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An application's stability and reliability depend on the depth of the test. In the last couple of decades, [automated testing](#), coupled with cloud-native, has enabled us to perform tests faster and more extensive testing.

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As an integral part of the Agile pipeline, automation testing is essential. In particular, CI/CD (Continuous Integration / Continuous Deployment) and testers to speed up development and testing so that their product is more efficient and driven.

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The [implementation of CI/CD](#) requires several tools, among which Jenkins is the most popular. This article will explore Jenkins, its features, and how it can facilitate test automation.

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What is Jenkins?



Jenkins

CI/CD is the way to continuous integration and deployment. Any change is made using unit tests and deployed successfully to production.

To achieve this CI/CD, Jenkins is a self-contained and configurable tool that automates the build process.

Jenkins can be used to automate building an application, running tests, and deploying. It can be easily installed through native system packages, Docker, or even as a Java Runtime Environment (JRE) installed.

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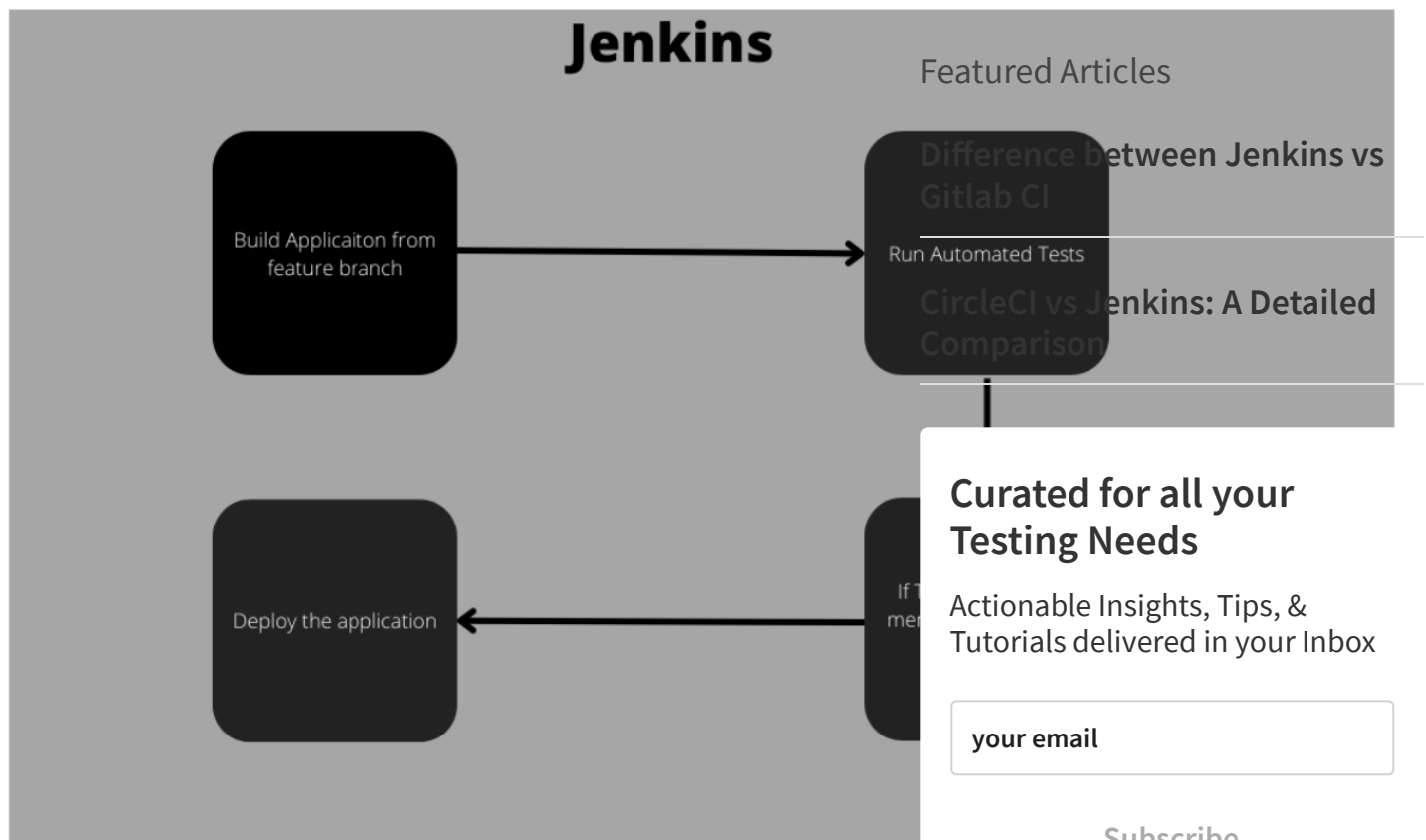
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Why use Jenkins for Test Automati

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Jenkins is a popular CI orchestration tool. It provides numerous plugin [automation tools and frameworks](#) into the test pipeline. When it comes to Test Automation, Jenkins provides plugins that help run test suites, gather dashboard results, and provide details on failures.

- **Runs Automated Test Suites:** Jenkins provides plugins for various test frameworks like [Selenium](#), [Cucumber](#), [Appium](#), etc. These can be integrated into CI pipelines to run automated tests for every build.
- **Summarizes the results:** Most plugins also summarize the test results and display them as an HTML page.
- **Provides Trends:** Jenkins keeps track of results and displays them as a trend graph. This offers a better view of how the tests have fared in the past.
- **Display details on Test Failures:** Test results are tabulated, and failures are logged with the test results.

Advantages of using Jenkins

Jenkins is a very popular open-source CI/CD build tool, with a wide variety of Plugins available. Here are some of its core advantages:

- Jenkins can be used to build pipeline/workflows
- It can be integrated with any source management tool
- It can be Integrated with Chat tools like Teams, and Slack for notifying the status of build jobs
- Jenkins can be used to Schedule builds periodically or trigger based on changes in Source code repository
- Jenkins can be used to show the HTML report of Automated Tests
- Jenkins can be used to send emails with Test Execution Report

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Limitations of using Jenkins

Some of the limitations faced while using Jenkins for Test Automation

- Jenkins, being a community-driven tool has a large number of community-driven plugins. A single tool integration can make the options unclear for users.
- Although there are plugins supporting Docker integration, Jenkins still has a long way to go in this domain.
- Jenkins does not itself host a cloud-based service. Users need to rely on Jenkins provided as a service by cloud service providers like AWS, GCP, Azure, Cloudbees, etc.
- Jenkins involves a steep learning curve as the configuration is not straightforward. Too many options and configurations can be complicated for newbies.
- Lesser flexibility in using plugins as they are not customizable.
- Lack of authentication and authorization rules and options.
- Most community-driven plugins do not have clear documentation on how to use them.

- Test Automation forms the crux of the [CI/CD process](#). Despite its issue, Jenkins is the most effective tool for implementing automation testing in CI/CD pipelines. The plethora of plugins that Jenkins offers and the strong community support makes it a powerful ally in automation efforts, no matter the software being tested.

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When to use Jenkins for Test Automation?

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With numerous plugins on offer, Jenkins meets all testing automation needs in most cases. Most popular testing tools can be easily integrated with Jenkins.

For simple workflows containing a streamlined CI process, Jenkins works well for automation. Test scripts can be called, and reports can be generated for the same.

It would be best to use Jenkins when the plugins are from a trusted source or the testing tool itself. This would avoid unruly behavior of the jobs as they make integrations much more seamless.

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Integrating Jenkins with Git

In order for Jenkins to build/run an application, Jenkins needs to be connected to a version management system like Git (other systems include Azure, Bitbucket, etc).

Note: Refer to this [GitHub demo repository](#), which can be cloned/forked for practice purposes.

Step 1 – Navigate to Configure Systems in the Jenkins using the below steps:

- Navigate to the GitHub Server section
- Enter the Name and API URL as shown below
- Click on Add button under Credentials

localhost:8080/configure

Dashboard > Configure System >

GitHub Server ?

Name ?

Github

API URL ?

https://api.github.com

Credentials ?

- none -

+ Add

☐ Manage hooks

Advanced...

Save Apply

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Step 2 – Select the Secret Text under Kind drop-down as seen in the screenshot. Specify what kind of authentication you need Jenkins to perform while accessing the repository.

- You need to get the Personal access token from Git and Enter that token in the Credentials field. Follow this [guide](#) to get a Personal access token in Git.

Jenkins Credentials Provider: Jenkins

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Add Credentials

Domain

Global credentials (unrestricted)

Kind

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

Username ?

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- Enter the secret key (Git personal access token) and ID as shown
- Click on Add button

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Secret text

Scope ?

Global (Jenkins, nodes, items, all child items, etc)

Secret

.....

ID ?

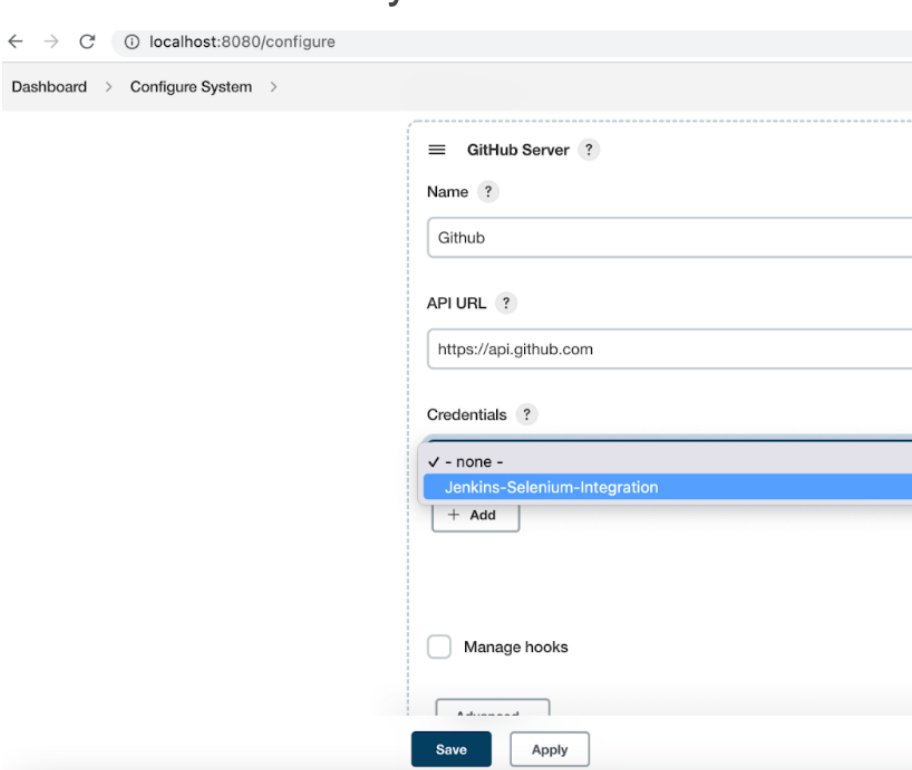
Jenkins-Selenium--Integration

Description ?

Add

Cancel

Step 3 – Select the newly added credential



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Step 4 – As the final step, click on Save on the Configure System page to complete the setup

Setup Job to Run Automated Test with Jenkins


To perform a build deployment or to run automated tests, you would need to create a job in Jenkins.

The job typically contains

- Source code repository link to the checkout
- Command to run
- Any post-run actions like collecting test reports or publishing build artifacts

Let's set up a job by following the below steps


Step 1 – Click on New Item in the Jenkins dashboard





Jenkins


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Dashboard >


 New Item

 People

 Build History

 Manage Jenkins

 My Views

 New View

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Step 2 – Next enter the Job name, Select Job type as Freestyle project, and click on OK button

Dashboard > All >


Enter an item name

Automated Test Execution


» Required field




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 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.



Multi-configuration project
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, builds, etc.



Folder
Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is a namespace, so you can have multiple things of the same name as long as they are in different namespaces.

OK

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Step 3 – The new Job is created which needs to be configured now by selecting the job name
>> Entering the root URL of the repository

Dashboard > All > Automated Test Execution >

General

Source Code Management

Build Triggers

Build Environment

Build

Post-build Actions

[Plain text] Preview

☐ Discard old builds ?

☒ GitHub project

Project url ?

https://github.com/gurudattgd04/Selenium-Jenkins/

Advanced...

☐ This project is parameterised ?

☐ Throttle builds ?

☐ Disable this project ?

☐ Execute concurrent builds if necessary ?

Advanced...

Save

Apply

Step 4 – You need to specify the git repo URL by selecting the Git radio button under the Source Code Management section

Dashboard > All > Automated Test Execution >

General

Source Code Management

Build Triggers

Build Environment

Build Post Actions

☐ None

☒ Git ?

Repositories ?

Repository URL ?

https://github.com/gurudattgd04/Selenium-Jenkins.git

Credentials ?

- none -

+ Add

Advanced...

Save

Apply

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Step 5 – Next step is to add Build Command and since the project used hence selecting the Invoke top-level Maven targets option.

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Dashboard > All > Automated Test Execution >

General Source Code Management Build Triggers Build Environment **Build** Post-build Actions

Filter

- Execute Windows batch command
- Execute shell
- Invoke Ant
- Invoke Gradle script
- Invoke top-level Maven targets**
- Run with timeout
- Set build status to "pending" on GitHub commit

Add build step ▲

Post-build Actions

Add post-build action ▼

Save Apply

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Step 6 – Select the Maven version and enter the Maven command under **Build** and **Post-build Actions** sections and click on **Save** to verify.

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Dashboard > All > Automated Test Execution >

GeneralSource Code ManagementBuild TriggersBuild EnvironmentBuildPost-build Actions

Build

Invoke top-level Maven targets ?

Maven Version

Maven 3.8.6

Goals

clean verify

Advanced...

Add build step ▾

Save

Apply

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Step 7 – Save the Job configuration by clicking on the Save button

Executing the Job

To execute the job Click on Build Now, which will trigger a new build as seen below.

Dashboard > All > Automated Test Execution >

Workspace

Build Now

Configure

Delete Project

GitHub

Rename

Workspace

Recent Changes

Permalinks

- Last build (#6), 2 days 22 hr ago
- Last stable build (#6), 2 days 22 hr ago
- Last successful build (#6), 2 days 22 hr ago
- Last failed build (#5), 2 days 22 hr ago
- Last unsuccessful build (#5), 2 days 22 hr ago
- Last completed build (#6), 2 days 22 hr ago

Build History trend

Filter builds...

✓ #7	21 Aug 2022, 21:18	
✓ #6	18 Aug 2022, 22:31	
✗ #5	18 Aug 2022, 22:26	
✗ #4	18 Aug 2022, 22:24	
✗ #3	18 Aug 2022, 22:24	
✗ #2	18 Aug 2022, 22:19	

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Once the build is completed, you can see the console output or the HT on the Build number (In this case its #7)

Dashboard > All > Automated Test Execution >

Workspace

Build Now

Configure

Delete Project

GitHub

Rename

Workspace

Recent Changes

Permalinks

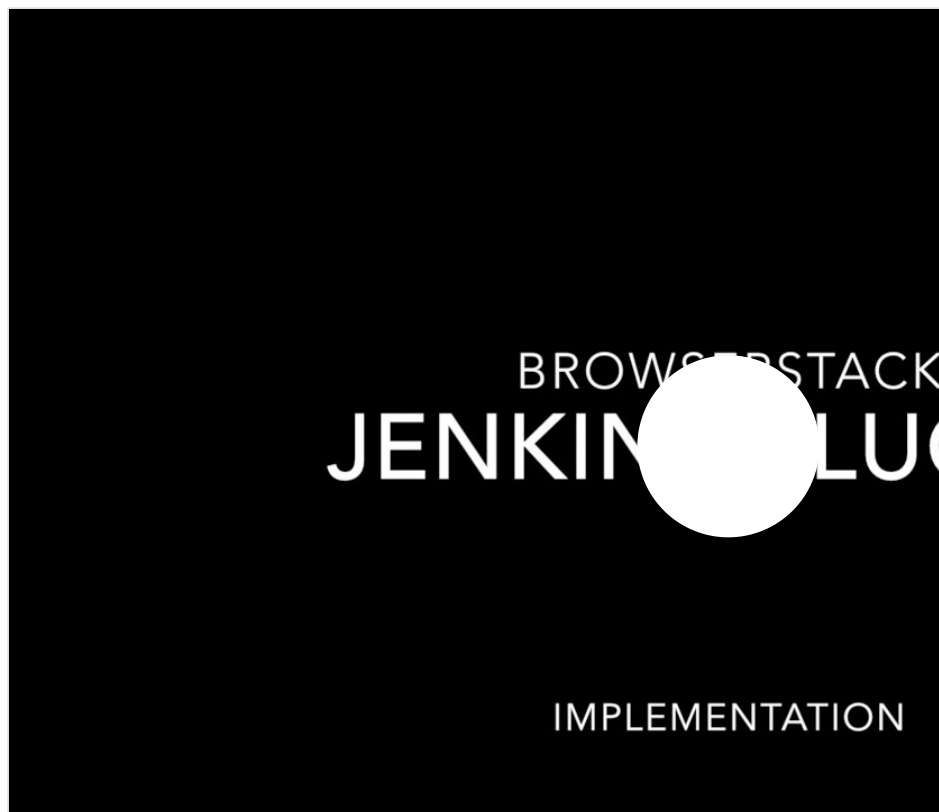
- Last build (#6), 2 days 22 hr ago
- Last stable build (#6), 2 days 22 hr ago
- Last successful build (#6), 2 days 22 hr ago
- Last failed build (#5), 2 days 22 hr ago
- Last unsuccessful build (#5), 2 days 22 hr ago
- Last completed build (#6), 2 days 22 hr ago

Build History trend

Filter builds...

✓ #7	21 Aug 2022, 21:18	
✓ #6	18 Aug 2022, 22:31	
✗ #5	18 Aug 2022, 22:26	
✗ #4	18 Aug 2022, 22:24	
✗ #3	18 Aug 2022, 22:24	
✗ #2	18 Aug 2022, 22:19	
✗ #1	18 Aug 2022, 22:19	

Read More: Learn how to [integrate BrowserStack Automate with Jenkins](#)



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Popular plugins for test automation:

- **Selenium Plugin:** This plugin helps turn the Jenkins cluster into a Selenium Grid3 cluster and carry out tests on the heterogeneous Jenkins clusters.
- **Cucumber-reports:** This plugin publishes the reports of Cucumber runs in pretty HTML format.
- **Browserstack Plugin:** Test suites can be integrated and run from the CI server on the Browserstack [real device cloud](#).
- **TestComplete:** TestComplete tests can be integrated with Jenkins Freestyle jobs and pipelines with this plugin.
- **Kalaton TestOps:** This plugin helps to run Kalaton Studio on Jenkins. It also automatically handles the download and deployment of Kalaton Studio.

Apart from these, many tools help with the analysis and reporting of tests. Some of these are **Tests Analysis Plugin**, **Test Results Analyzer**, **bootstrapper-multi-test-reports-plugin**, **JUnit publisher plugin**, etc.

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BrowserStack's [cloud Selenium grid](#) of 3000+ real browsers and devices offers integrations with multiple CI/CD tools, including Jenkins. [Sign up for free](#) and start running automated tests on the latest devices and browsers on the cloud.

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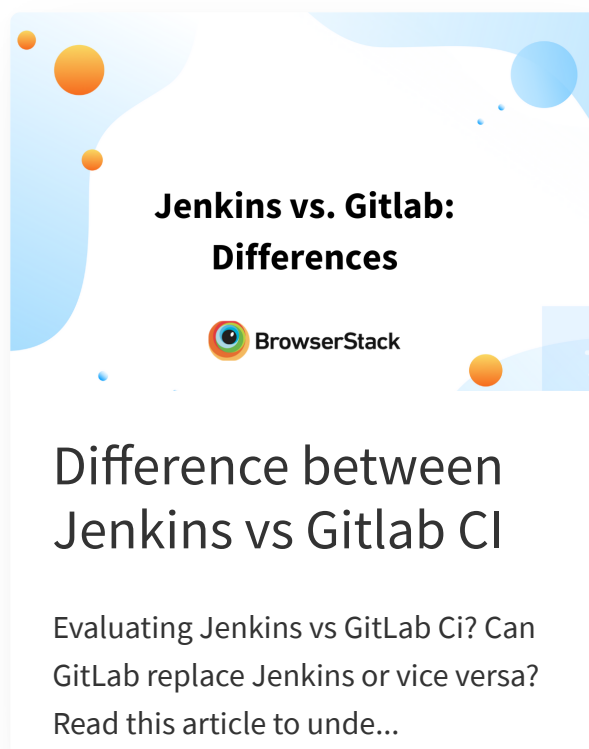
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