

Week 6 : SOFTWARE DEVELOPMENT TOOLS AND ENVIRONMENTS

# Set Up Jenkins Credentials

---



# For Github

## New credentials

Kind **1** **1**

Username with password

Scope **1**

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

Username **2**

tuchisani

☐ Treat username as secret **2**

Password **3**

ID **3**

Description

ID ?

github

Description ?

my github for test jenkins

Settings / Developer settings

GitHub Apps

OAuth Apps

Personal access tokens

Fine-grained tokens

Tokens (classic)

## Personal access tokens (classic)

Generate new token

Revoke all

Tokens you have generated that can be used to access the GitHub API.

Make sure to copy your personal access token now. You won't be able to see it again!

ghp\_Zp7azz7td4qxUcZdLyTT8PHG1LjrI8t3FnZ

Delete

Personal access tokens (classic) function like legacy OAuth access tokens. They can be used instead of a password for Git over HTTPS, or can be used to authenticate to the API over Basic Authentication.

## Select scopes

Scopes define the access for personal tokens. [Read more about OAuth scopes.](#)

- ☒ **repo** Full control of private repositories
  - ☒ repo:status Access commit status
  - ☒ repo\_deployment Access deployment status
  - ☒ public\_repo Access public repositories
  - ☒ repo:invite Access repository invitations
  - ☒ security\_events Read and write security events



- ☒ **admin:repo\_hook** Full control of repository hooks
  - ☒ write:repo\_hook Write repository hooks
  - ☒ read:repo\_hook Read repository hooks

# For Github

Global credentials (unrestricted)

+ Add Credentials

Credentials that should be available irrespective of domain specification to requirements matching.

ID	Name	Kind	Description	
 github	tuchsanai/***** (my github for test jenkins)	Username with password	my github for test jenkins	

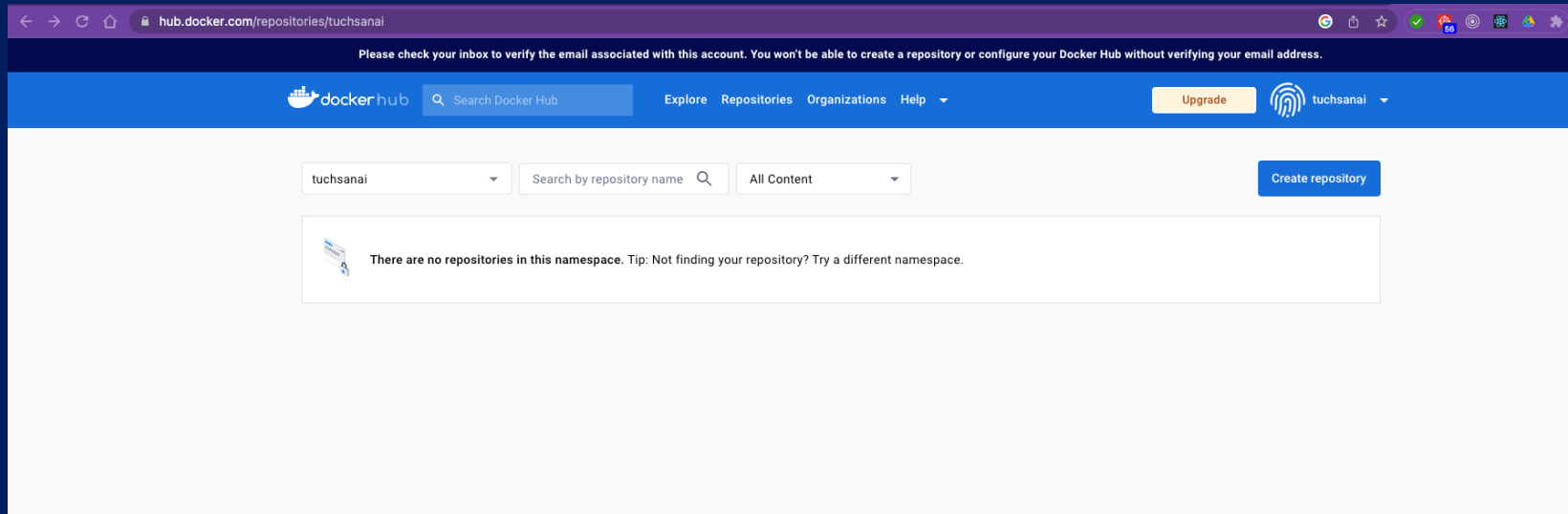
Icon:

S

M

L

# For docker Hub



## New credentials

Kind

Username with password

Scope ?

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

Username ?

tuchsanai

1

☐ Treat username as secret ?

Password ?

.....

2

ID ?

dockerhub

3

Description ?





my docker hub

[Create](#)

## Global credentials (unrestricted)

[+ Add Credentials](#)

Credentials that should be available irrespective of domain specification to requirements matching.

ID	Name	Kind	Description	
 <a href="#">github</a>	tuchsanai/***** (my github for test jenkins)	Username with password	my github for test jenkins	
 <a href="#">dockerhub</a>	tuchsanai/***** (my docker hub)	Username with password	my docker hub	

Icon: S M L



# Intro to Jenkins Plugins

---



# Plugins Index

Discover the 1800+ community contributed Jenkins plugins to support building, deploying and automating any project.

Browse



## Browse categories

Platforms  
User interface  
Administration  
Build management  
Source Code Management

## New Plugins

Add Changes to Build Changelog  
CodeThreat  
DevOps Portal  
CatLight Notification  
Qualys IaC Security  
Pipeline Input Step Notification  
BeVigil CI  
Matomo analytics  
Deploy to webMethods Integration Server  
Casdoor Authentication

## Recently updated

Venafi CodeSign Protect  
Build Failure Analyzer  
Add Changes to Build Changelog  
Pipeline Aggregator View  
Parameterized Scheduler  
Nomad  
Kubernetes  
SnakeYAML API  
Pipeline: Basic Steps  
Jakarta Mail API

## Trending

Configuration as Code  
AnsiColor  
Job DSL  
Pipeline Utility Steps  
CloudBees Disk Usage Simple  
SSH Agent  
Kubernetes  
Active Directory  
Blue Ocean  
Slack Notification



# Plugins Index


Discover the 1800+ community contributed Jenkins plugins to support building, deploying and automating any project.

Browse

docker




← → ↺ ↻ 🏠 🔒 plugins.jenkins.io/ui/search?query=docker

Jenkins 

Blog Documentation ▾ Plugins Community ▾ Subprojects ▾ Security ▾ About ▾ English ▾ Dev


Sort Relevance

- ☒ Relevance
- ☐ Most installed
- ☐ Trending
- ☐ Title
- ☐ Release date

Categories 

- ☐ Platforms
  - ☐ iOS Development
  - ☐ .NET Development
  - ☐ Android Development
  - ☐ Ruby Development
- ☐ User interface
  - ☐ User Interface
  - ☐ List view columns
- ☐ Administration
  - ☐ Agent Management
  - ☐ Page Decorators
  - ☐ Authentication and User Management
  - ☐ Cluster Management
  - ☐ Command Line Interface
- ☐ Build management
  - ☐ Build Triggers
  - ☐ Build Wrappers
  - ☐ Build Notifiers
  - ☐ Deployment
  - ☐ Build Parameters
  - ☐ Other Post-Build Actions
  - ☐ Build Tools
  - ☐ Build Reports
  - ☐ Artifact Uploaders
- ☐ Source Code Management

Browse ▾ docker

Search by  algolia

1 to 26 of 26

Previous 1 Next


Docker

Installs: 40105  
Released: 4 weeks ago

adopt-this-plugin, Cloud Provider

This plugin integrates Jenkins with Docker

Kanstantsin Shautsou  
magnayn  
(4 other contributors)




Docker Compose Build Step

Installs: 5378  
Released: 5 years ago

This plugin has no labels

Docker Compose plugin for Jenkins

João Galego



CloudShare Docker-Machine

Installs: 162  
Released: 6 years ago


Docker Commons

Installs: 140949  
Released: 6 months ago

Library plugins (for use by other)

Provides the common shared functionality for various Docker-related plugins.

Jesse Glick  
Kohsuke Kawaguchi  
(3 other contributors)




Docker Slaves

Installs: 5330  
Released: 6 years ago

docker

Uses Docker containers to run Jenkins build agents.

Yoann Dubreuil



Yet Another Docker

Installs: 1396  
Released: 3 years ago

Cloud Providers, Cluster Manag


Docker Pipeline

Installs: 128051  
Released: 3 months ago

adopt-this-plugin, Deployment,

Build and use Docker containers from pipelines.

Jesse Glick  
Oleg Nenashev  
(6 other contributors)




CloudBees Docker Custom Build

Installs: 3103  
Released: 5 years ago

docker

Run builds inside a docker container, defined by a Docker image or Dockerfile stored in project SCM.

Vincent Latombe  
Jon Hermansen



Panoptica Vulnerability Scanner

Installs: 6  
Released: 4 months ago


Docker API

Installs: 43867  
Released: 4 days ago

adopt-this-plugin, Library plugi

This plugin provides docker-java API for other plugins.

Yoann Dubreuil  
Eric Claire




CloudBees Docker Hub/Registry Notification

Installs: 1767  
Released: a week ago

docker

Integrates Jenkins with DockerHub and Docker Registry

rsandell  
Adrien Lecharpentier  
(11 other contributors)



Amazon ECR

Installs: 8908  
Released: 3 weeks ago

aws


docker-build-step

Installs: 15524  
Released: 4 months ago

Build Tools, docker

This plugin allows to add various docker commands to your job as build steps.

vjuranek




Docker Swarm

Installs: 1398  
Released: 2 years ago

docker

Docker swarm cloud plugin.

surya gaddipati  
Roman Băriswyl



Aqua MicroScanner

Installs: 189  
Released: 3 years ago


This plugin has no labels

CloudBees Docker Build and Publish

Installs: 9934  
Released: 6 months ago

Build Tools, docker

This plugin enables building Dockerfile based projects, as well as publishing of the built images/repos to the docker Carlos Sanchez  
Michael Neale  
(2 other contributors)




CloudBees Docker Traceability

Installs: 1062  
Released: 7 years ago

docker

Provides an ability to trace server deployments via fingerprints

Oleg Nenashev  
Alex Taylor



CrowdStrike Security

Installs: 13  
Released: 4 months ago

This plugin has no labels

← → ↻ 🏠 Not Secure | time.tuchsanai.com:8080

# Jenkins

Dashboard >

- + New Item
- 👤 People
- 📅 Build History
- 🕒 Project Relationship
- 🔍 Check File Fingerprint
- ⚙️ Manage Jenkins >
  - 📄 My Views
  - ⚙️ Manage Jenkins
  - 📄 My Views

**Build Queue**

No builds in the queue.

**Build Executor Status**

- 1 Idle
- 2 Idle

**System Configuration**

- ⚙️ Configure System
- 🔑 Global Tool Configuration
- ⚙️ Manage Plugins
- 🌐 Manage Nodes and Clouds

**Security**

- 🔒 Configure Global Security
- 🔑 Manage Credentials
- 🔑 Configure Credential Providers

**Manage Users**

**Status Information**

- 📄 System Information
- 📄 System Log
- 📈 Load Statistics
- 👤 About Jenkins

**Troubleshooting**

- 🗑️ Manage Old Data

**Tools and Actions**

- 🔄 Reload Configuration from Disk
- 📄 Jenkins CLI
- ↔️ Script Console
- 🛑 Prepare for Shutdown

**Uncategorized**

- 🐳 Docker

time.tuchsanai.com:8080/manage/pluginManager

Jenkins

Search (⌘+K)

Dashboard > Manage Jenkins > Plugin Manager

Updates

Available plugins

Installed plugins

Advanced settings

## Plugins

Q docker

Name ↓	Enabled
<b>Docker API</b> 3.2.13-37.vf3411c9828b9 This plugin provides <b>docker-java</b> API for other plugins. <a href="#">Report an issue with this plugin</a>	<input checked="" type="checkbox"/>
This plugin is up for adoption! We are looking for new maintainers. Visit our <a href="#">Adopt a Plugin</a> initiative for more information.	
<b>Docker Commons Plugin</b> 1.21 Provides the common shared functionality for various Docker-related plugins. <a href="#">Report an issue with this plugin</a>	<input checked="" type="checkbox"/>
<b>Docker Pipeline</b> 563.vd5d2e5c4007f Build and use Docker containers from pipelines. <a href="#">Report an issue with this plugin</a>	<input checked="" type="checkbox"/>
This plugin is up for adoption! We are looking for new maintainers. Visit our <a href="#">Adopt a Plugin</a> initiative for more information.	
<b>Docker plugin</b> 1.3.0 This plugin integrates Jenkins with Docker <a href="#">Report an issue with this plugin</a>	<input checked="" type="checkbox"/>
This plugin is up for adoption! We are looking for new maintainers. Visit our <a href="#">Adopt a Plugin</a> initiative for more information.	

## Plugins

Q Docker Pipeline

Install	Name ↓	Released
<input type="checkbox"/>	<b>Docker Pipeline</b> 563.vd5d2e5c4007f <a href="#">pipeline</a> <a href="#">DevOps</a> <a href="#">Deployment</a> <a href="#">docker</a> Build and use Docker containers from pipelines. <a href="#">Report an issue with this plugin</a>	2 mo 20 days ago
This plugin is up for adoption! We are looking for new maintainers. Visit our <a href="#">Adopt a Plugin</a> initiative for more information.		

# First pipeline using Pipeline script

---

# How To View and Update the Linux PATH Environment Variable

which python3

```
Last login: Mon Feb 20 06:06:03 2023 from ec2-3-0-5-37.ap-southeast-1.compute.amazonaws.com
```

```
  _ | _ | _ |  
  _ | ( _ | /  
  _ | \ _ | _ |  
Amazon Linux 2 AMI
```

```
https://aws.amazon.com/amazon-linux-2/  
30 package(s) needed for security, out of 34 available  
Run "sudo yum update" to apply all updates.  
[ec2-user@ip-172-31-17-81 ~]$ which python3  
/usr/bin/python3  
[ec2-user@ip-172-31-17-81 ~]$
```

You can view the `PATH` variable with the following command:

```
$ echo $PATH
```


Copy

An unchanged `PATH` may look something like this (file paths may differ slightly depending on your system):

```
[ec2-user@ip-172-31-17-81 ~]$ echo $PATH  
/usr/local/bin:/usr/bin:/usr/local/sbin:/usr/sbin:/home/ec2-user/.local/bin:/home/ec2-user/bin  
[ec2-user@ip-172-31-17-81 ~]$
```

1. Verify that Python 3 is installed on the system: You can check if Python 3 is installed by running the following command in a terminal:

css

 Copy code

```
python3 --version
```

If the output shows the version number of Python 3, it means Python 3 is installed.

2. Add the path to Python 3 to the system path: If Python 3 is installed, but Jenkins is still unable to find it, you can add the path to Python 3 to the system path. To do this, you can add the following line to the end of the `.bashrc` or `.bash_profile` file in your home directory:

ruby

 Copy code

```
export PATH=$PATH:/path/to/python3/bin
```


Replace `/path/to/python3/bin` with the actual path to the directory containing the `python3` binary.

3. Restart Jenkins: After adding the path to Python 3 to the system path, you may need to restart Jenkins for the changes to take effect. You can do this by running the following command in a terminal:

 Copy code

```
sudo systemctl restart jenkins
```

This command may vary depending on your system and how Jenkins is installed.

 **Jenkins**


Search (⌘+K)

Dashboard > All >


Enter an item name

myFirstPipeline


» 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 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 a free-style job type.

 **Multi-configuration project**


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

 **Folder**

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

 **Multibranch Pipeline**

Creates a set of Pipeline projects according to detected branches in one SCM repository.

 **Organization Folder**

Creates a set of multibranch project subfolders by scanning for repositories.

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

Copy from

OK

to autocomplete

## Pipeline

### Definition

Pipeline script

#### Script ?

```
1 pipeline {
2   agent any
3   stages {
4     stage('first pipeline') {
5       steps {
6
7         echo 'welcome to first pipeline'
8         sh 'python3 --version'
9       }
10    }
11  }
12 }
13 }
```

☒ Use Groovy Sandbox ?



## Console Output

```
Started by user Tuchsanaei Ploysuwan
[Pipeline] Start of Pipeline
[Pipeline] node
Running on Jenkins in /var/lib/jenkins/workspace/e
[Pipeline] {
[Pipeline] stage
[Pipeline] { (first pipeline)
[Pipeline] echo
welcome to first pipeline
[Pipeline] sh
+ python3 --version
Python 3.7.16
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```





```

pipeline {
  agent any
  stages {
    stage("build") {
      steps {
      }
    }
  }
  node {
    // groovy script
  }
}

```

- "pipeline" must be top-level
- "agent" where to execute
- "stages" where the "work" happens

## Declarative Pipeline fundamentals

In Declarative Pipeline syntax, the `pipeline` block defines all the work done throughout your entire Pipeline.

*Jenkinsfile (Declarative Pipeline)*

```
pipeline {  
  agent any ❶  
  stages {  
    stage('Build') { ❷  
      steps {  
        // ❸  
      }  
    }  
    stage('Test') { ❹  
      steps {  
        // ❺  
      }  
    }  
    stage('Deploy') { ❻  
      steps {  
        // ❼  
      }  
    }  
  }  
}
```

- ❶ Execute this Pipeline or any of its stages, on any available agent.
- ❷ Defines the "Build" stage.
- ❸ Perform some steps related to the "Build" stage.
- ❹ Defines the "Test" stage.
- ❺ Perform some steps related to the "Test" stage.
- ❻ Defines the "Deploy" stage.
- ❼ Perform some steps related to the "Deploy" stage.

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

# Python

*Jenkinsfile (Declarative Pipeline)*

```
/* Requires the Docker Pipeline plugin */
pipeline {
  agent { docker { image 'python:3.10.7-alpine' } }
  stages {
    stage('build') {
      steps {
        sh 'python --version'
      }
    }
  }
}
```

# Node.js / JavaScript

*Jenkinsfile (Declarative Pipeline)*

```
/* Requires the Docker Pipeline plugin */
pipeline {
  agent { docker { image 'node:16.17.1-alpine' } }
  stages {
    stage('build') {
      steps {
        sh 'node --version'
      }
    }
  }
}
```

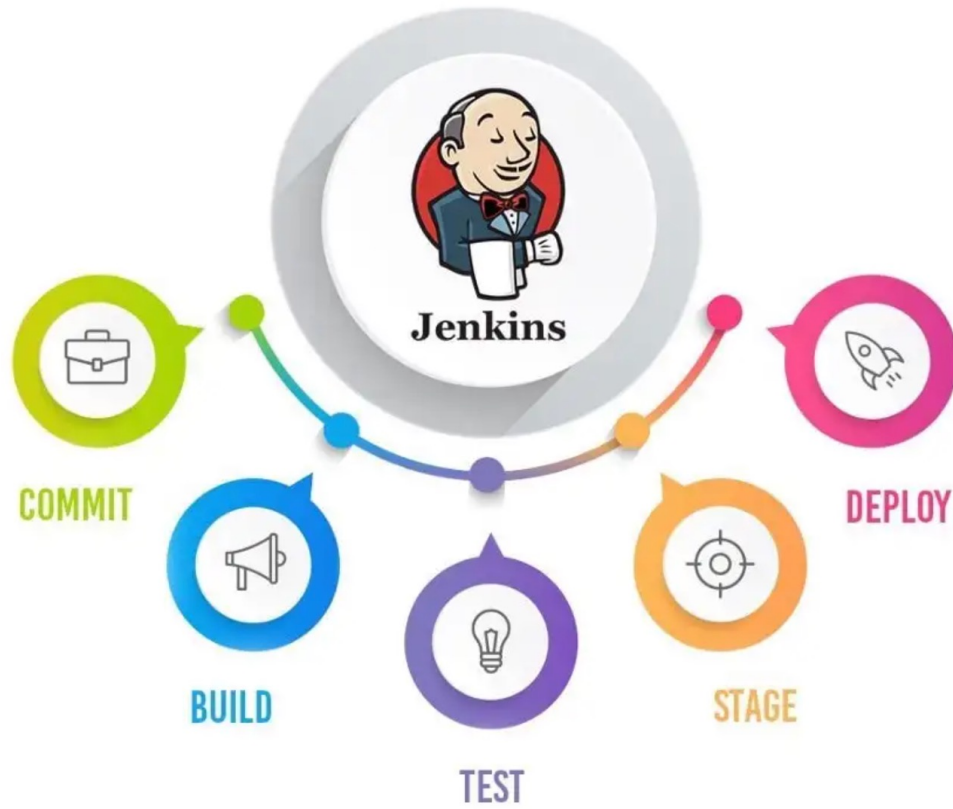
# Go

*Jenkinsfile (Declarative Pipeline)*

```
/* Requires the Docker Pipeline plugin */
pipeline {
  agent { docker { image 'golang:1.19.1-alpine' } }
  stages {
    stage('build') {
      steps {
        sh 'go version'
      }
    }
  }
}
```

<https://www.jenkins.io/doc/pipeline/tour/hello-world/>



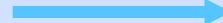
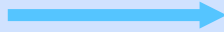




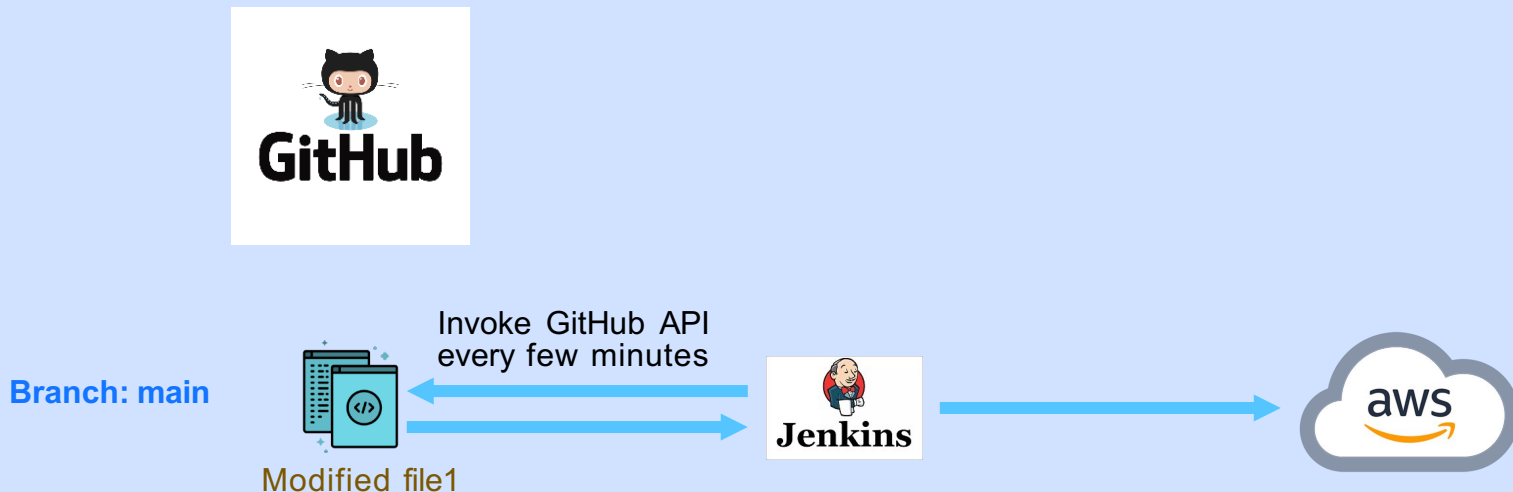
Branch: main



Modified file1



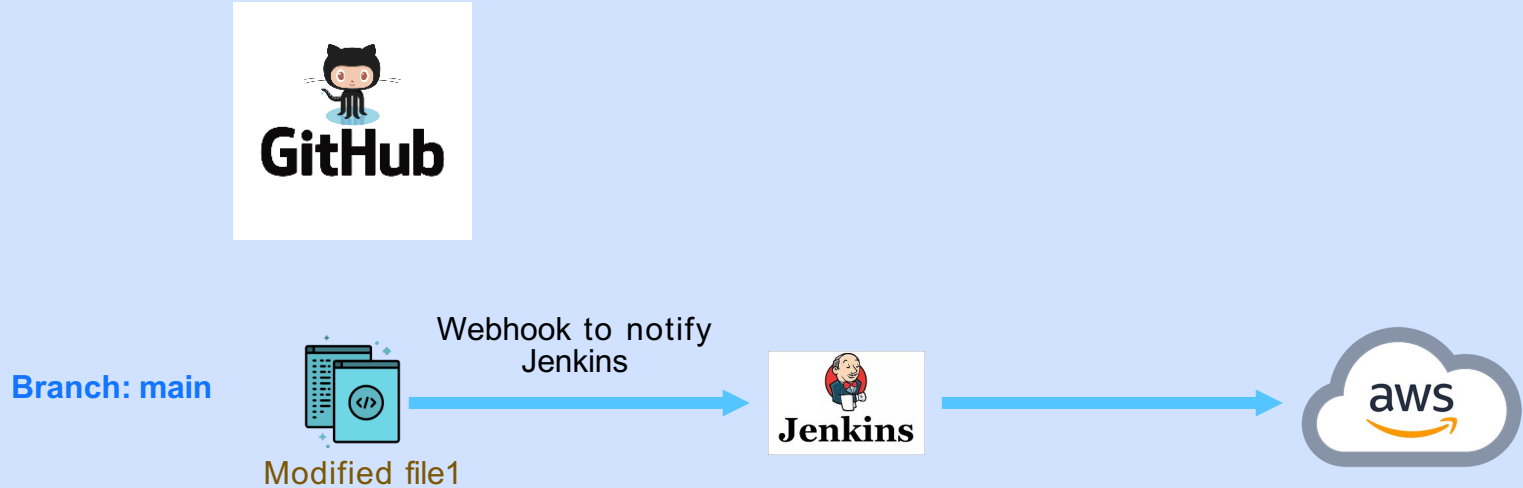
# Calling API



- Most of the times API will return stagnant data
- GitHub server will be bombarded
- Apps will exceed API limits

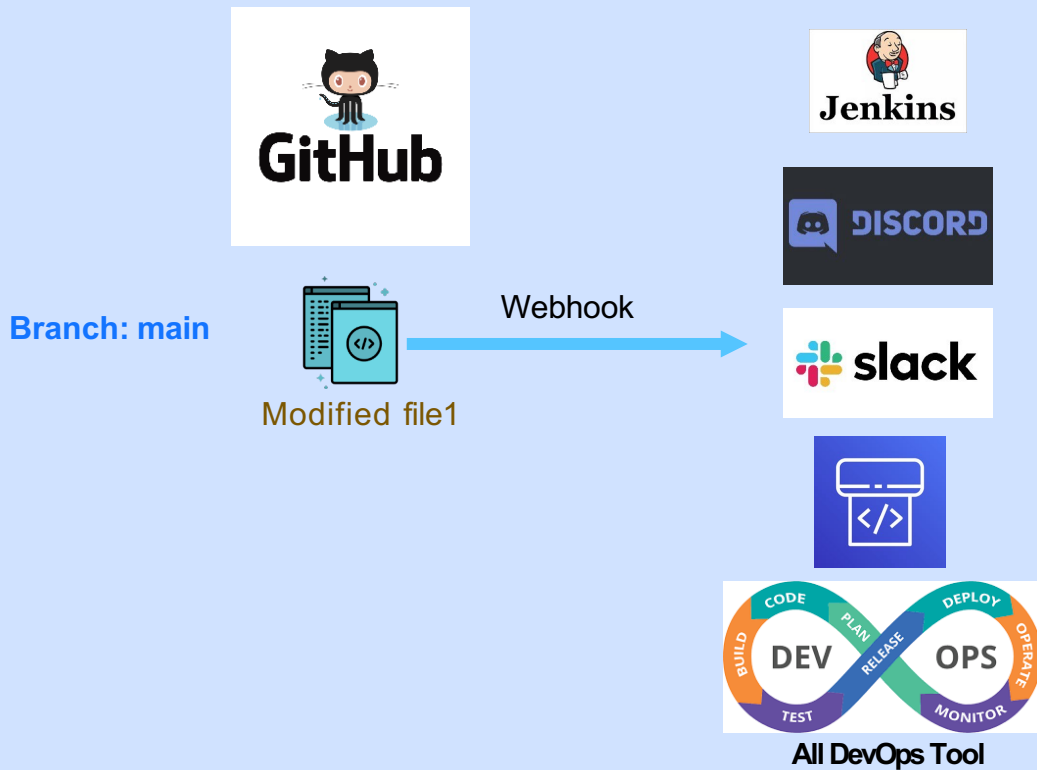


# Webhook



- GitHub will do a POST call to your app if repo changes
- Lightweight
- Realtime

# Implementation









## **Jenkins & GitHub Integration with Selenium Python**

<https://www.youtube.com/watch?v=h2Abne2jljM&t=248s>







