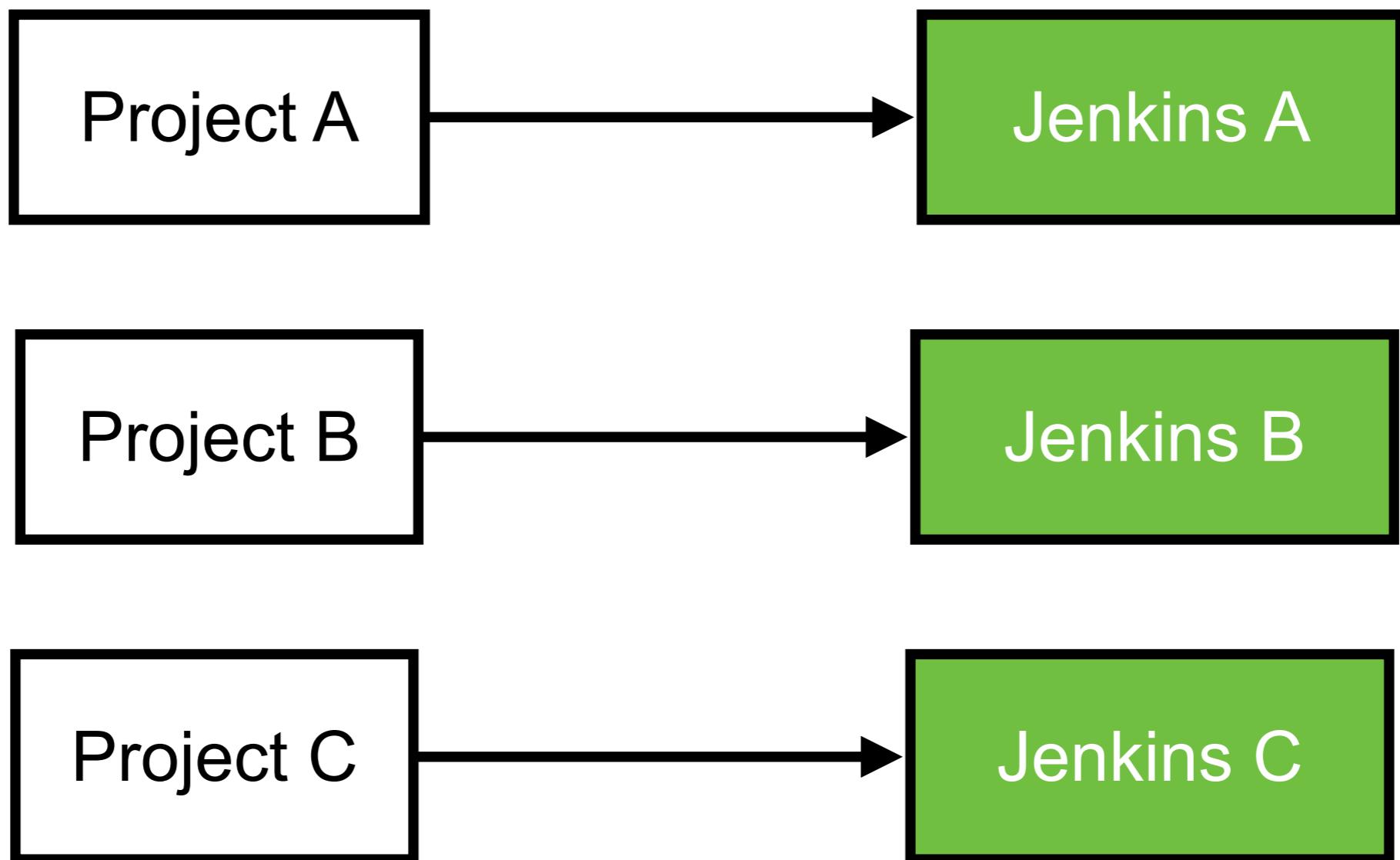
Scale Jenkins

Add more resources for all projects



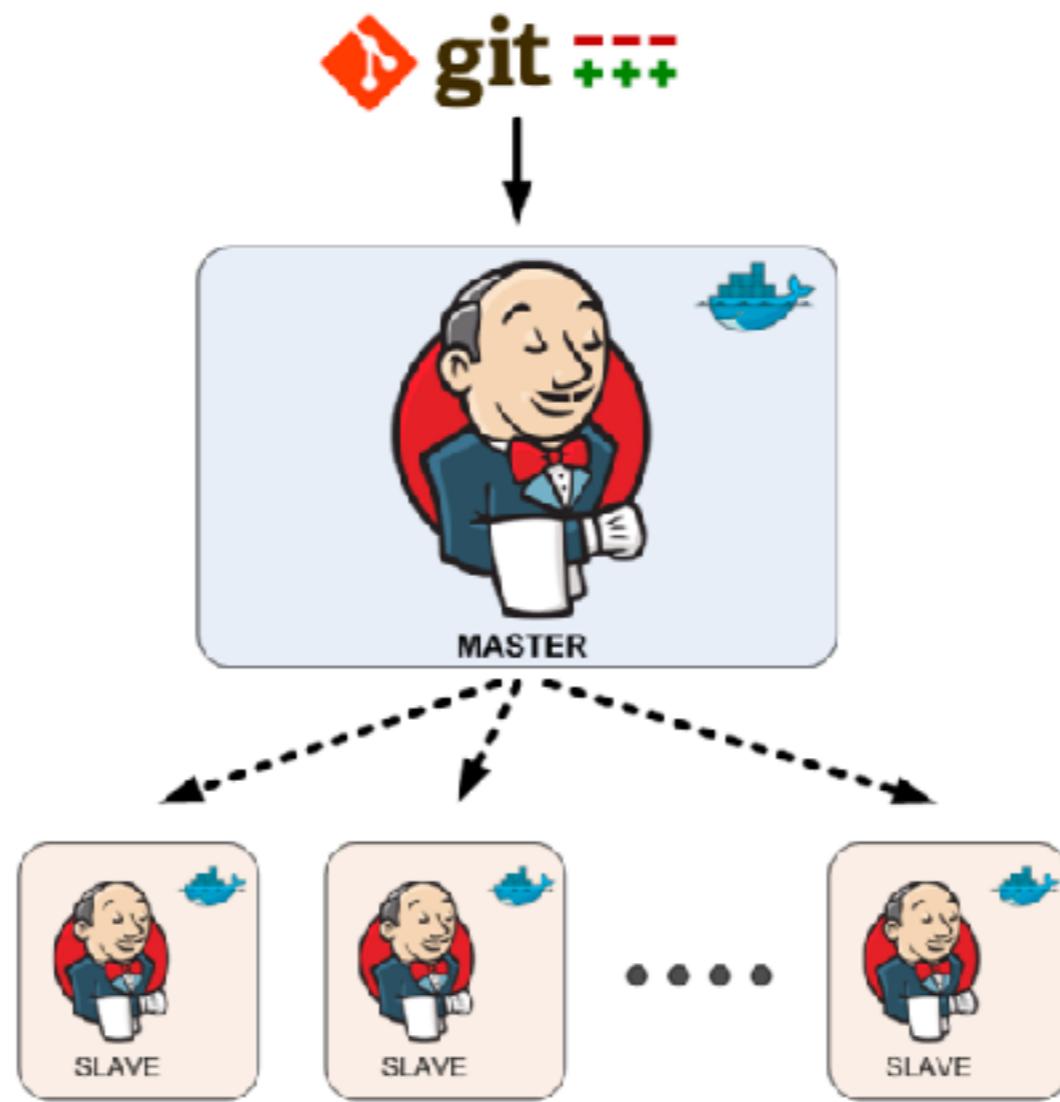
Scale Jenkins

Jenkins server per project



Scale Jenkins

Master and Slaves (Add more nodes)

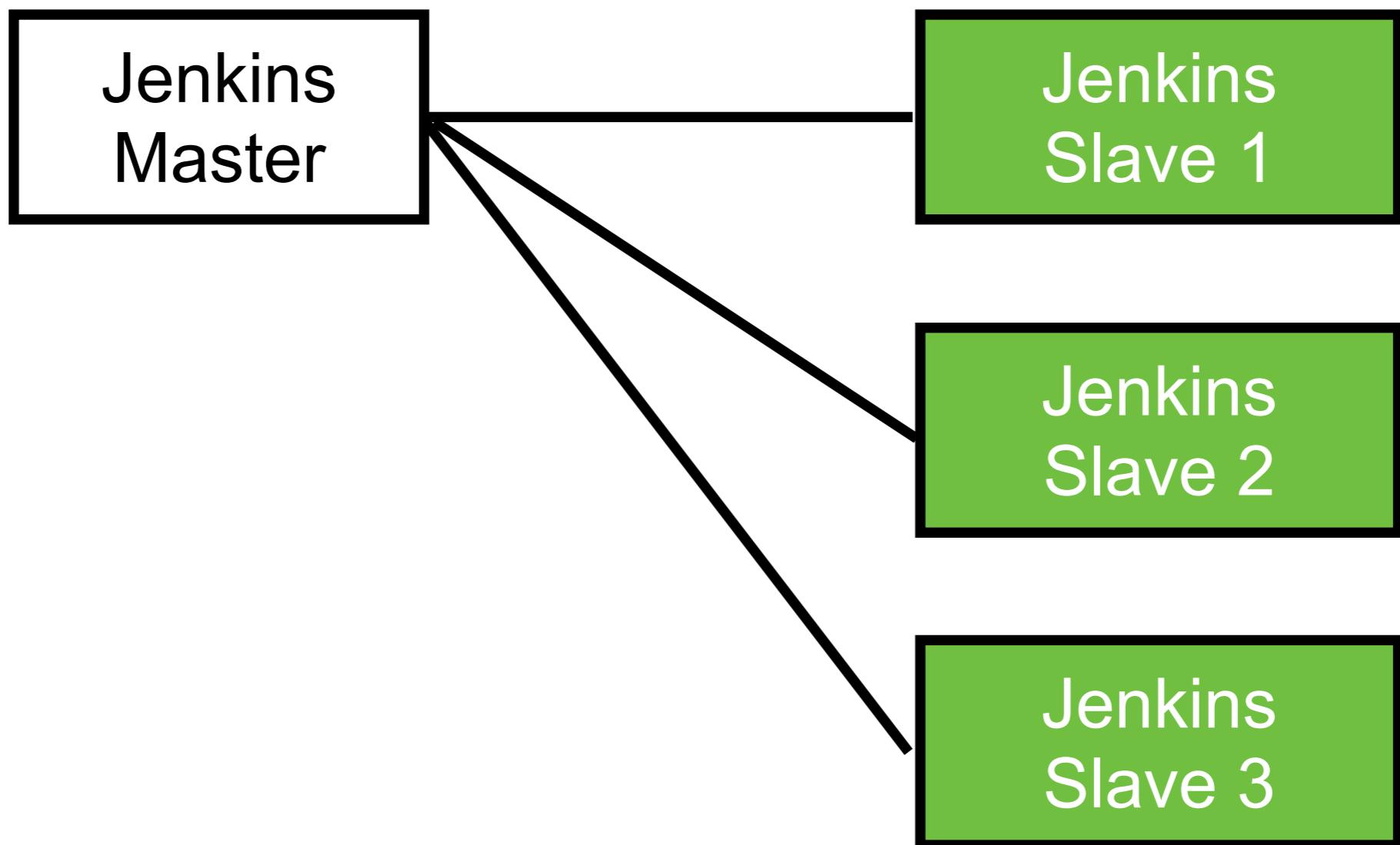


Add new nodes/agents



Scale Jenkins

Jenkins server per project



Create new node

Manage Jenkins -> Manage nodes and clouds

System Configuration

 **Configure System**
Configure global settings and paths.

 **Global Tool Configuration**
Configure tools, their locations and automatic installers.

 **Manage Plugins**
Add, remove, disable or enable plugins that can extend the functionality of Jenkins.
⚠ There are updates available

 **Manage Nodes and Clouds**
Add, remove, control and monitor the various nodes that Jenkins runs jobs on.

Security

 **Configure Global Security**
Secure Jenkins; define who is allowed to access/use the system.

 **Manage Users**
Create/delete/modify users that can log in to this Jenkins

 **Manage Credentials**
Configure credentials

 **Configure Credential Providers**
Configure the credential providers and types



Create new node

Detail of new node

Name	<input type="text" value="worker01"/> worker01
Description	<input type="text"/>
Number of executors	<input type="text" value="1"/>
Remote root directory	<input type="text" value="/var/jenkins_home"/> /var/jenkins_home
Labels	<input type="text" value="worker01"/>



Launch methods

By agent from JNLP/SSH

Launch method

- Launch agent by connecting it to the master
 - Launch agent via execution of command on the master
 - Launch agents via SSH
- Custom WorkDir path



Start node with JNLP

How to start a new agent/node ?



Agent worker01

Connect agent to Jenkins one of these ways:

- [Java Web Start is not available for the JVM version running Jenkins](#)
- Run from agent command line:

```
java -jar agent.jar -jnlpUrl http://165.22.244.58:8080/computer/worker01/jenkins-agent.jnlp -secret 276c622e46b2b0cd0efd93c97b0e51b84b47b2e1c51f11858aae67b01bd68681 -workDir "/var/jenkins_home"
```

Run from agent command line, with the secret stored in a file:

```
echo 276c622e46b2b0cd0efd93c97b0e51b84b47b2e1c51f11858aae67b01bd68681 > secret-file  
java -jar agent.jar -jnlpUrl http://165.22.244.58:8080/computer/worker01/jenkins-agent.jnlp -secret @secret-file
```

Projects tied to worker01

None



Success with new node

S	Name ↓	Architecture	Clock Difference	Free Disk Space
	master	Linux (amd64)	In sync	51.29 GB
	worker01	Linux (amd64)	In sync	51.29 GB
	Data obtained	1 sec	0.98 sec	0.92 sec



Working with SonarQube



SonarQube

The screenshot shows the SonarQube homepage. At the top, there's a navigation bar with links for Product, What's New, Documentation, Community, and a prominent blue 'Download' button. A banner at the top of the main content area says 'LTS SonarQube 8.9 LTS: Better than ever Discover Now →'. Below this, a large heading reads 'Your teammate for Code Quality and Code Security'. A subtext below it says 'SonarQube empowers all developers to write cleaner and safer code. Join an Open Community of more than 200k dev teams.' On the left, a code editor window displays Java code with several annotations. One annotation highlights a potential NullPointerException with the message 'A "NullPointerException" could be thrown; "providedClass" is nullable here.' It shows the annotation type as 'Bug' and severity as 'Major'. On the right, a summary card provides quality metrics: Reliability (0 Bugs, A grade), Security (0 Vulnerabilities, A grade), and Maintainability (4.5, A grade). A green box on the card states 'Quality Gate Passed All conditions passed'.

<https://www.sonarqube.org/>

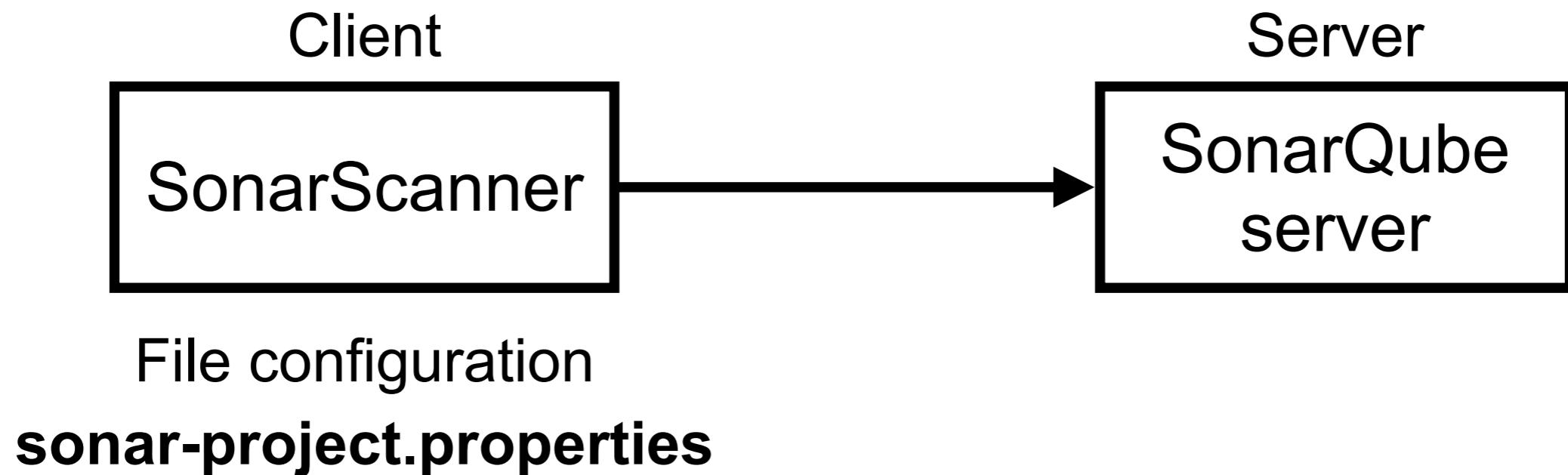


SonarQube Community version

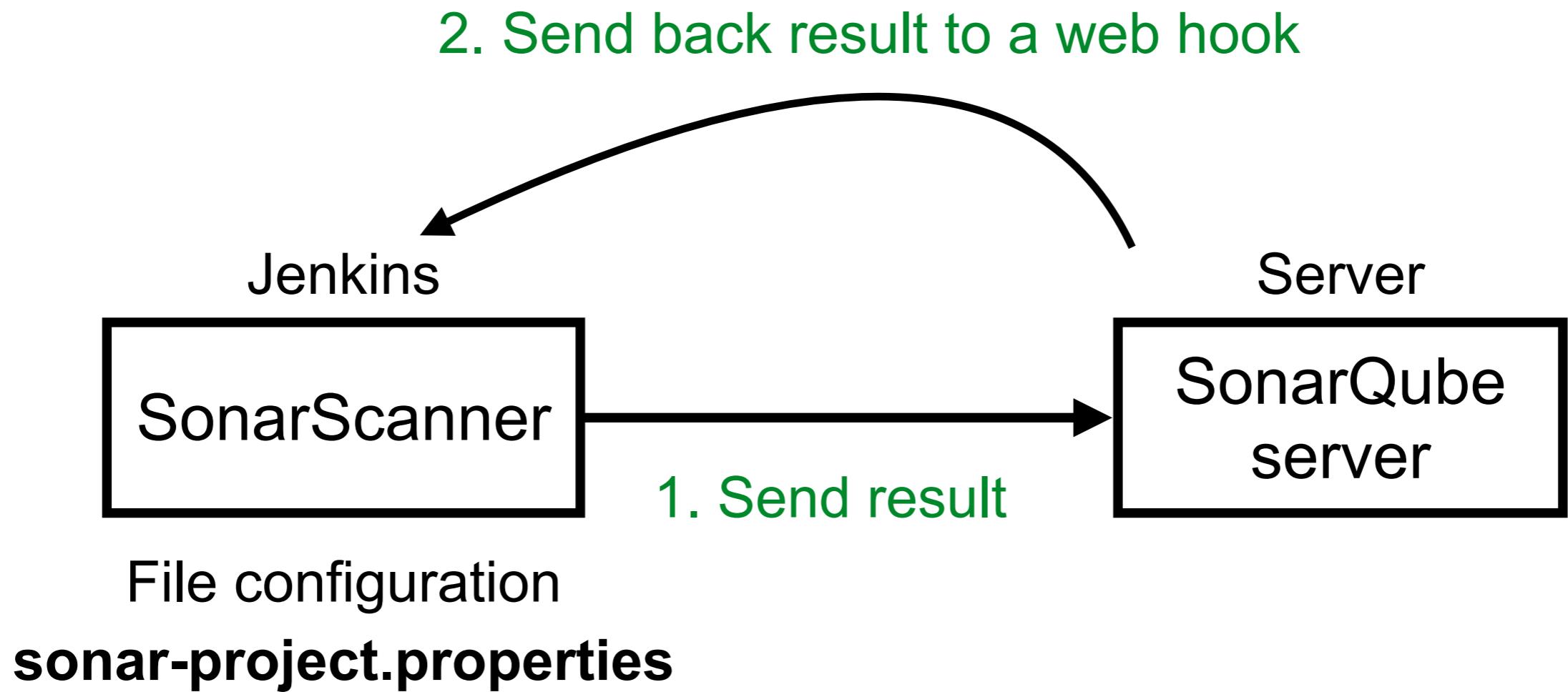
The screenshot shows the SonarQube Community version homepage. At the top, there is a navigation bar with links for Projects, Issues, Rules, Quality Profiles, Quality Gates, Administration, a search bar, and a user icon. The main content area has a heading "How do you want to create your project?". It provides two options: "Create a project manually" or "Create your project from your favorite DevOps platform". A blue info box at the top left of the main content area says: "We recommend setting up a DevOps platform configuration so you and your team can benefit from more SonarQube features." Below this, there are five cards for creating projects: "From Azure DevOps" (with a blue Azure logo), "From Bitbucket" (with a blue Bitbucket logo), "From GitHub" (with a black GitHub logo), "From GitLab" (with an orange GitLab logo), and "Manually" (with a blue double arrow icon). Each card also includes a note about global configuration: "Global configuration not set" for the first four and "Global configuration set" for the fifth. At the bottom, a yellow warning box states: "Embedded database should be used for evaluation purposes only. The embedded database will not scale, it will not support upgrading to newer versions of SonarQube, and there is no support for migrating your data out of it into a different database engine." The footer contains the text "SonarQube™ technology is powered by SonarSource SA", "Community Edition - Version 9.0.1 (build 48107) - LGPL v3 - Community - Documentation - Plugins - Web API - About", and a copyright notice "© 2017 - 2018 Siam Chamnankit Company Limited. All rights reserved."



SonarQube and Scanner



Jenkins + SonarQube



SonarScanner

SonarScanner

By [SonarSource](#) | GNU LGPL 3 | [Issue Tracker](#)

4.6.2 [Show more versions](#)

2021-05-07

Update dependencies, bug fix

[Linux 64-bit](#) [Windows 64-bit](#) [Mac OS X 64-bit](#) [Docker](#)

[Any \(Requires a pre-installed JVM\)](#) [Release notes](#)

The SonarScanner is the scanner to use when there is no specific scanner for your build system.

<https://docs.sonarqube.org/latest/analysis/scan/sonarscanner/>



Generate secret token

User -> My Account -> Security

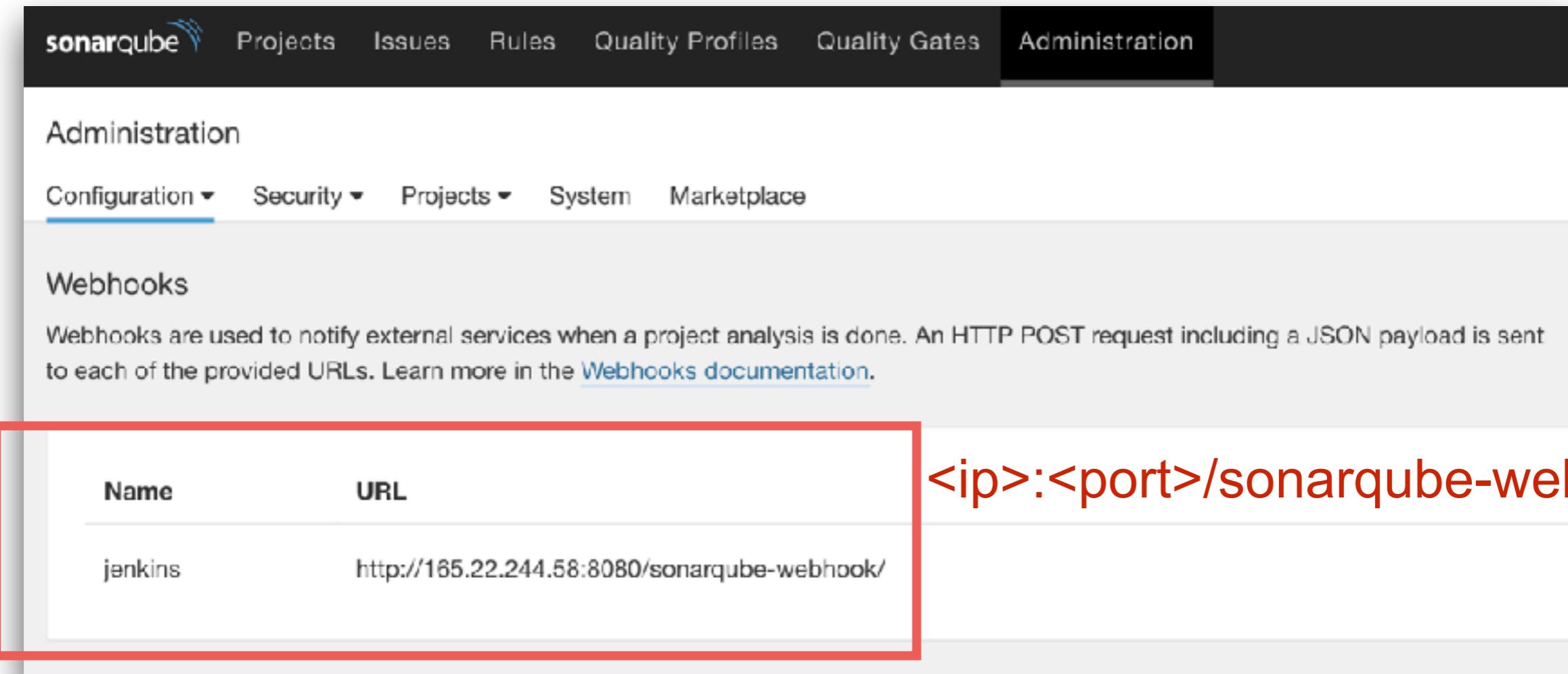
The screenshot shows the 'Tokens' section of the SonarQube 'Security' tab. A message at the top explains that tokens can be used instead of user credentials for security. Below this, a 'Generate Tokens' form has a 'Enter Token Name' input field and a 'Generate' button. A success message indicates a token named 'demo' was created, with a green 'Copy' button and the token value '4f2dca129fb346a115bf22586b31h67615e0f088'. A table lists the token details: Name (demo), Last use (Never), Created (August 25, 2021), and a Revoke button.

Name	Last use	Created	
demo	Never	August 25, 2021	Revoke



Create SonarQube Webhook

Administration -> Configuration -> Webhooks



The screenshot shows the SonarQube administration interface. The top navigation bar includes links for Projects, Issues, Rules, Quality Profiles, Quality Gates, and Administration. The Administration link is highlighted. Below the navigation, the Configuration tab is selected. The main content area is titled "Webhooks". It contains a brief description: "Webhooks are used to notify external services when a project analysis is done. An HTTP POST request including a JSON payload is sent to each of the provided URLs. Learn more in the [Webhooks documentation](#)". A table lists existing webhooks:

Name	URL
jenkins	<code>http://165.22.244.58:8080/sonarqube-webhook/</code>

`<ip>:<port>/sonarqube-webhook`



SonarScanner for Jenkins

SonarScanner for Jenkins

By [SonarSource](#)

GNU LGPL 3

[Issue Tracker](#)

2.13.1

[Show more versions](#)

2021-04-30

Update dependencies

[Download](#) [Release notes](#)

This plugin lets you centralize the configuration of SonarQube server connection details in Jenkins global configuration.

Then you can trigger SonarQube analysis from Jenkins using standard Jenkins Build Steps or [Jenkins Pipeline DSL](#) to trigger analysis with:

- [SonarScanner](#)
- [SonarScanner for Maven](#)
- [SonarScanner for Gradle](#)
- [SonarScanner for .NET](#)

<https://docs.sonarqube.org/latest/analysis/scan/sonarscanner-for-jenkins/>



SonarScanner for Jenkins

SonarQube Scanner

Documentation **Releases** Issues Dependencies

Older versions of this plugin may not be safe to use. Please review the following warnings before using an older version:

- Server authentication token stored in plain text

Documentation of SonarQube plugin available in SonarQube wiki
<http://redirect.sonarsource.com/plugins/jenkins.html>
Please don't use this page to ask questions or report bugs.

This plugin allow easy integration of **SonarQube™**, the open source platform for Continuous Inspection of code quality.

<https://plugins.jenkins.io/sonar/>



SonarScanner for Jenkins

SonarQube Scanner



External Site/Tool Integrations

Build Reports

2.13.1

This plugin allows an easy integration of **SonarQube**, the open source platform for Continuous Inspection of code quality.

Sonar Quality Gates

Fails the build whenever the Quality Gates criteria in the Sonar 5.6+ analysis aren't met (the project Quality Gates status is different than "Passed")



Warning: This plugin version may not be safe to use. Please review the following security notices:

1.3.1

- Credentials transmitted in plain text

<https://plugins.jenkins.io/sonar/>



Config SonarQube Server

Manage Jenkins -> Configure System

SonarQube servers

Environment variables Enable injection of SonarQube server configuration as build environment variables

If checked, job administrators will be able to inject a SonarQube server configuration as environment variables in the build.

SonarQube installations

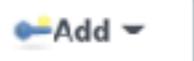
Name

 This property is mandatory.

Server URL

Default is `http://localhost:9000`

Server authentication token

- none - 

SonarQube authentication token. Mandatory when anonymous access is disabled.



Config SonarQube Scanner

Manage Jenkins -> Global tool configuration

The screenshot shows the Jenkins 'Global tool configuration' page for the 'SonarQube Scanner' plugin. The page title is 'SonarQube Scanner'. Under 'SonarQube Scanner installations', there is a button 'Add SonarQube Scanner'. A single installation is listed with the name 'scanner'. The 'Name' field contains the value 'scanner' in red text, with a red exclamation mark icon indicating it is required. Below the name is a checkbox 'Install automatically' which is checked. Underneath this is a section for 'Install from Maven Central' with a dropdown menu showing 'SonarQube Scanner 4.6.2.2472'. To the right of this section are two buttons: 'Delete Installer' and 'Delete SonarQube Scanner'. At the bottom left is a button 'Add Installer'.



Pipeline in Jenkins

```
stage('Sonarqube') {
```

Reference to SonarQube Scanner

```
    environment {
        scannerHome = tool 'scanner'
    }
    steps {
        withSonarQubeEnv('sonarqube') {
            sh "${scannerHome}/bin/sonar-scanner"
        }
        timeout(time: 10, unit: 'MINUTES') {
            waitForQualityGate abortPipeline: true
        }
    }
}
```



Pipeline in Jenkins

```
stage('Sonarqube') {  
  
    environment {  
        scannerHome = tool 'scanner'  
    }  
    steps {  
        withSonarQubeEnv('sonarqube') {  
            sh "${scannerHome}/bin/sonar-scanner"  
        }  
        timeout(time: 10, unit: 'MINUTES') {  
            waitForQualityGate abortPipeline: true  
        }  
    }  
}
```

Use config of SonarQube Server



Pipeline in Jenkins

```
stage('Sonarqube') {  
  
    environment {  
        scannerHome = tool 'scanner'  
    }  
    steps {  
        withSonarQubeEnv('sonarqube') {  
            sh "${scannerHome}/bin/sonar-scanner"  
        }  
        timeout(time: 10, unit: 'MINUTES') {  
            waitForQualityGate abortPipeline: true  
        }  
    }  
}
```

**Waiting result from SonarQube Server
via webhook**



Result of SonarQube via webhook

SonarQube Quality Gate

demo01 Passed

server-side processing: Success

Permalinks

- [Last build \(#43\), 17 sec ago](#)
- [Last stable build \(#43\), 17 sec ago](#)
- [Last successful build \(#43\), 17 sec ago](#)
- [Last failed build \(#40\), 24 min ago](#)
- [Last unsuccessful build \(#42\), 6 min 27 sec ago](#)
- [Last completed build \(#43\), 17 sec ago](#)



Using Docker

```
docker container run \
    --rm \
    -e SONAR_HOST_URL="${SONAR_URL}" \
    -e SONAR_LOGIN="${SONAR_SECRET}" \
    -v ${SOURCE_PATH}:/usr/src \
    sonarsource/sonar-scanner-cli
```

<https://hub.docker.com/r/sonarsource/sonar-scanner-cli>

