Week 6 : SOFTWARE DEVELOPMENT TOOLS AND ENVIRONMENTS

Set Up Jenkins Credentials

Screenshot 1 — Jenkins Dashboard

Jenkins | Search | Raj Saha | log out

Dashboard

New Item
People
Build History
Manage Jenkins
My Views
New View

I will Learn Jenkins and get better paying job

All + Add description

S	W	Name ↓	Last Success	Last Failure	Last Duration
✓	☀	VeryFirstJenkinsJob	19 days #3	N/A	22 ms

Icon: S M L

Icon legend   Atom feed for all   Atom feed for failures   Atom feed for just latest builds

Build Queue
No builds in the queue.

Build Executor Status
1 Idle
2 Idle

REST API   Jenkins 2.332.3

1

Screenshot 2 — Manage Jenkins

Dashboard

Build Queue
No builds in the queue.

Build Executor Status
1 Idle
2 Idle

Configure global settings and paths.
Configure tools, their locations and automatic installers.
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 Credentials
Configure credentials

Configure Credential Providers
Configure the credential providers and types

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

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. 1 scripts pending approval.

Status Information

System Information
Displays various environmental

System Log
System log captures output from

Load Statistics
Check your resource utilization and see if

2

Screenshot 3 — Credentials

Jenkins | Search (⌘+K)

Dashboard > Manage Jenkins > Credentials

Credentials

T	P	Store ↓	Domain	ID	Name

Stores scoped to Jenkins

P	Store ↓	Domains
System	(global)

Icon: S M L

3

Screenshot 4 — Global credentials (unrestricted)

Jenkins | Search (⌘+K)

Dashboard > Manage Jenkins > Credentials > System > Global credentials (unrestricted)

Global credentials (unrestricted)

+ Add Credentials

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

ID	Name	Kind	Description

This credential domain is empty. How about adding some credentials?

Icon: S M L

4

For Github

New credentials

Kind

Username with password **1** **1**

Scope ?

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

Username ? **2**

tuchsanai

☐ Treat username as secret ?

Password ? **3**

··

ID ?

Description ?

ID ? **4**

github

Description ?

my github for test jenkins

🔲 GitHub Apps

👤 OAuth Apps

🔑 Personal access tokens ⌃

    Fine-grained tokens (Beta)

    Tokens (classic)

3

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!

✓ 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 [Delete]

Personal access tokens (classic) function like ordinary 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
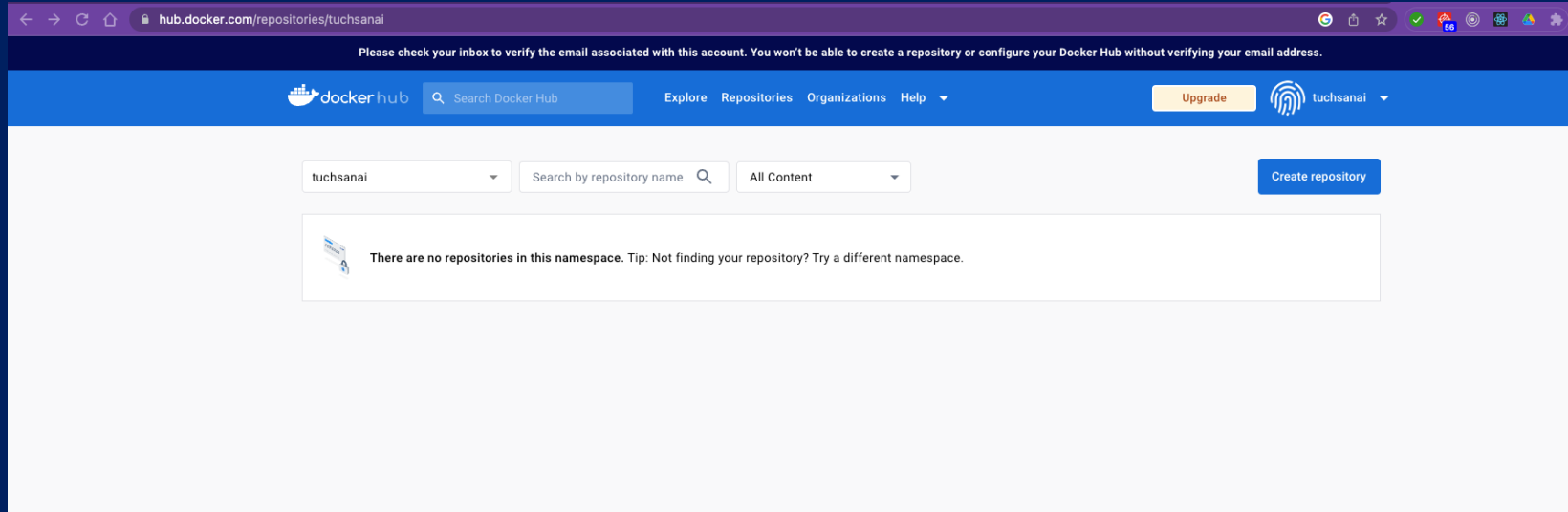
New credentials

Kind

Username with password

Scope ?

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

Username ?

tuchsanai

☐ Treat username as secret ?

Password ?

••••••••••

ID ?

dockerhub

Description ?

my docker hub

Create

Search (⌘+K)

Tuchsanai Ploysuwan

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	🔧
dockerhub	tuchsanai/****** (my docker hub)	Username with password	my docker hub	🔧

Icon: S M L

Intro to Jenkins Plugins

Jenkins cd

Blog Documentation Plugins Community Subprojects

Plugins Index

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

| Browse | Find plugins... | |

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

Improve this page   Report a problem

Resources   **Project**   **Community**   **Other**

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 cd ▾

Blog | Documentation ▾ | Plugins | Community ▾ | Subprojects ▾ | Security ▾ | About ▾ | English ▾ | Do

Sort Relevance

- ● Relevance
- ○ Most installed
- ○ Trending
- ○ Title
- ○ Release date

Categories [Show all]

☐ 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

x docker

1 to 26 of 26

Previous | **1** | Next

Docker
Installs: 40105
Released: 4 weeks ago
adopt-this-plugin, Cloud Provide
This plugin integrates Jenkins with Docker
Kanstantsin Shautsou
magnayn
(4 other contributors) | Do

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) | DC

Docker Pipeline
Installs: 128051
Released: 3 months ago
adopt-this-plugin, Deployment,
Build and use Docker containers from pipelines.
Jesse Glick
Oleg Nenashev
(5 other contributors) | DP

Docker API
Installs: 43867
Released: 4 days ago
adopt-this-plugin, Library plugir
This plugin provides docker-java API for other plugins.
Yoann Dubreuil
Eric Citaire | DA

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 | Do

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) | CD

Docker Compose Build Step
Installs: 5378
Released: 5 years ago
This plugin has no labels
Docker Compose plugin for Jenkins
João Galego | DC

Docker Slaves
Installs: 5330
Released: 6 years ago
docker
Uses Docker containers to run Jenkins build agents.
Yoann Dubreuil | DS

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 | CD

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) | CD

Docker Swarm
Installs: 1398
Released: 2 years ago
docker
Docker swarm cloud plugin.
surya gaddipati | DS

CloudBees Docker Traceability
Installs: 1062
Released: 7 years ago
docker
Provides an ability to trace server deployments via fingerprints
Oleg Nenashev
Alex Taylor | CD

CloudShare Docker-Machine
Installs: 162
Released: 6 years ago
Build Wrappers, Cloud Provider

Yet Another Docker
Installs: 1396
Released: 3 years ago
Cloud Providers, Cluster Manage

Panoptica Vulnerability Scanner
Installs: 6
Released: 4 months ago

Amazon ECR
Installs: 8908
Released: 3 weeks ago
aws

Aqua MicroScanner
Installs: 189
Released: 3 years ago
This plugin has no labels

CrowdStrike Security
Installs: 13
Released: 4 months ago
This plugin has no labels

Jenkins

Dashboard

New Item

People

Build History

Project Relationship

Check File Fingerprint

Manage Jenkins

My Views

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

Manage Jenkins

My Views

Build Queue

No builds in the queue.

Build Executor Status

1 Idle

2 Idle

time.tuchsanai.com:8080/manage/pluginManager

Jenkins

Search (⌘+K)

Tuchsanai Ploysuwan   log ou

Dashboard > Manage Jenkins > Plugin Manager

Plugins

Updates

Available plugins

Installed plugins

Advanced settings

docker

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

1

Plugins

Docker Pipeline

Install	Name ↓	Released
☐	Docker Pipeline 563.vd5d2e5c4007f	
	pipeline DevOps Deployment docker	
	Build and use Docker containers from pipelines.	2 mo 20 days ago
	This plugin is up for adoption! We are looking for new maintainers. Visit our Adopt a Plugin initiative for more information.	

2

First pipeline using Pipeline script

First pipeline
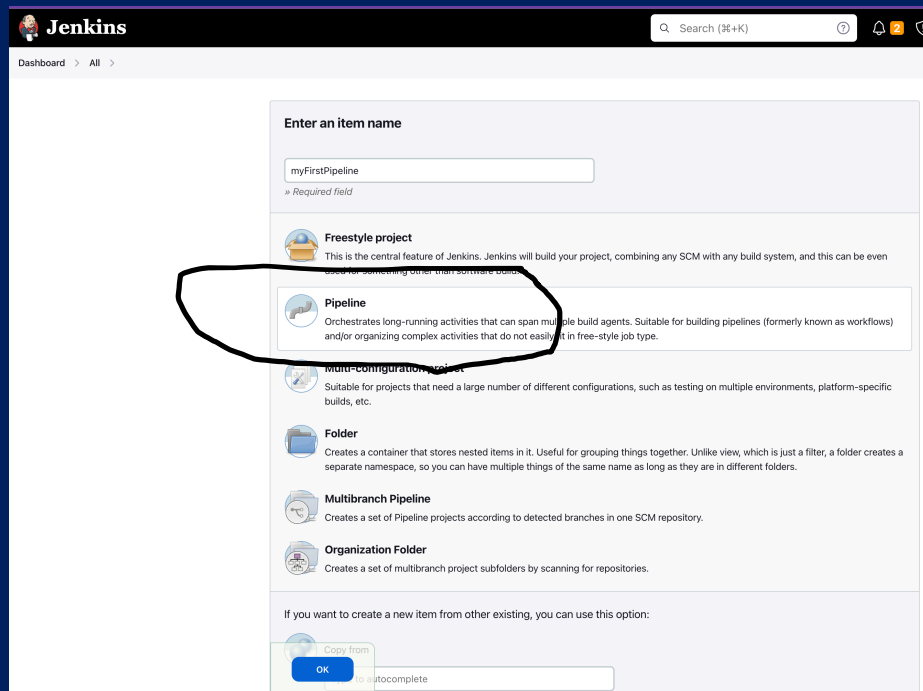
Pipeline

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 Tuchsanai 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
```

https://github.com/Tuchsanai/devtool_week6_jenkins/tree/main/First_pipeline_using_Pipeline_script

```
pipeline {

    agent any       I

    stages {

        stage("build") {

            steps {

            }
        }
    }
}

node {
    // groovy script
}
```

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

https://www.youtube.com/watch?v=7KCS70sCoK0&t=1452s

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 1
    stages {
        stage('Build') { 2
            steps {
                // 3
            }
        }
        stage('Test') { 4
            steps {
                // 5
            }
        }
        stage('Deploy') { 6
            steps {
                // 7
            }
        }
    }
}
```

1. Execute this Pipeline or any of its stages, on any available agent.
2. Defines the "Build" stage.
3. Perform some steps related to the "Build" stage.
4. Defines the "Test" stage.
5. Perform some steps related to the "Test" stage.
6. Defines the "Deploy" stage.
7. Perform some steps related to the "Deploy" stage.

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

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

How To Update the Linux PATH Environment Variable

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
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
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:

```
sudo systemctl restart jenkins
```

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

JENKINSFILE using (Github)

Jenkins

Dashboard > All >

Enter an item name

test_Jenkins_github

» Required field

Freestyle project
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system,

Pipeline
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (former job type.

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

Folder
Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just 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.

OK

Pipeline

Definition

✓ Pipeline script
Pipeline script from SCM

Script ?

1

☑ Use Groovy Sandbox ?

Pipeline Syntax

Configure

- General
- Advanced Project Options
- Pipeline

SCM ?

Git

Repositories ?

Repository URL ?

https://github.com/Tuchsanai/devtool_week6_jenkins.git

1

Credentials ?

tuchsanai/****** (my github)

2

+ Add

Advanced...

Add Repository

Branches to build ?

Branch Specifier (blank for 'any') ?

*/main

3

Add Branch

Repository browser ?

(Auto)

Additional Behaviours

Add ▾

Script Path ?

jenkinsfile_Pipeline_using_SCM

4

☑ Lightweight checkout ?

Pipeline Syntax

Left panel (GitHub file view):

main / devtool_week6_jenkins / jenkinsfile_Pipeline_using_SCM

Tuchsanai Update jenkinsfile_Pipeline_using_SCM

1 contributor

12 lines (11 sloc) | 220 Bytes

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

Give feedback

Right panel (Jenkins console output):

```
Started by user Tuchsanai Ploysuwan
Obtained jenkinsfile_Pipeline_using_SCM from git https://github.com/Tuchsanai/devtool_week6_jenkins.git
[Pipeline] Start of Pipeline
[Pipeline] node
Running on Jenkins in /var/lib/jenkins/workspace/s
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Declarative: Checkout SCM)
[Pipeline] checkout
Selected Git installation does not exist. Using Default
The recommended git tool is: NONE
using credential github
 > git rev-parse --resolve-git-dir /var/lib/jenkins/workspace/s/.git # timeout=10
Fetching changes from the remote Git repository
 > git config remote.origin.url https://github.com/Tuchsanai/devtool_week6_jenkins.git # timeout=10
Fetching upstream changes from https://github.com/Tuchsanai/devtool_week6_jenkins.git
 > git --version # timeout=10
 > git --version # 'git version 2.39.1'
using GIT_ASKPASS to set credentials my github
 > git fetch --tags --force --progress -- https://github.com/Tuchsanai/devtool_week6_jenkins.git +refs/heads/*:refs/remotes/origin/* # timeout=10
Checking out Revision 1d977a9cc984a899946be4a83188d65aebffb790 (refs/remotes/origin/main)
 > git config core.sparsecheckout # timeout=10
 > git checkout -f 1d977a9cc984a899946be4a83188d65aebffb790 # timeout=10
Commit message: "Update .gitattributes"
 > git rev-list --no-walk 1d977a9cc984a899946be4a83188d65aebffb790 # timeout=10
[Pipeline] }
[Pipeline] // stage
[Pipeline] withEnv
[Pipeline] {
[Pipeline] stage
[Pipeline] { (build)
[Pipeline] echo
 welcome to github pipeline
[Pipeline] sh
+ python3 --version
Python 3.7.16
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

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'
            }
        }
    }
}
```
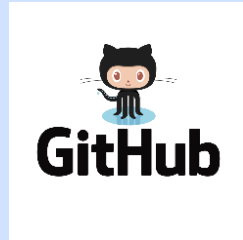
Node.js / JavaScript

Jenkinsfile (Declarative Pipeline)

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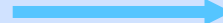
Go

Jenkinsfile (Declarative Pipeline)

```
/* Requires the Docker Pipeline plugin */
pipeline {
    agent { docker { image 'golang:1.19.1-alpine' } }
    stages {
        stage('build') {
            steps {
                sh 'go version'
            }
        }
    }
}
```
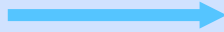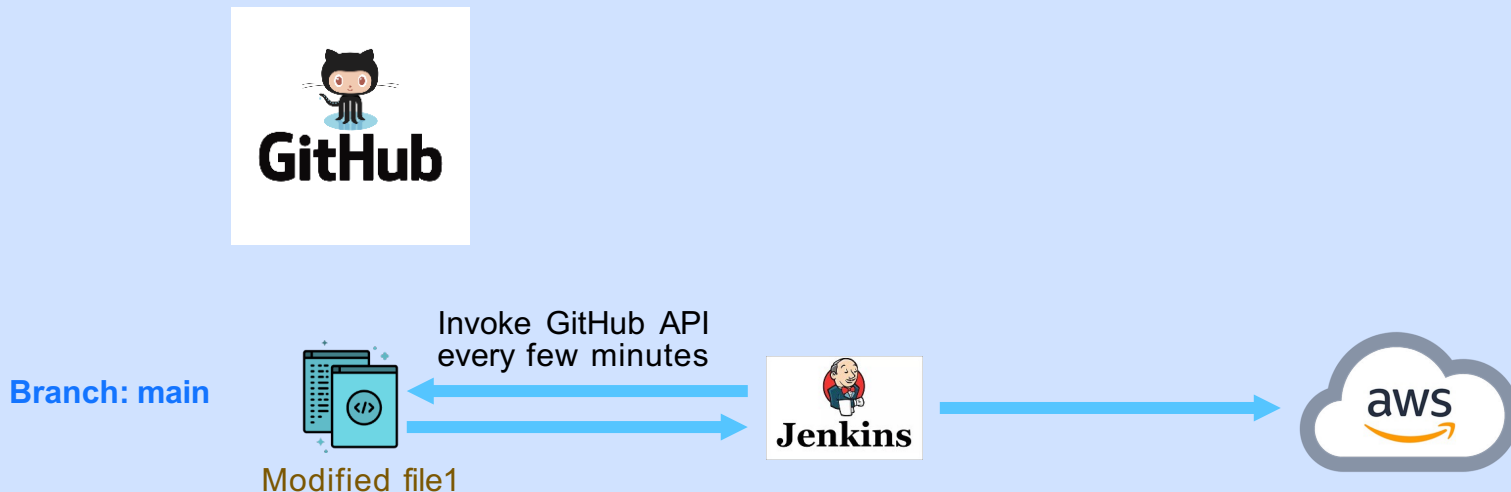
https://www.jenkins.io/doc/pipeline/tour/hello-world/

https://medium.com/@knoldus/setup-jenkins-in-docker-container-eb420f3a994

https://medium.com/tektutor/ci-cd-with-maven-github-docker-jenkins-aca28c252fec

Branch: main

Modified file1

Branch: main

Invoke GitHub API every few minutes

Modified file1

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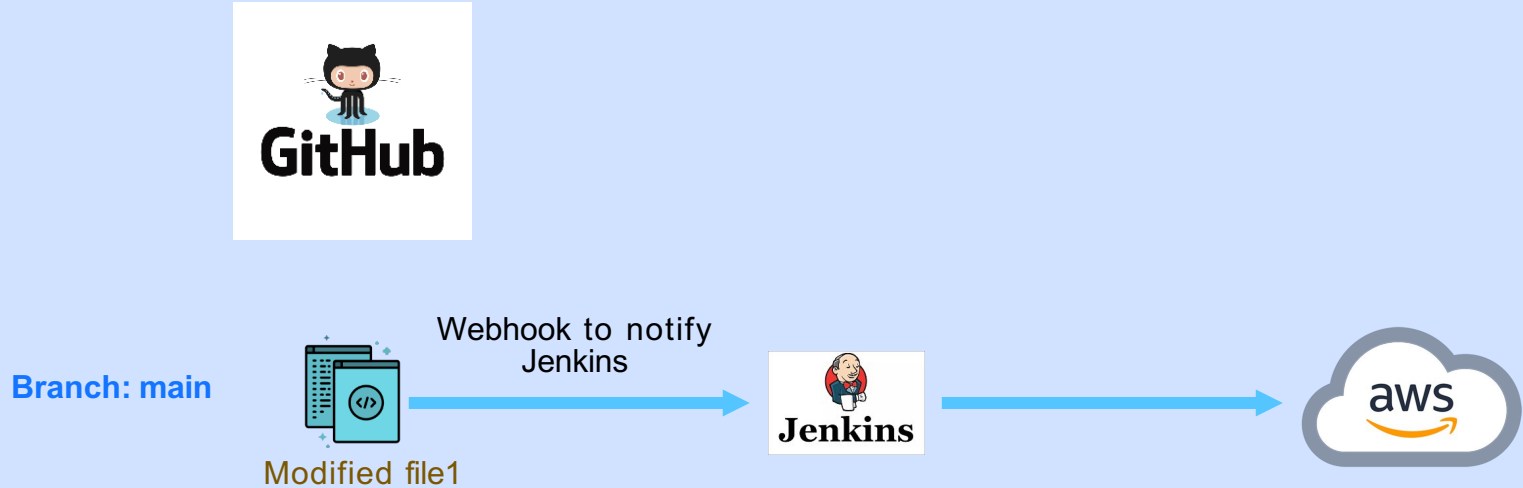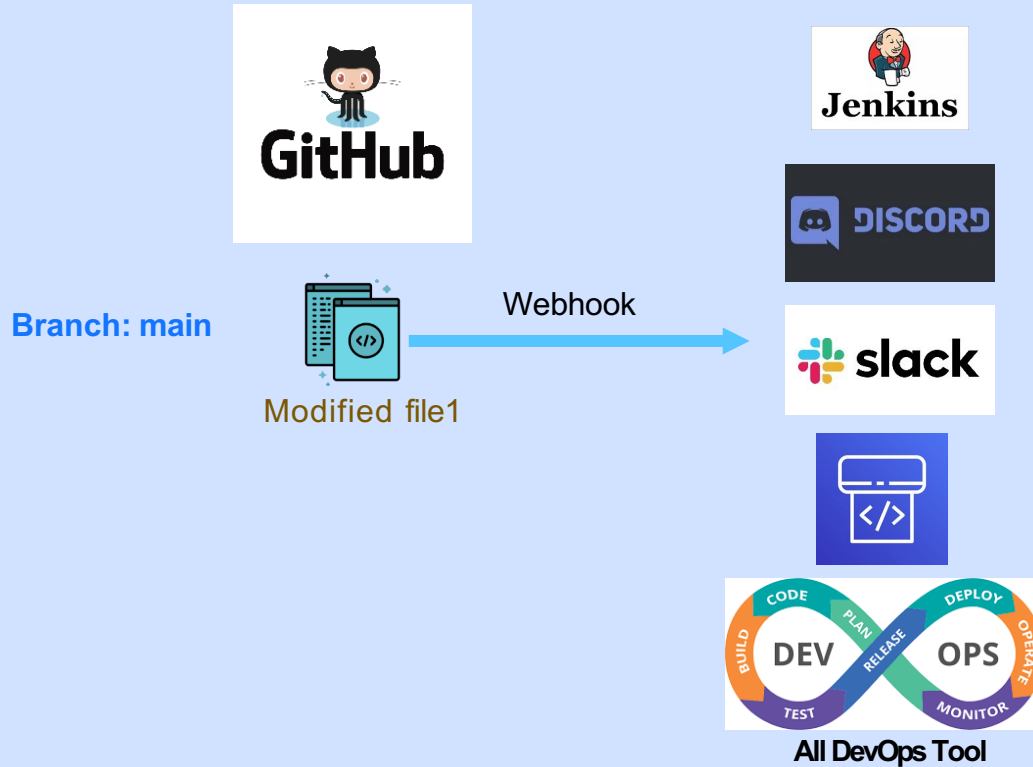
- Most of the times API will return stagnant data
- GitHub server will be bombarded
- Apps will exceed API limits

Webhook

Branch: main

Modified file1

Webhook to notify
Jenkins

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

Implementation

Branch: main

Modified file1

Webhook

All DevOps Tool

Jenkins & GitHub Integration with Selenium Python

https://www.youtube.com/watch?v=h2Abne2jIjM&t=248s