Jenkins Pipeline
--> It is a way to define CI CD process as a code
--> CI CD workflow will be defined as a code in Jenkins pipeline and whenever we are dealing with complex CI/CD process it is highly recommended to go with Jenkins pipeline concept
Pipeline contains stages to perform CI CD
--> Clone Git Repo
--> Build that project with Maven
--> Review the code with tools (SonarQube)
--> Artifact upload using Nexus
--> Build Docker image
--> Add into the Docker hub
--> Push Docker image into registry
--> Deploy App in K8s

We are going to automate the entire CI/CD pipeline using two approaches:
1. Declarative pipeline

```
pipeline {
        agents any ---> where we want to execute our job
        tools {
                maven “maven.3.9”
        }

        stages {
                // 3 operations I am performing
                // cloning the code
                // building the project
                // reviewing the code
                // uploading using Nexus etc
                stage (‘Git Clone’){
                        steps {
                                echo ‘cloning git repo…’
                        }
                }

                stage (‘Maven Build’){
                        steps {
                                echo ‘project build with Maven’
                        }
                }

                stage (‘Deploy’){
                        steps {
                                echo ‘deploying application with Tomcat’
                        }
                }

        }
}
```

Declarative pipeline with Jenkins + Git + Maven

```
pipeline {
  agent any

  tools {
    maven "maven-3.9.10"
  }
```

```
  stages {
    stage('git clone') {
      steps {
        git branch: 'main', url: 'https://github.com/Haider7214/SpringApp.git'
      }
    }
    stage('maven build') {
      steps {
        sh 'mvn clean compile test package'
      }
    }
    stage('deploy') {
      steps {
        echo 'Deploying App with Tomcat'
      }
    }
  }
}
```

Declarative pipeline with Jenkins + Git + Maven + Tomcat
---> SSH Agent Configuration
It is used to establish remote SSH connection from one server (Linux VM) to another server (Linux VM)
Ex: Jenkins server is getting connected to Tomcat server to copy WAR file

Install SSH Agent Plugin --> Manage Jenkins --> Plugins --> Available Plugins --> SSH Agent --> Install

```
pipeline {
  agent any

  tools {
    maven "maven-3.9.10"
  }

  stages {
    stage('git clone') {
      steps {
        git branch: 'main', url: 'https://github.com/Haider7214/SpringApp.git'
      }
    }
    stage('maven build') {
      steps {
        sh 'mvn clean compile test package'
      }
    }
    stage('App deployment') {
      steps {
        sshagent(['Tomcat-Server-Credentials-Pipeline']) {
          sh 'scp -o StrictHostKeyChecking=no target/FirstSpringWebApp-0.0.1-SNAPSHOT.war ec2-
user@15.156.94.232:/home/ec2-user/apache-tomcat-11.0.8/webapps'
        }
      }
    }
  }
}
```

Parallel stages:
Some stages I want to execute at the same time. Few stages I want to execute parallely

```
pipeline {
   agent any

   tools {
      maven "maven-3.9.10"
   }

   stages {
      stage('git clone') {
         steps {
            git branch: 'main', url: 'https://github.com/Haider7214/SpringApp.git'
         }
      }
      stage('maven build') {
         steps {
            sh 'mvn clean compile test package'
         }
      }
      stage('parallel stage') {
         parallel {
            stage('code-review'){
               steps {
                  echo 'code review'
                  }
            }

            stage('nexus-upload'){
               steps {
                  echo 'nexus upload'
                  }
            }
         }

      }
      stage('app deployed') {
         steps {
            echo 'Deploying App with Tomcat'
         }
      }
   }
}
```

Shared libraries in Jenkins
Say we want to deploy a microservice application, there are 5 microservices, 5 RestAPIs, maven command will be the same
The code review code will be the same
Instead of writing the same logic again and again, we will reuse the same code
--> Whenever there are multiple pipelines of a project, there might be some common logics in all pipelines. Ex: Artifact upload using Nexus, Code review, Maven build
Instead of we writing this same logics in all our pipelines, we can write this logic at one place and reuse it whenever we need it
--> To achieve this pipeline logic re-usability we can go with the concept of Shared libraries
--> We use Groovy scripting to create shared libraries

```
def call()
{
        sh “mvn clean package”
}
```

https://github.com/Haider7214/shared-lib

https://github.com/Haider7214/shared-lib.git

Jenkins Pipeline with Shared library

```
pipeline {
  agent any

  tools {
    maven "maven-3.9.10"
  }

  stages {
    stage('git clone') {
      steps {
        git branch: 'main', url: 'https://github.com/Haider7214/SpringApp.git'
      }
    }
    stage('maven build') {
      steps {
        mavenBuild()
      }
    }
    stage('parallel stage') {
      parallel {
        stage('code-review'){
          steps {
            echo 'code review'
            }
        }

        stage('nexus-upload'){
          steps {
            echo 'nexus upload'
            }
        }
      }

    }
    stage('app deployed') {
      steps {
        echo 'Deploying App with Tomcat'
      }
    }
  }
}
```

```
@Library('demo_shared_lib')_
pipeline {
  agent any
```

```
    tools {
        maven "maven-3.9.10"
    }

    stages {
        stage('git clone') {
            steps {
                git branch: 'main', url: 'https://github.com/Haider7214/SpringApp.git'
            }
        }
        stage('demo message') {
            steps {
                telusko()
            }
        }
        stage('maven build') {
            steps {
                mavenBuild()
            }
        }
        stage('parallel stage') {
            parallel {
                stage('code-review'){
                    steps {
                        echo 'code review'
                        }
                }

                stage('nexus-upload'){
                    steps {
                        echo 'nexus upload'
                        }
                }
            }

        }
        stage('app deployed') {
            steps {
                echo 'Deploying App with Tomcat'
            }
        }
    }
}
```

mavenBuild.groovy

```
def call()
{
            sh “mvn clean package”
}
```

2. Scripted pipeline (Groovy)

Multi branch pipeline in Jenkins

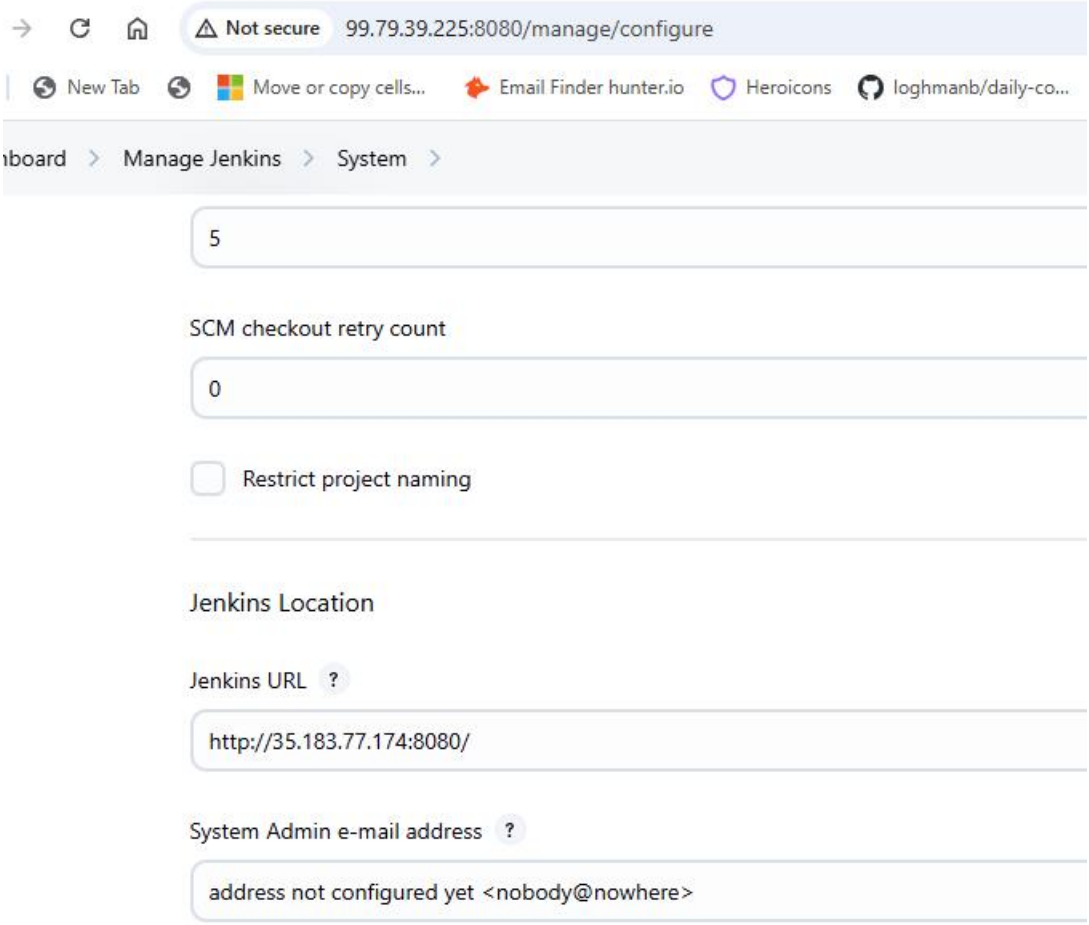
SonarQube
Nexus
CICD pipeline projects

22.00
Declarative pipeline
Start JenkinsServer and Slave

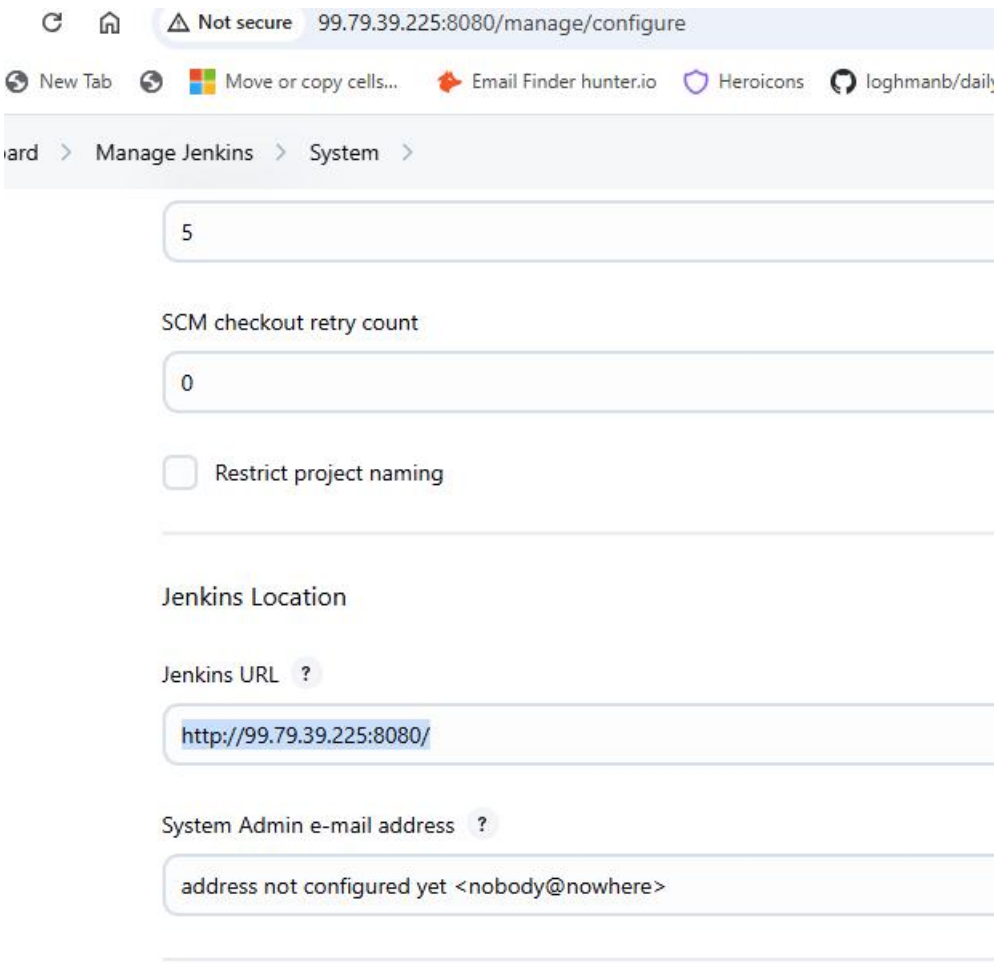
JenkinsSlave	i-01f4ee18204bd61fd	Running	t2.micro	–	
EKS-host	i-01289fc5ca918b25f	Stopped	t2.micro	–	
Jenkins-server	i-0abe9191466188c59	Running	t2.medium	Initializing	

Open
http://99.79.39.225:8080/manage/configure

What we have here is different from public IP

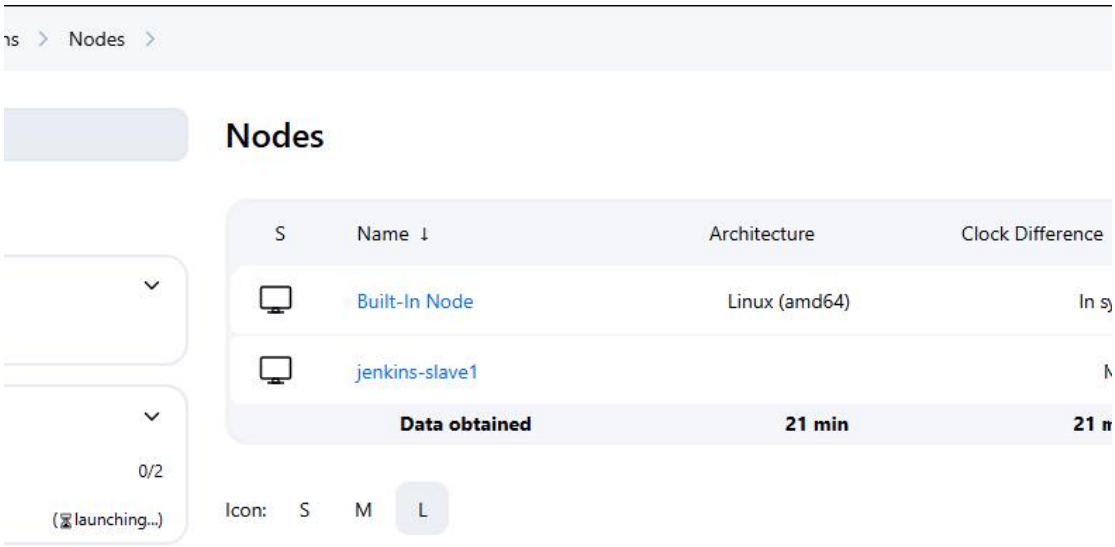


I update Jenkins URL
http://99.79.39.225:8080/



Apply and Save

Go to Nodes



Configure jenkins-slave1

Launch agents via SSH

Host ?

ec2-99-79-127-107.ca-central-1.compute.amazonaws.com

Credentials ?

ec2-user (jenkins-slave-credentials)

+ Add

Update Host
Apply and Save
New Item +

New Item

New Item

Enter an item name

first-pipeline

Select an item type

Freestyle project
Classic, general-purpose job type that checks out from up to one SCM, executes build steps serially, followed by post-build steps like archiving artifacts and sending email notifications.

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, platform-specific builds, etc.

Select Pipeline , click Ok
Pipeline script, Hello World

Definition

Pipeline script

Script ?

Hello World

```
pipeline {
    agent any

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

Use Groovy Sandbox ?

Apply and Save

Dashboard > first-pipeline >

- Status
- Changes
- Build Now
- Configure
- Delete Pipeline
- Stages
- Rename
- Pipeline Syntax

first-pipeline

Demo First Pipeline

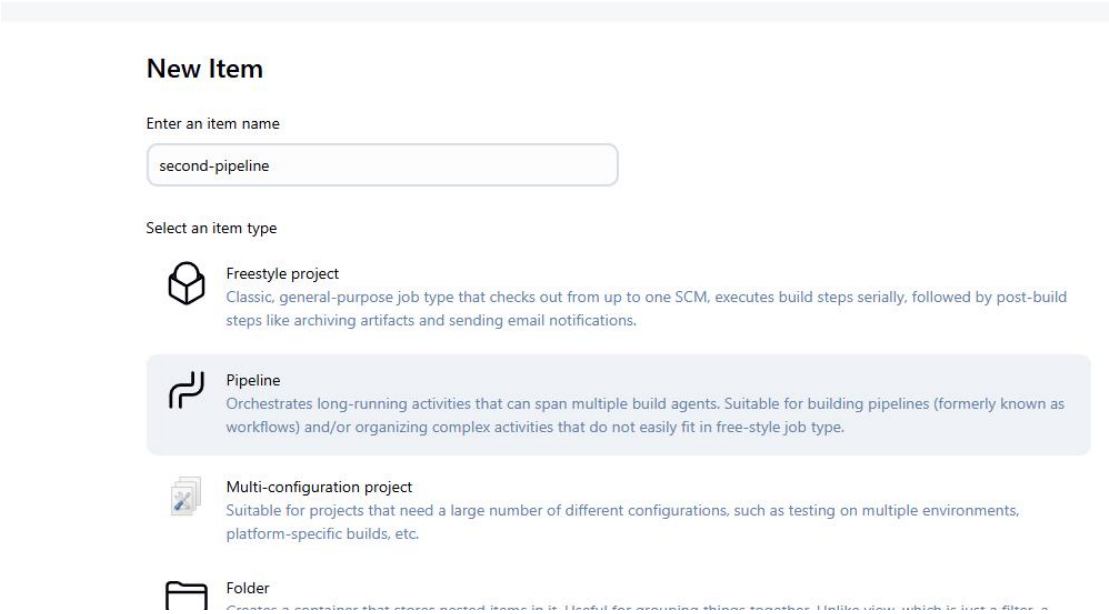
Permalinks

Click Build Now

Console Output
Only one stage is there (Hello World)

Console Output

```
Started by user demo
[Pipeline] Start of Pipeline
[Pipeline] node
Running on Jenkins in /var/lib/jenkins/workspace/first-pipeline
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Hello)
[Pipeline] echo
Hello World
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```




```
pipeline {
  agent any

  stages {
    stage('git clone') {
      steps {
        echo 'Cloning Git repo'
      }
    }
    stage('maven build') {
      steps {
        echo 'Project build with Maven'
      }
    }
    stage('deploy') {
      steps {
        echo 'Deploying App with Tomcat'
      }
    }
  }
}
```

Apply and Save
Build Now

Console Output

```
Started by user demo
[Pipeline] Start of Pipeline
[Pipeline] node
Running on Jenkins in /var/lib/jenkins/workspace/second-pipeline
[Pipeline] {
[Pipeline] stage
[Pipeline] { (git clone)
[Pipeline] echo
Cloning Git repo
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (maven build)
[Pipeline] echo
Project build with Maven
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (deploy)
[Pipeline] echo
Deploying App with Tomcat
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

Pipeline Overview

#1

Manually run by demo Started 7 min 53 sec ago Queued 3 ms Took 1 sec

Graph

Start git clone maven build deploy End

Search

deploy 49ms

git clone 0.13s

maven build 81ms

deploy 49ms

Deploying App with Tomcat

Deploying App with Tomcat

Go back to Configure

```
13            }
14        }
15        stage('deploy') {
16            steps {
17                echo 'Deploying App with Tomcat'
18            }
19        }
20    }
21 }
22
```

Use Groovy Sandbox ?

Pipeline Syntax

There is something called as Pipeline Syntax

Steps

Sample Step

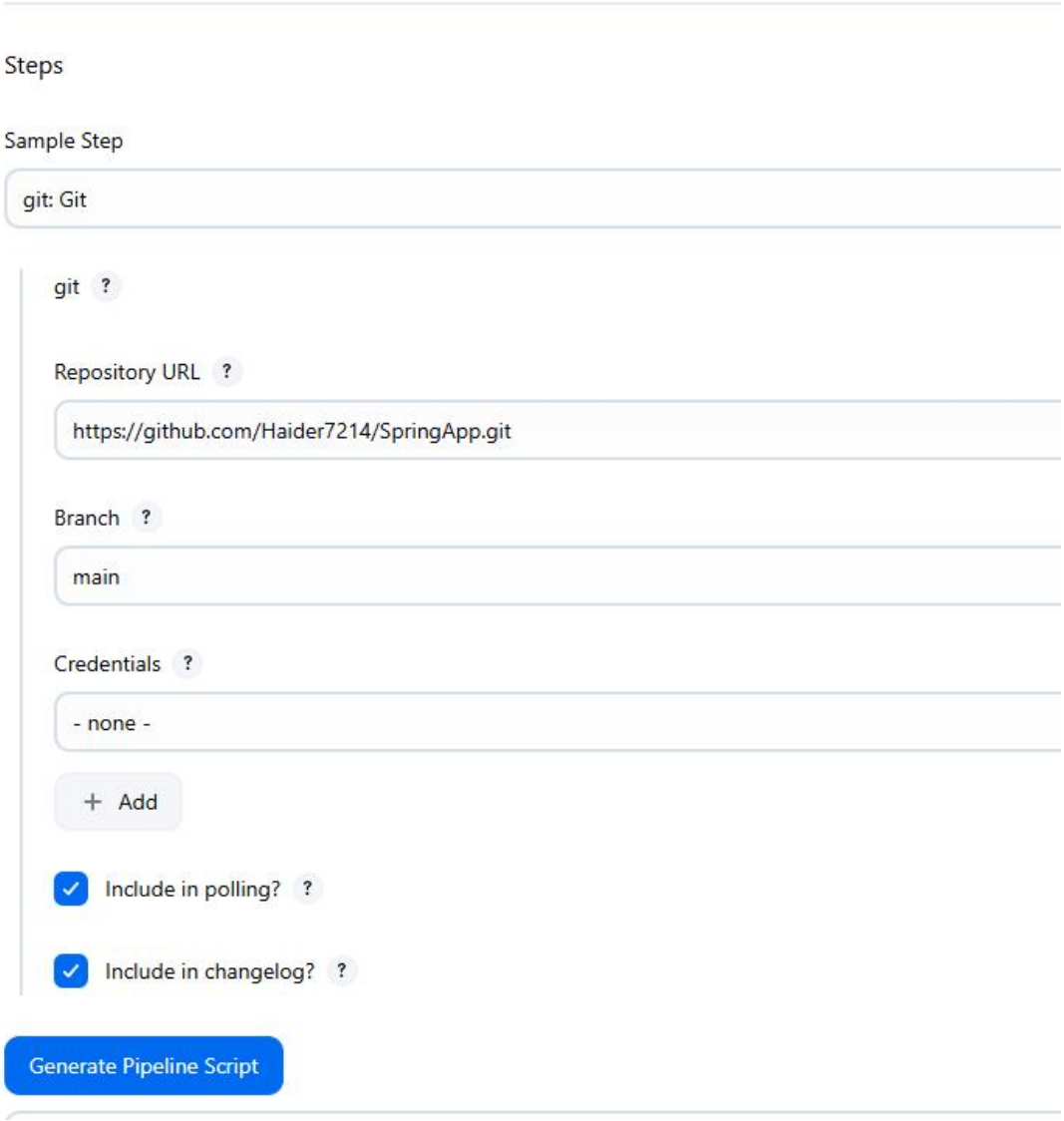
archiveArtifacts: Archive the artifacts

archiveArtifacts ?

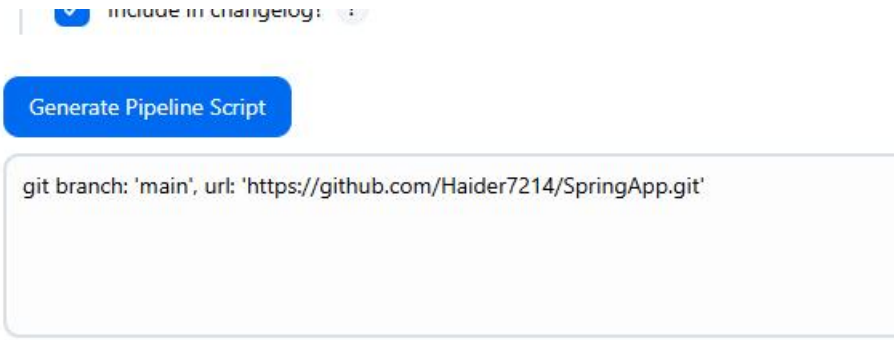
Files to archive ?

Advanced

Generate Pipeline Script



Click Generate Pipeline Script



git branch: 'main', url: 'https://github.com/Haider7214/SpringApp.git'

We need not know the syntax

Go back to Pipeline script
Instead of echo add the generated script

Pipeline script

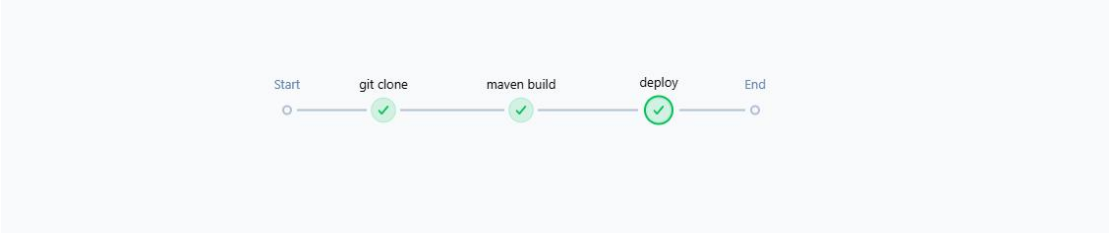
Script ?

```
pipeline {
    agent any

    stages {
        stage('git clone') {
            steps {
                git branch: 'main', url: 'https://github.com/Haider7214/SpringApp.git'
            }
        }
        stage('maven build') {
            steps {
                echo 'Project build with Maven'
            }
        }
        stage('deploy') {
```

Use Groovy Sandbox ?

Pipeline Syntax

Apply and Save
Build Now



It is able to clone the entire project

```
[Pipeline] stage
[Pipeline] { (git clone)
[Pipeline] git
The recommended git tool is: NONE
No credentials specified
Cloning the remote Git repository
Cloning repository https://github.com/Haider7214/SpringApp.git
 > git init /var/lib/jenkins/workspace/second-pipeline # timeout=10
Fetching upstream changes from https://github.com/Haider7214/SpringApp.git
 > git --version # timeout=10
 > git --version # 'git version 2.43.0'
 > git fetch --tags --force --progress -- https://github.com/Haider7214/SpringApp.git +refs/heads/*:refs/remotes/origin/* # timeout=10
 > git config remote.origin.url https://github.com/Haider7214/SpringApp.git # timeout=10
 > git config --add remote.origin.fetch +refs/heads/*:refs/remotes/origin/* # timeout=10
Avoid second fetch
 > git rev-parse refs/remotes/origin/main^{commit} # timeout=10
Checking out Revision 7b1e402d1b8f6981c88b2aa6832ce94bfc21d974 (refs/remotes/origin/main)
 > git config core.sparsecheckout # timeout=10
 > git checkout -f 7b1e402d1b8f6981c88b2aa6832ce94bfc21d974 # timeout=10
```

Shell script --> Generate Pipeline Script

Steps

Sample Step

sh: Shell Script

sh

Shell Script ?

mvn clean compile test package

Advanced

Generate Pipeline Script

```
sh 'mvn clean compile test package'
```

sh 'mvn clean compile test package'
Update Pipeline script

Script ?

```
pipeline {
    agent any

    stages {
        stage('git clone') {
            steps {
                git branch: 'main', url: 'https://github.com/Haider7214/SpringApp.git'
            }
        }
        stage('maven build') {
            steps {
                sh 'mvn clean compile test package'
            }
        }
        stage('deploy') {
```

Use Groovy Sandbox ?

Pipeline Syntax

Apply and Save
Build Now

It failed because of mvn: not found

```
[Pipeline] { (maven build)
[Pipeline] sh
+ mvn clean compile test package
/var/lib/jenkins/workspace/second-pipeline@tmp/durable-b10d60b6/script.sh.copy: 1: mvn: not found
[Pipeline] }
[Pipeline] // stage
```

```
tools {
   maven "maven.3.9"
}
```

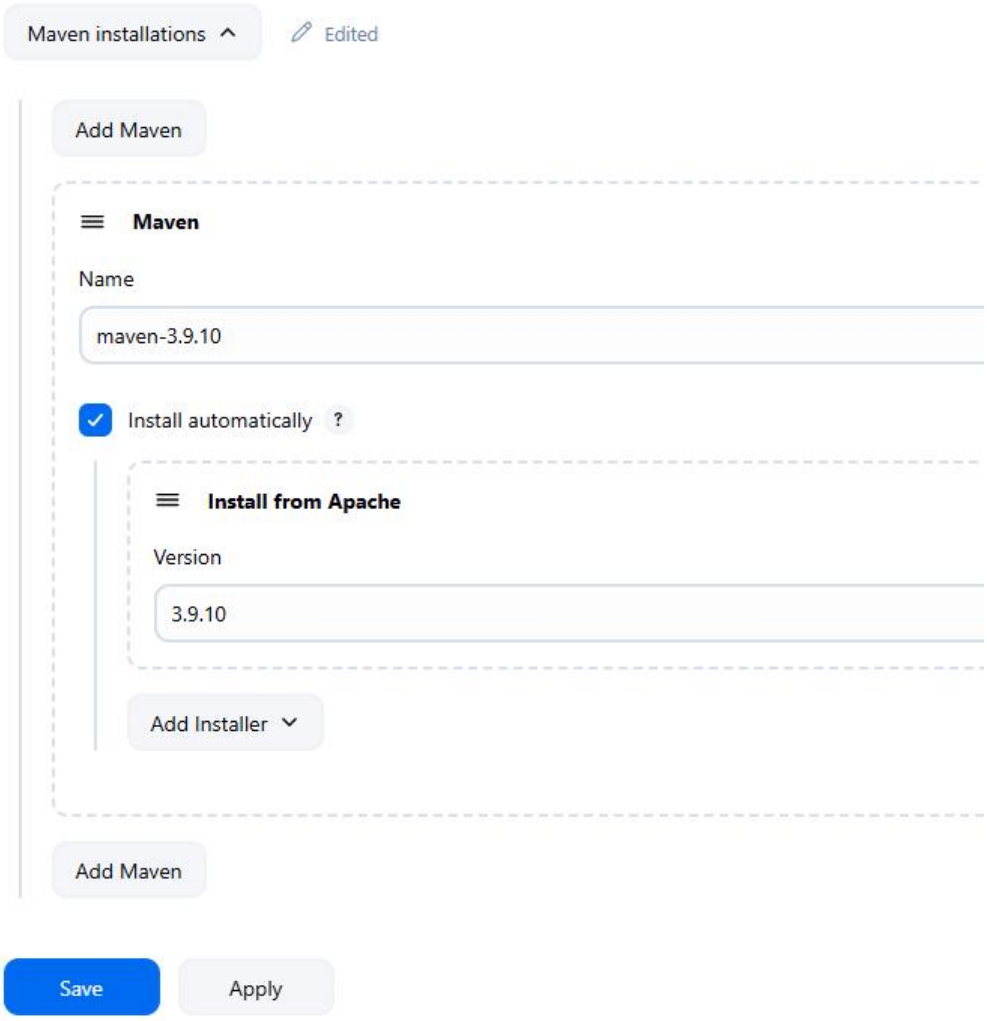
Script ?

```
pipeline {
    agent any

    tools {
        maven "maven.3.9"
    }

    stages {
        stage('git clone') {
            steps {
                git branch: 'main', url: 'https://github.com/Haider7214/SpringApp.git'
            }
        }
        stage('maven build') {
            steps {
```

Apply and Save

Manage Jenkins --> Tools

Use the same name here (maven-3.9.10)



Again second-pipeline, Configure

Definition

Pipeline script

Script ?

```
pipeline {
    agent any

    tools {
        maven "maven-3.9.10"
    }

    stages {
        stage('git clone') {
            steps {
                git branch: 'main', url: 'https://github.com/Haider7214/SpringApp.git'
            }
        }
        stage('maven build') {
            steps {
```

Use Groovy Sandbox ?

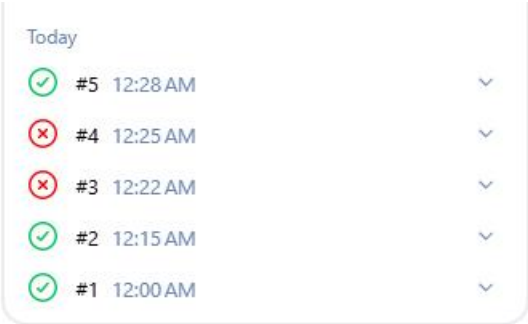
Pipeline Syntax

Advanced

```
pipeline {
  agent any

  tools {
    maven "maven-3.9.10"
  }

  stages {
    stage('git clone') {
      steps {
        git branch: 'main', url: 'https://github.com/Haider7214/SpringApp.git'
      }
    }
    stage('maven build') {
      steps {
        sh 'mvn clean compile test package'
      }
    }
    stage('deploy') {
      steps {
        echo 'Deploying App with Tomcat'
      }
    }
  }
}
```

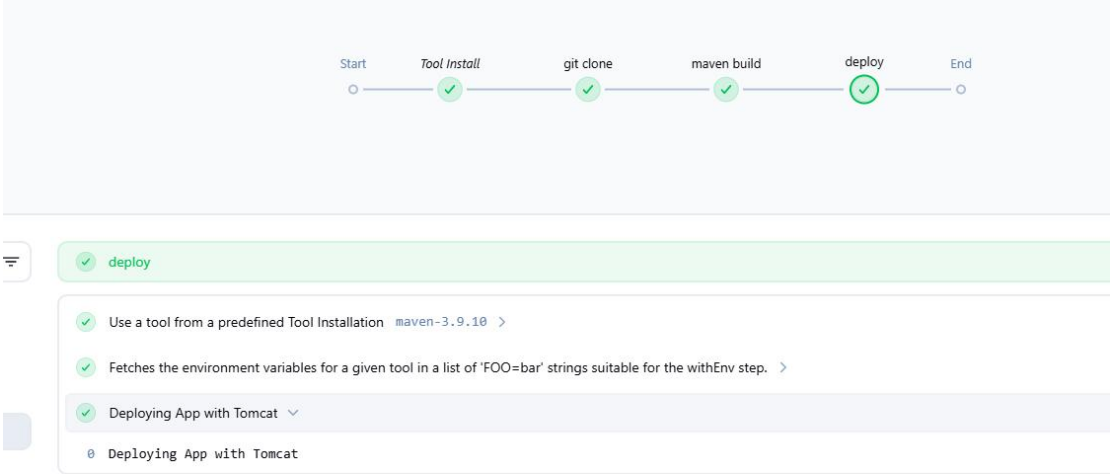
Apply and Save
Build Now

Now Build is successful



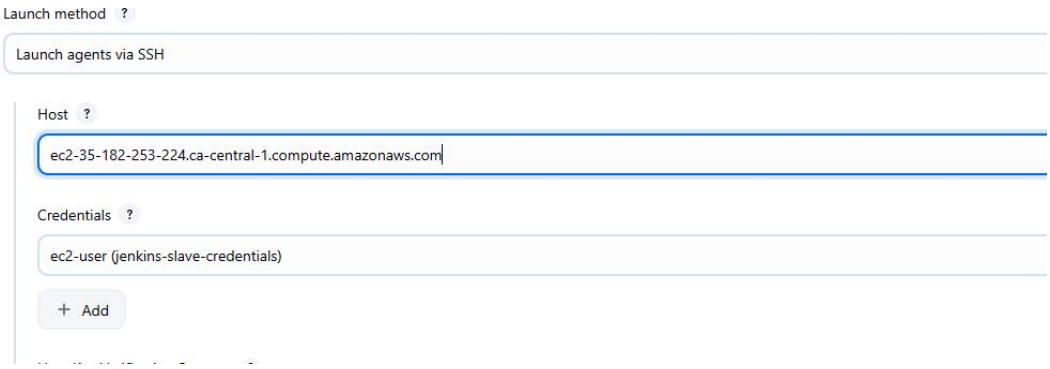

```
[INFO] The original artifact has been renamed to /var/lib/jenkins/workspace/second-pipeline/target/FirstSpringwe
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  12.128 s
[INFO] Finished at: 2025-07-02T00:29:08Z
[INFO] ------------------------------------------------------------------------
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (deploy)
[Pipeline] tool
[Pipeline] envVarsForTool
[Pipeline] withEnv
[Pipeline] {
[Pipeline] echo
Deploying App with Tomcat
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // stage
```

Now we can see Tool is installed



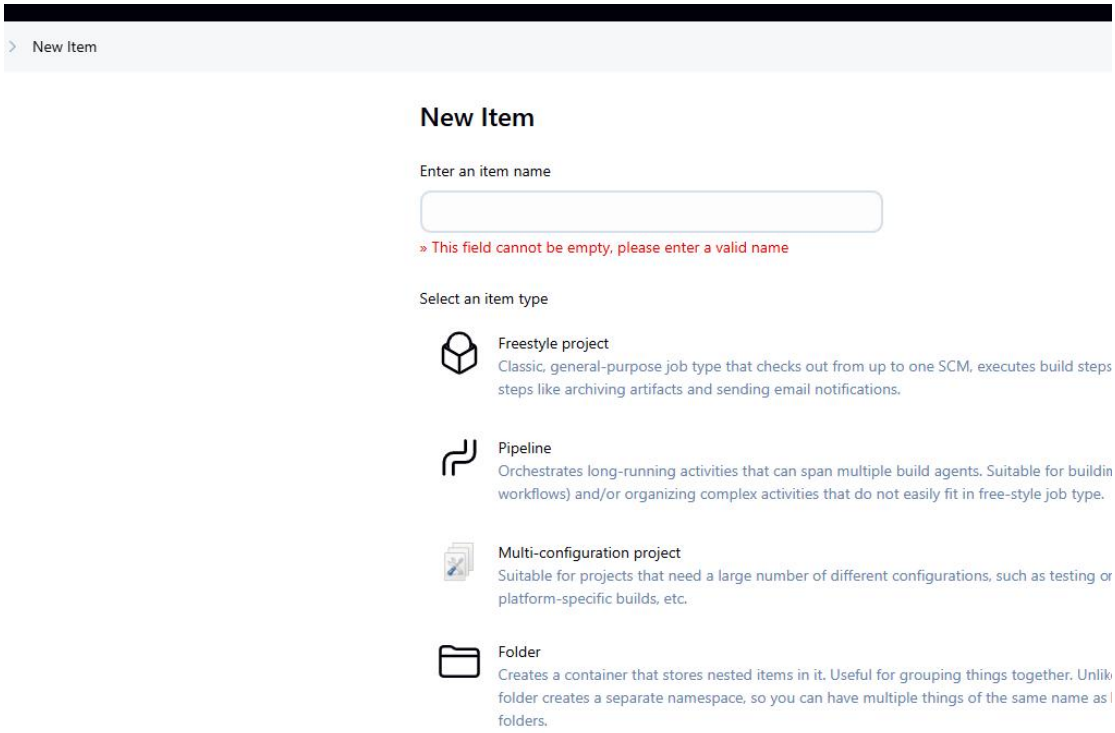
If one stage is not successful, it will not go to the next stage
Entire build and deployment process, the code works interlinked with each other

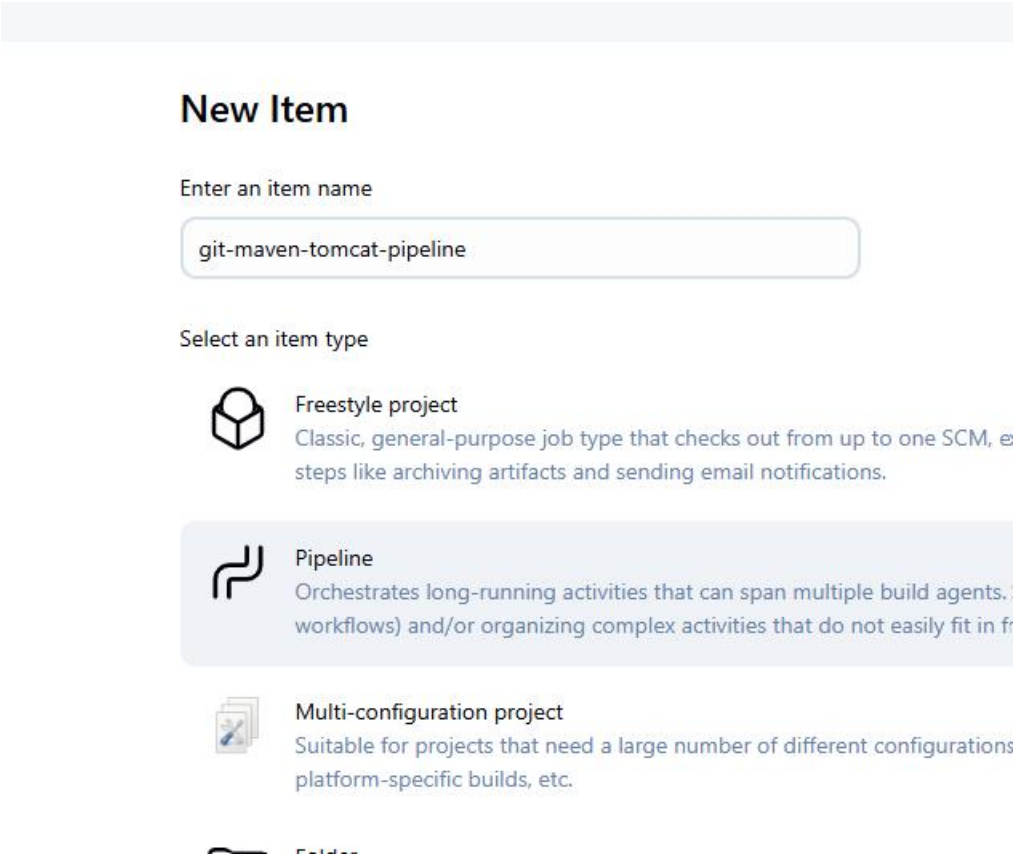
56:00
Restarted Jenkins VM
http://16.52.71.170:8080/manage/configure
Update slave VM configuration



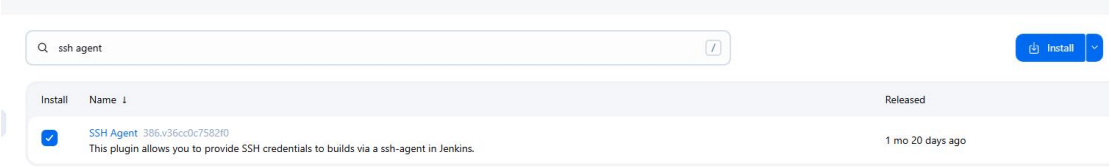
Declarative pipeline with Jenkins + Git + Maven + Tomcat

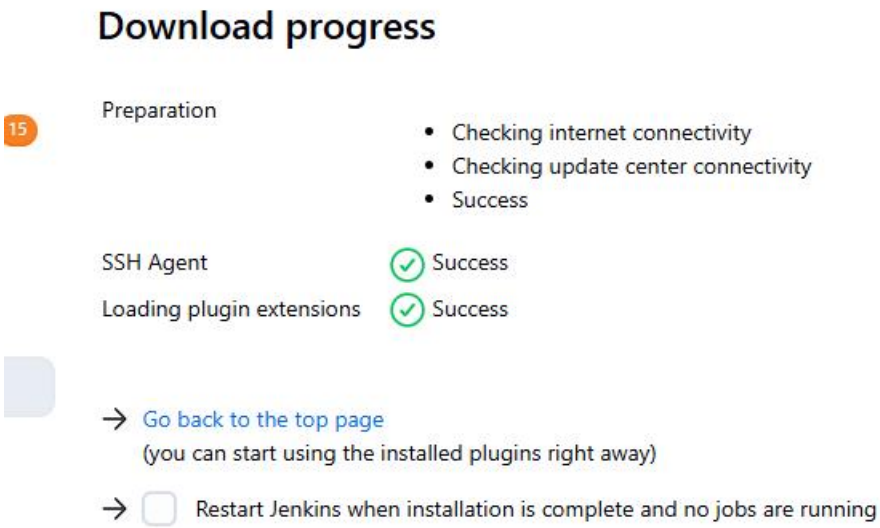
Jenkins Dashboard New Item





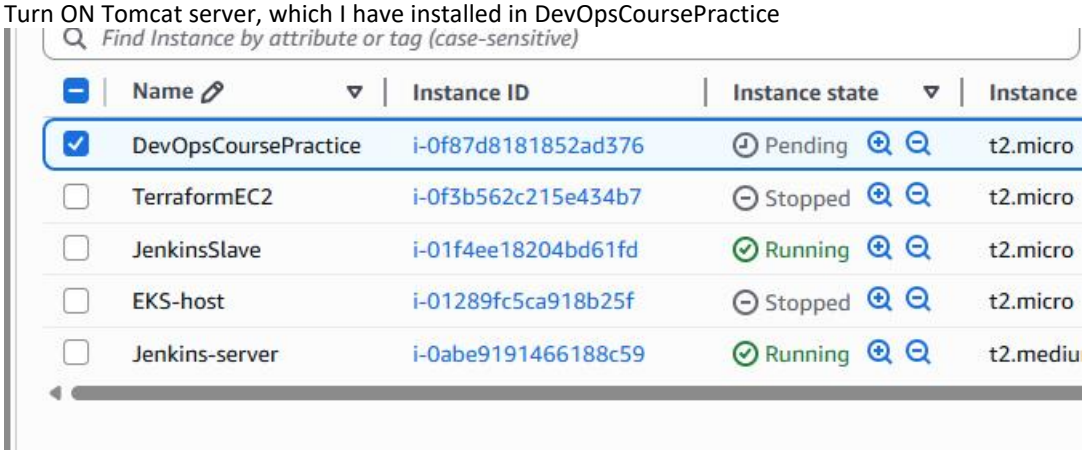
Manage Jenkins --> Plugins

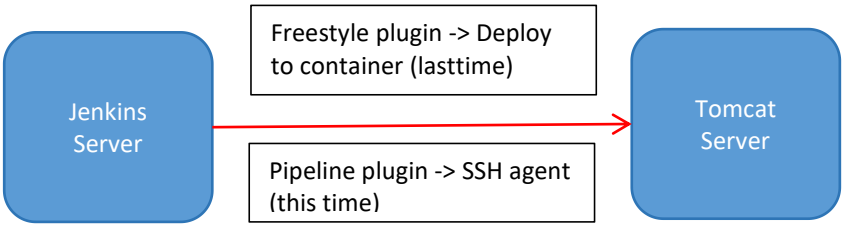




Pipeline Syntax

Turn ON Tomcat server, which I have installed in DevOpsCoursePractice



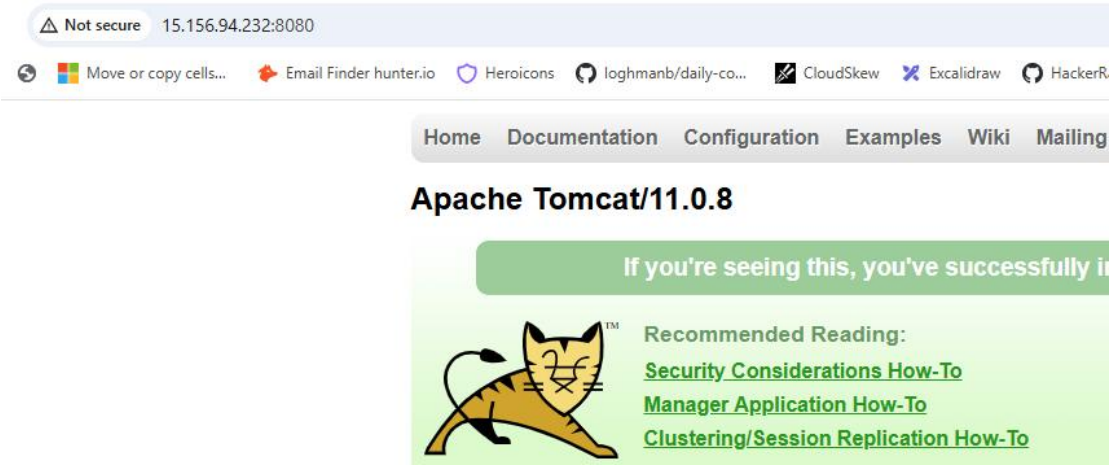



```
-rw-r--r--. 1 ec2-user ec2-user      363 Mar  2 00:54 sys-info.sh
[ec2-user@ip-172-31-13-80 ~]$ cd apache-tomcat-11.0.8/
[ec2-user@ip-172-31-13-80 apache-tomcat-11.0.8]$
[ec2-user@ip-172-31-13-80 apache-tomcat-11.0.8]$
[ec2-user@ip-172-31-13-80 apache-tomcat-11.0.8]$ ls -l
total 172
-rw-r-----. 1 ec2-user ec2-user 24262 Jun  5 17:49 BUILDING.txt
-rw-r-----. 1 ec2-user ec2-user  6166 Jun  5 17:49 CONTRIBUTING.md
-rw-r-----. 1 ec2-user ec2-user 60517 Jun  5 17:49 LICENSE
-rw-r-----. 1 ec2-user ec2-user  2333 Jun  5 17:49 NOTICE
-rw-r-----. 1 ec2-user ec2-user  3291 Jun  5 17:49 README.md
-rw-r-----. 1 ec2-user ec2-user  6469 Jun  5 17:49 RELEASE-NOTES
-rw-r-----. 1 ec2-user ec2-user 16109 Jun  5 17:49 RUNNING.txt
drwxr-x---. 2 ec2-user ec2-user 16384 Jun 22 18:30 bin
drwx------. 3 ec2-user ec2-user 16384 Jun 22 20:20 conf
drwxr-x---. 2 ec2-user ec2-user 16384 Jun 22 18:30 lib
drwxr-x---. 2 ec2-user ec2-user   162 Jun 22 19:57 logs
drwxr-x---. 2 ec2-user ec2-user    30 Jun 22 18:30 temp
drwxr-x---. 8 ec2-user ec2-user   173 Jun 22 19:57 webapps
drwxr-x---. 3 ec2-user ec2-user    22 Jun 22 18:50 work
[ec2-user@ip-172-31-13-80 apache-tomcat-11.0.8]$
```

[ec2-user@ip-172-31-13-80 bin]$ sh startup.sh

```
-rw-r-----. 1 ec2-user ec2-user   2026 Jun  5 17:49 version.bat
-rwxr-x---. 1 ec2-user ec2-user   1908 Jun  5 17:49 version.sh
[ec2-user@ip-172-31-13-80 bin]$ sh startup.sh
Using CATALINA_BASE:   /home/ec2-user/apache-tomcat-11.0.8
Using CATALINA_HOME:   /home/ec2-user/apache-tomcat-11.0.8
Using CATALINA_TMPDIR: /home/ec2-user/apache-tomcat-11.0.8/temp
Using JRE_HOME:        /usr
Using CLASSPATH:       /home/ec2-user/apache-tomcat-11.0.8/bin/bootstrap.jar:/home
Using CATALINA_OPTS:
Tomcat started.
[ec2-user@ip-172-31-13-80 bin]$
```

http://15.156.94.232:8080/



Jenkins Credentials Provider: Jenkins

Add Credentials

Domain

Global credentials (unrestricted)

Kind

SSH Username with private key

Scope ?

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

ID ?

Tomcat-Server-Credentials-Pipeline

Description ?

Tomcat credentials

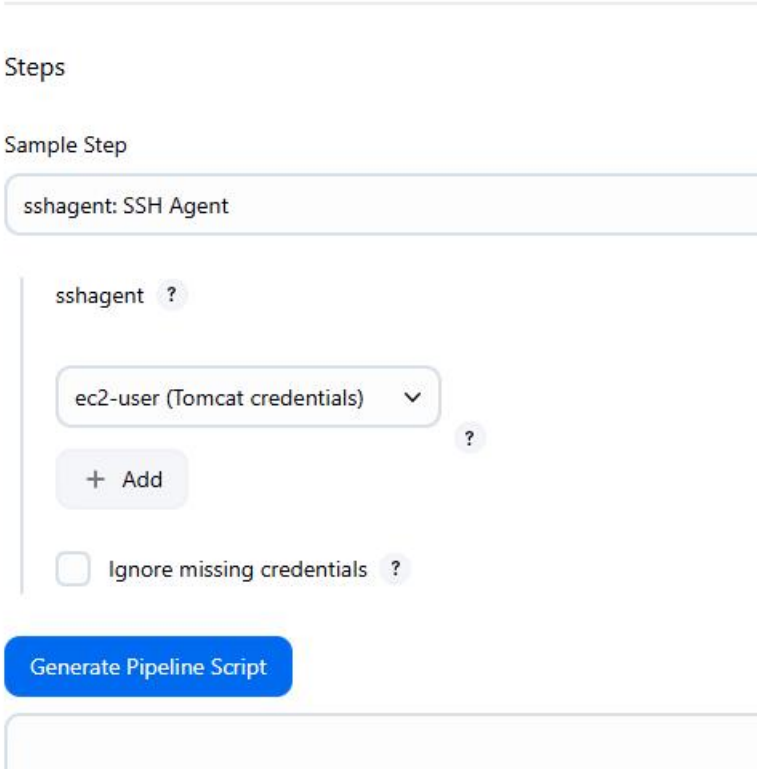
Username

ec2-user

☐ Treat username as secret ?

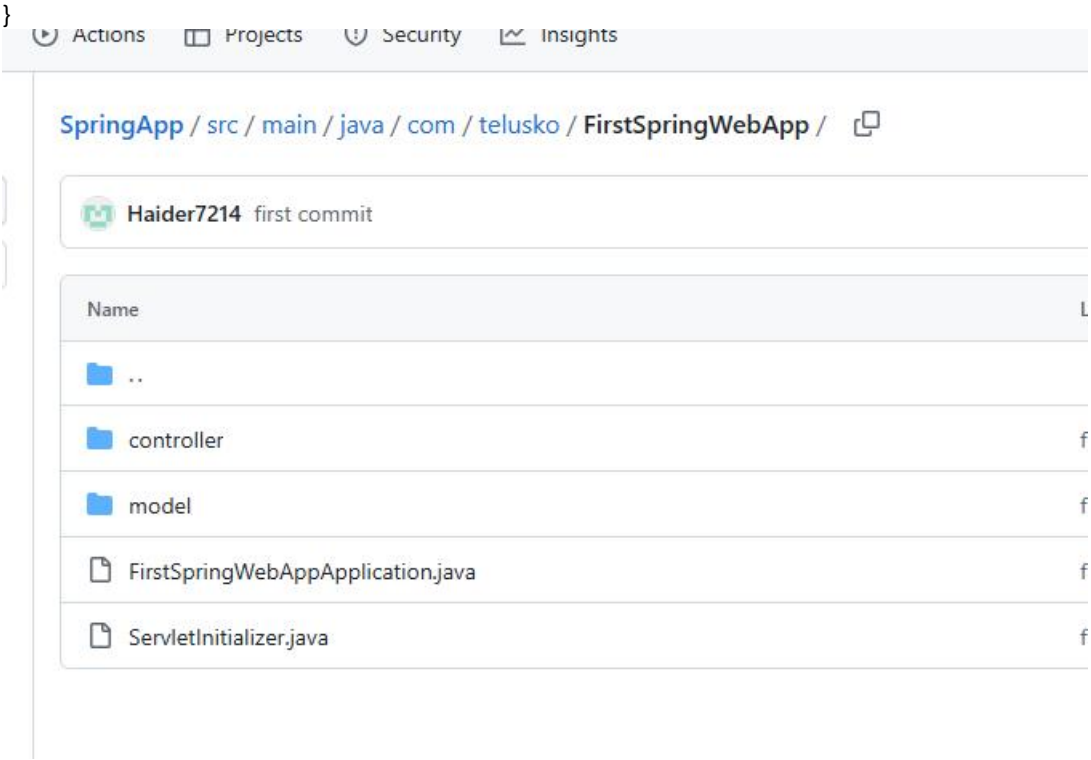
Copy Paste the Private Key

Click Add



Click Generate Pipeline Script

```
sshagent(['Tomcat-Server-Credentials-Pipeline']) {
   // some block
}
```



https://github.com/Haider7214/SpringApp/tree/main/src/main/java/com/telusko/FirstSpringWebApp

sh 'scp -o StrictHostKeyChecking=no target/FirstSpringWebApp-0.0.1-SNAPSHOT.war'

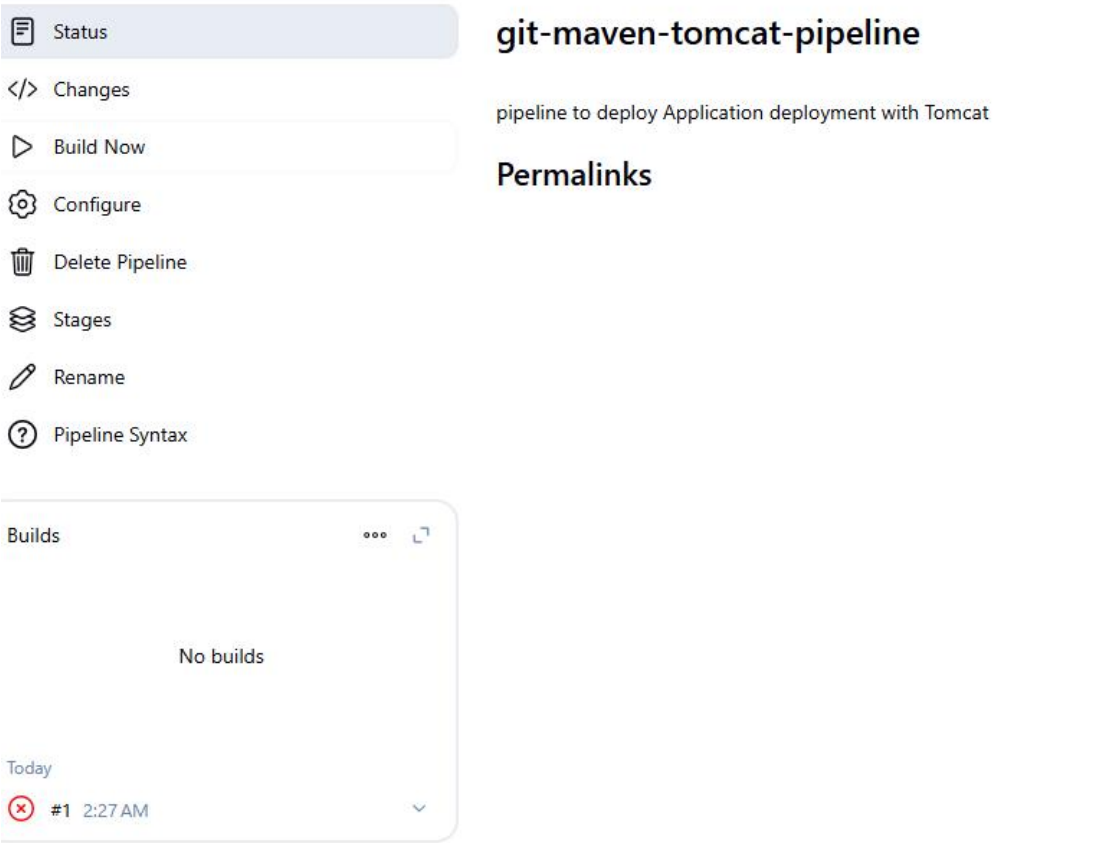
```
[ec2-user@ip-172-31-13-80 bin]$ cd ..
[ec2-user@ip-172-31-13-80 apache-tomcat-11.0.8]$ cd webapps/
[ec2-user@ip-172-31-13-80 webapps]$
[ec2-user@ip-172-31-13-80 webapps]$ pwd
/home/ec2-user/apache-tomcat-11.0.8/webapps
[ec2-user@ip-172-31-13-80 webapps]$
```

Copy this path
/home/ec2-user/apache-tomcat-11.0.8/webapps

sh 'scp -o StrictHostKeyChecking=no target/FirstSpringWebApp-0.0.1-SNAPSHOT.war ec2-user@15.156.94.232:/home/ec2-user/apache-tomcat-11.0.8/webapps'

```
pipeline {
  agent any

  tools {
    maven "maven-3.9.10"
  }

  stages {
    stage('git clone') {
      steps {
        git branch: 'main', url: 'https://github.com/Haider7214/SpringApp.git'
      }
    }
    stage('maven build') {
      steps {
        sh 'mvn clean compile test package'
      }
    }
    stage('App deployment') {
      steps {
        sshagent(['Tomcat-Server-Credentials-Pipeline']) {
          sh 'scp -o StrictHostKeyChecking=no target/FirstSpringWebApp-0.0.1-SNAPSHOT.war ec2-
user@15.156.94.232:/home/ec2-user/apache-tomcat-11.0.8/webapps'
        }
      }
    }
  }
}
```

Apply and Save
Build Now



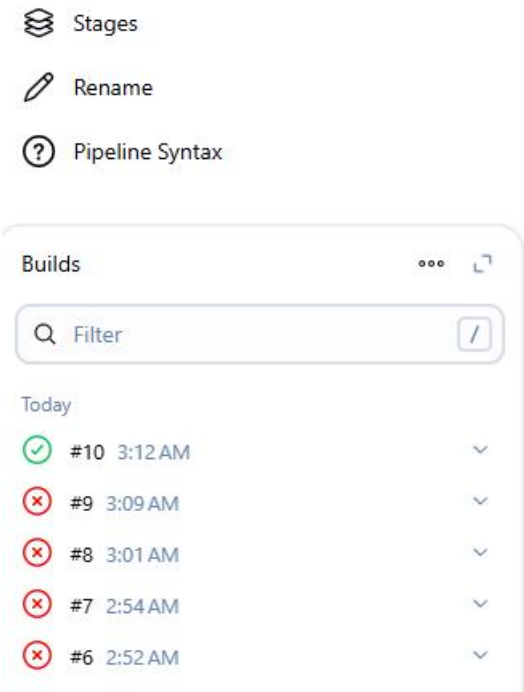

```
SSH_AGENT_PID=7037
Running ssh-add (command line suppressed)
Identity added: /home/ec2-user/slavenode/workspace/git-maven-tomcat-pipeline@tmp/private_key_7406386655683991356.key (/home/ec2-user/slavenode/workspace/git-maven-tomcat-
pipeline@tmp/private_key_7406386655683991356.key)
[ssh-agent] Started.
[Pipeline] {
[Pipeline] sh
+ scp -o StrictHostKeyChecking=no target/FirstSpringWebApp-0.0.1-SNAPSHOT.war ec2-user@15.156.94.232:/home/ec2-user/apache-tomcat-11.0.8/webapps
dest open("/home/ec2-user/apache-tomcat-11.0.8/webapps/FirstSpringWebApp-0.0.1-SNAPSHOT.war"): Failure
failed to upload file target/FirstSpringWebApp-0.0.1-SNAPSHOT.war to /home/ec2-user/apache-tomcat-11.0.8/webapps/FirstSpringWebApp-0.0.1-SNAPSHOT.war
[Pipeline] }
$ ssh-agent -k
```

It is there in the slavenode

```
drwxr-xr-x. 6 ec2-user ec2-user 88 Jul  3 02:28 slavenode
[ec2-user@ip-172-31-30-34 ~]$ cd
.cache/    .config/   .m2/       .ssh/      slavenode/
[ec2-user@ip-172-31-30-34 ~]$ cd slavenode/
[ec2-user@ip-172-31-30-34 slavenode]$ ls -l
total 1368
drwxrwxr-x. 3 ec2-user ec2-user      26 Jul  3 02:28 caches
drwxrwxr-x. 4 ec2-user ec2-user      34 Jun 27 02:58 remoting
-rw-rw-r--. 1 ec2-user ec2-user 1396936 Jun 27 02:58 remoting.jar
drwxrwxr-x. 3 ec2-user ec2-user      50 Jul  3 02:28 tools
drwxrwxr-x. 5 ec2-user ec2-user      96 Jul  3 02:28 workspace
[ec2-user@ip-172-31-30-34 slavenode]$ pwd
/home/ec2-user/slavenode
[ec2-user@ip-172-31-30-34 slavenode]$ cd workspace/
[ec2-user@ip-172-31-30-34 workspace]$ ls -l
total 0
drwxrwxr-x. 2 ec2-user ec2-user  23 Jun 27 03:23 DemoFirstJob
drwxrwxr-x. 6 ec2-user ec2-user 138 Jul  3 02:54 git-maven-tomcat-pipeline
drwxrwxr-x. 2 ec2-user ec2-user   6 Jul  3 02:54 git-maven-tomcat-pipeline@tmp
[ec2-user@ip-172-31-30-34 workspace]$ cd git-maven-tomcat-pipeline
[ec2-user@ip-172-31-30-34 git-maven-tomcat-pipeline]$ ls -l
total 40
-rw-rw-r--.  1 ec2-user ec2-user 10665 Jul  3 02:28 mvnw
-rw-rw-r--.  1 ec2-user ec2-user  7061 Jul  3 02:28 mvnw.cmd
-rw-rw-r--.  1 ec2-user ec2-user  1890 Jul  3 02:28 pom.xml
drwxrwxr-x.  4 ec2-user ec2-user    30 Jul  3 02:28 src
drwxrwxr-x. 10 ec2-user ec2-user 16384 Jul  3 02:54 target
[ec2-user@ip-172-31-30-34 git-maven-tomcat-pipeline]$ cd target/
[ec2-user@ip-172-31-30-34 target]$ ls -l
total 51884
drwxrwxr-x. 5 ec2-user ec2-user       49 Jul  3 02:54 FirstSpringWebApp-0.0.1-SNAPSHOT
-rw-rw-r--. 1 ec2-user ec2-user 28070167 Jul  3 02:54 FirstSpringWebApp-0.0.1-SNAPSHOT.war
-rw-rw-r--. 1 ec2-user ec2-user 25051845 Jul  3 02:54 FirstSpringWebApp-0.0.1-SNAPSHOT.war.original
drwxrwxr-x. 3 ec2-user ec2-user       47 Jul  3 02:54 classes
drwxrwxr-x. 3 ec2-user ec2-user       25 Jul  3 02:54 generated-sources
drwxrwxr-x. 3 ec2-user ec2-user       30 Jul  3 02:54 generated-test-sources
drwxrwxr-x. 2 ec2-user ec2-user       28 Jul  3 02:54 maven-archiver
drwxrwxr-x. 3 ec2-user ec2-user       35 Jul  3 02:54 maven-status
drwxrwxr-x. 2 ec2-user ec2-user      161 Jul  3 02:54 surefire-reports
drwxrwxr-x. 3 ec2-user ec2-user       17 Jul  3 02:54 test-classes
[ec2-user@ip-172-31-30-34 target]$
```

don’t know why it is not copying into Tomcat-server

I deleted existing FirstSpringWebApp-0.0.1-SNAPSHOT.war




```
pipeline {
   agent any

   tools {
```

```
    maven "maven-3.9.10"
  }

  stages {
    stage('git clone') {
      steps {
        git branch: 'main', url: 'https://github.com/Haider7214/SpringApp.git'
      }
    }
    stage('maven build') {
      steps {
        sh 'mvn clean compile test package'
      }
    }
    stage('App deployment') {
      steps {
        sshagent(['Tomcat-Server-Credentials-Pipeline1']) {
          sh 'scp -o StrictHostKeyChecking=no target/FirstSpringWebApp-0.0.1-SNAPSHOT.war ec2-
user@15.156.94.232:/home/ec2-user/apache-tomcat-11.0.8/webapps'
        }
      }
    }
  }
}
```

```
[Pipeline] sshagent
[ssh-agent] Using credentials ec2-user
$ ssh-agent
SSH_AUTH_SOCK=/tmp/ssh-XXXXXXQf7Pk7/agent.8289
SSH_AGENT_PID=8291
Running ssh-add (command line suppressed)
Identity added: /home/ec2-user/slavenode/workspace/git-maven-tomcat-pipeline@tmp/private_key_9013734709230507359.key (/home/ec2-user/s
pipeline@tmp/private_key_9013734709230507359.key)
[ssh-agent] Started.
[Pipeline] {
[Pipeline] sh
+ scp -o StrictHostKeyChecking=no target/FirstSpringWebApp-0.0.1-SNAPSHOT.war ec2-user@15.156.94.232:/home/ec2-user/apache-tomcat-11.0.
[Pipeline] }
$ ssh-agent -k
unset SSH_AUTH_SOCK;
unset SSH_AGENT_PID;
echo Agent pid 8291 killed;
[ssh-agent] Stopped.
[Pipeline] // sshagent
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

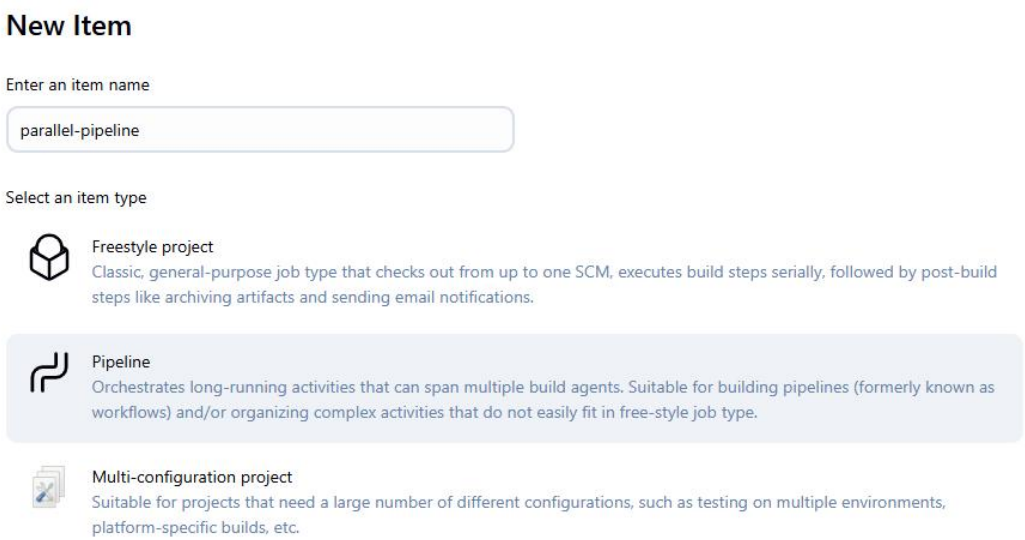
http://15.156.94.232:8080/manager/html
Go to Tomcat ---> Manage Apps

http://15.156.94.232:8080/FirstSpringWebApp-0.0.1-SNAPSHOT/register

1:30

```
-rw-r----- 1 ubuntu ubuntu   2026 Jun  5 17:49 version.bat
-rwxr-x--- 1 ubuntu ubuntu   1908 Jun  5 17:49 version.sh
ubuntu@ip-172-31-11-116:~/apache-tomcat-11.0.8/bin$ sh startup.sh
Using CATALINA_BASE:   /home/ubuntu/apache-tomcat-11.0.8
Using CATALINA_HOME:   /home/ubuntu/apache-tomcat-11.0.8
Using CATALINA_TMPDIR: /home/ubuntu/apache-tomcat-11.0.8/temp
Using JRE_HOME:        /usr
Using CLASSPATH:       /home/ubuntu/apache-tomcat-11.0.8/bin/bootstrap.jar:/home
Using CATALINA_OPTS:
Tomcat started.
ubuntu@ip-172-31-11-116:~/apache-tomcat-11.0.8/bin$
```

Parallel Stages:
Create a new pipeline



Just get any of the script to add into this pipeline

```
pipeline {
   agent any

   tools {
```

```
        maven "maven-3.9.10"
    }

    stages {
        stage('git clone') {
            steps {
                git branch: 'main', url: 'https://github.com/Haider7214/SpringApp.git'
            }
        }
        stage('maven build') {
            steps {
                sh 'mvn clean compile test package'
            }
        }
        stage('deploy') {
            steps {
                echo 'Deploying App with Tomcat'
            }
        }
    }
}
```

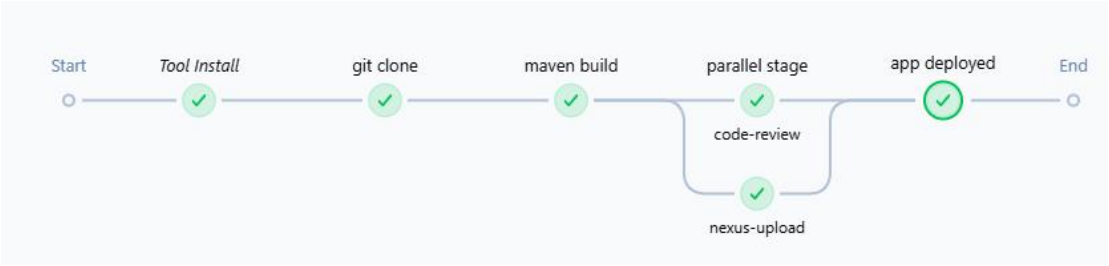
Modified script

```
pipeline {
    agent any

    tools {
        maven "maven-3.9.10"
    }

    stages {
        stage('git clone') {
            steps {
                git branch: 'main', url: 'https://github.com/Haider7214/SpringApp.git'
            }
        }
        stage('maven build') {
            steps {
                sh 'mvn clean compile test package'
            }
        }
        stage('parallel stage') {
            parallel {
                stage('code-review'){
                    steps {
                        echo 'code review'
                        }
                }

                stage('nexus-upload'){
                    steps {
                        echo 'nexus upload'
                        }
                }
            }

        }
```

```
        stage('app deployed') {
            steps {
                echo 'Deploying App with Tomcat'
            }
        }
    }
}
```

Apply and Save

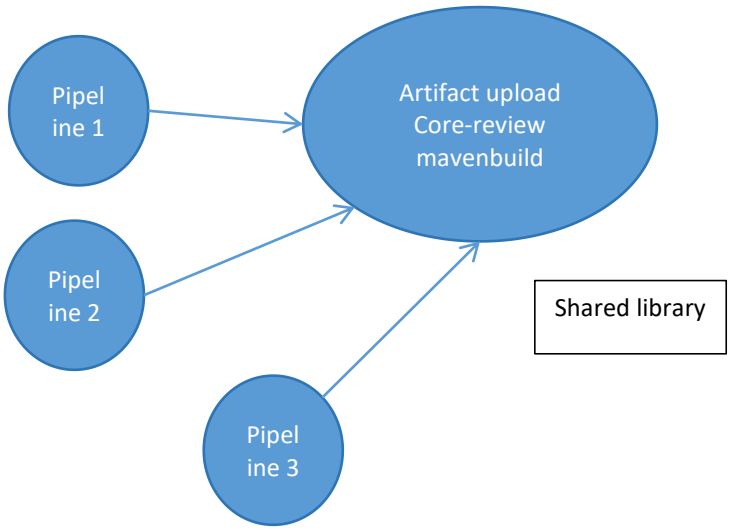
Build Now




```
[INFO] Skipping execution of surefire because it has already been run for this configuration
[INFO]
[INFO] --- war:3.4.0:war (default-war) @ FirstSpringWebApp ---
[INFO] Packaging webapp
[INFO] Assembling webapp [FirstSpringWebApp] in [/var/lib/jenkins/workspace/parallel-pipeline/target/FirstSpringWebApp-0.0.1-SNAPSHOT]
[INFO] Processing war project
[INFO] Copying webapp resources [/var/lib/jenkins/workspace/parallel-pipeline/src/main/webapp]
[INFO] Building war: /var/lib/jenkins/workspace/parallel-pipeline/target/FirstSpringWebApp-0.0.1-SNAPSHOT.war
[INFO]
[INFO] --- spring-boot:3.3.5:repackage (repackage) @ FirstSpringWebApp ---
[INFO] Replacing main artifact /var/lib/jenkins/workspace/parallel-pipeline/target/FirstSpringWebApp-0.0.1-SNAPSHOT.war with repackaged archive, adding nested dependencies in BOOT-INF/.
[INFO] The original artifact has been renamed to /var/lib/jenkins/workspace/parallel-pipeline/target/FirstSpringWebApp-0.0.1-SNAPSHOT.war.original
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
```

Code review and nexus-upload execute parallely

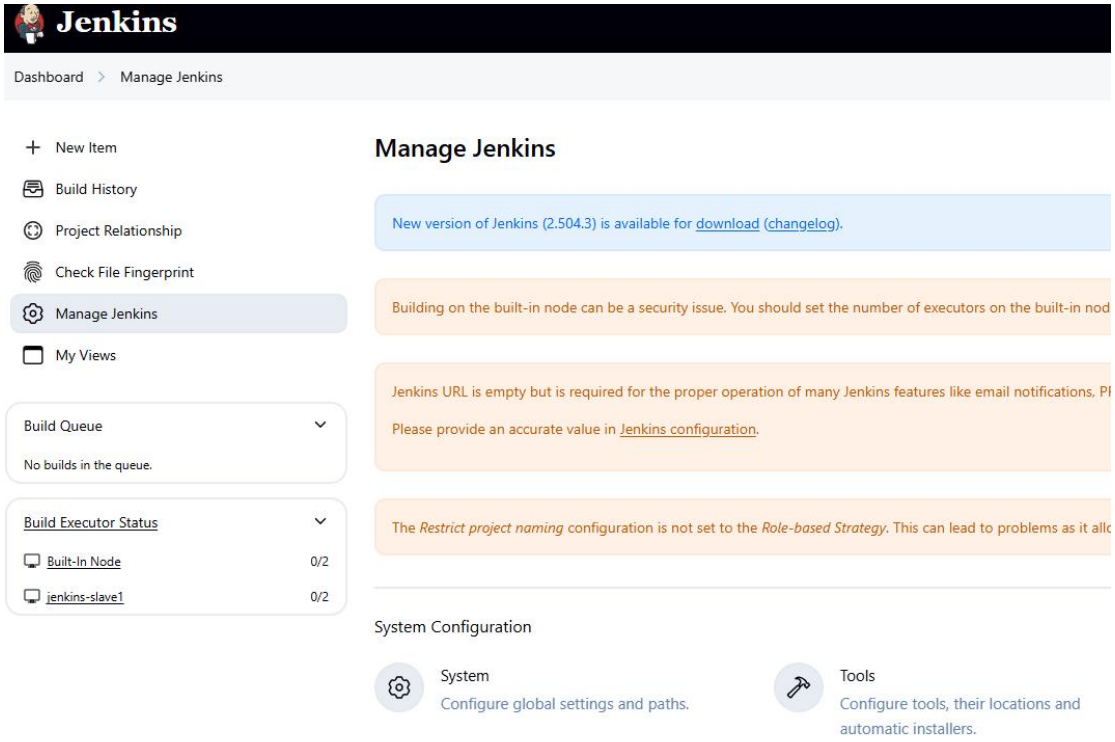
Shared library



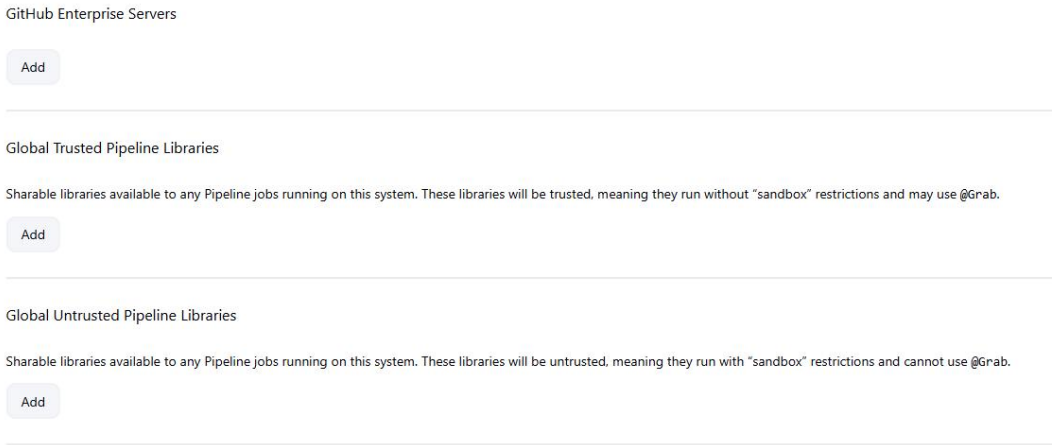
How do we define Groovy syntax in Jenkins?

Lets say code-review code is the same, nexus-upload code is the same, why to write the same code again and again

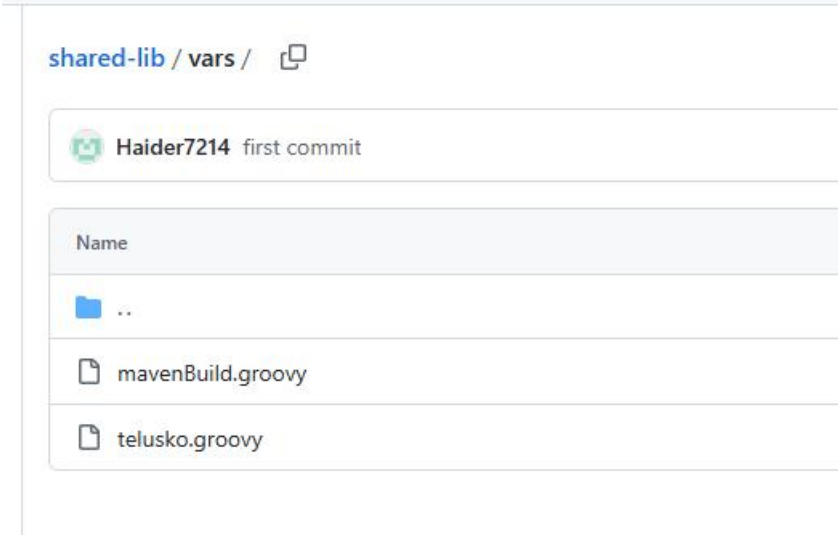
Manage Jenkins --> System



Global Trusted Pipeline Libraries



Github groovy scripts are there



Global Trusted Pipeline Libraries

Sharable libraries available to any Pipeline jobs running on this system. These libraries will be trusted, mean

Library

Name ?

demo_shared_lib

Default version ?

main

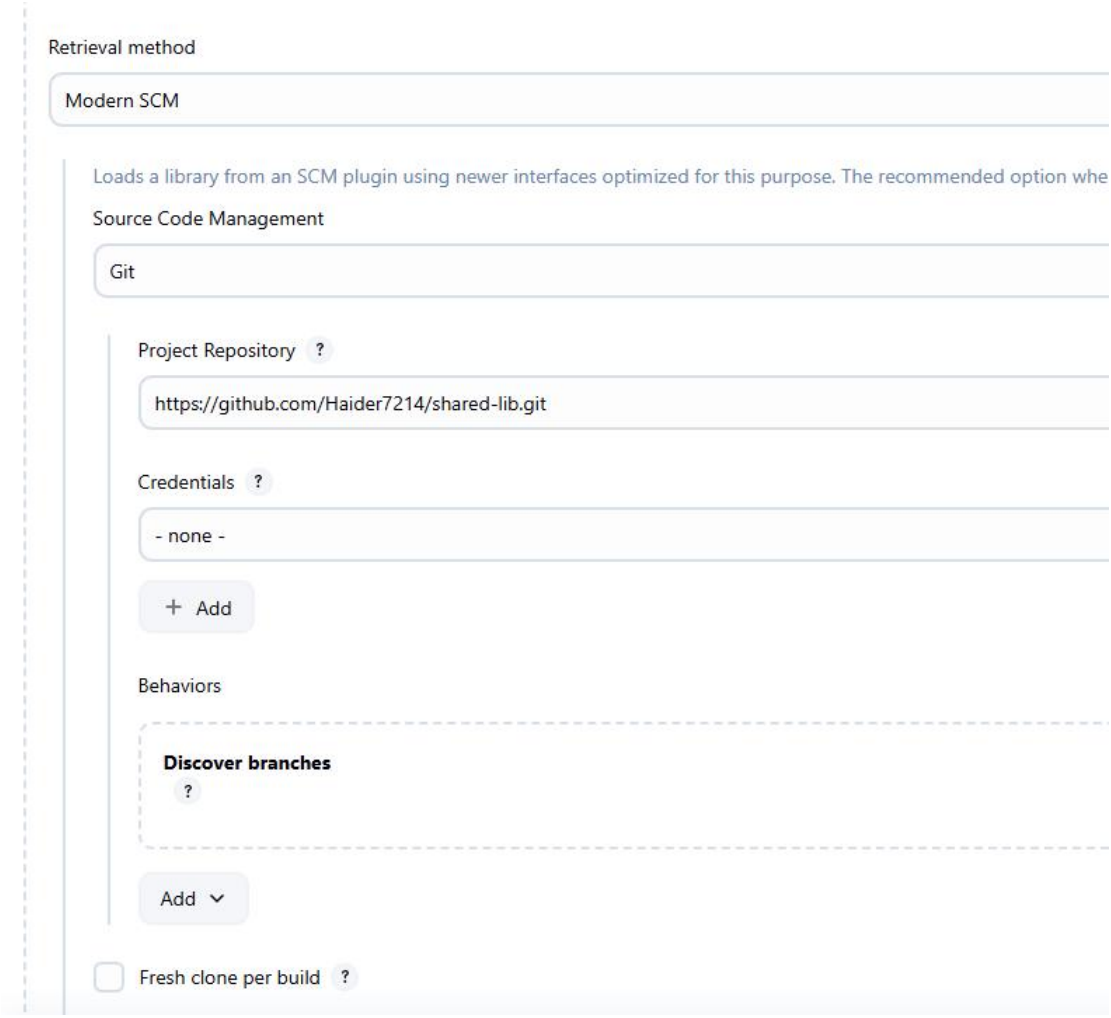
Cannot validate default version until after saving and reconfiguring.

- [ ] Load implicitly ?
- [x] Allow default version to be overridden ?
- [x] Include @Library changes in job recent changes ?
- [ ] Cache fetched versions on controller for quick retrieval ?

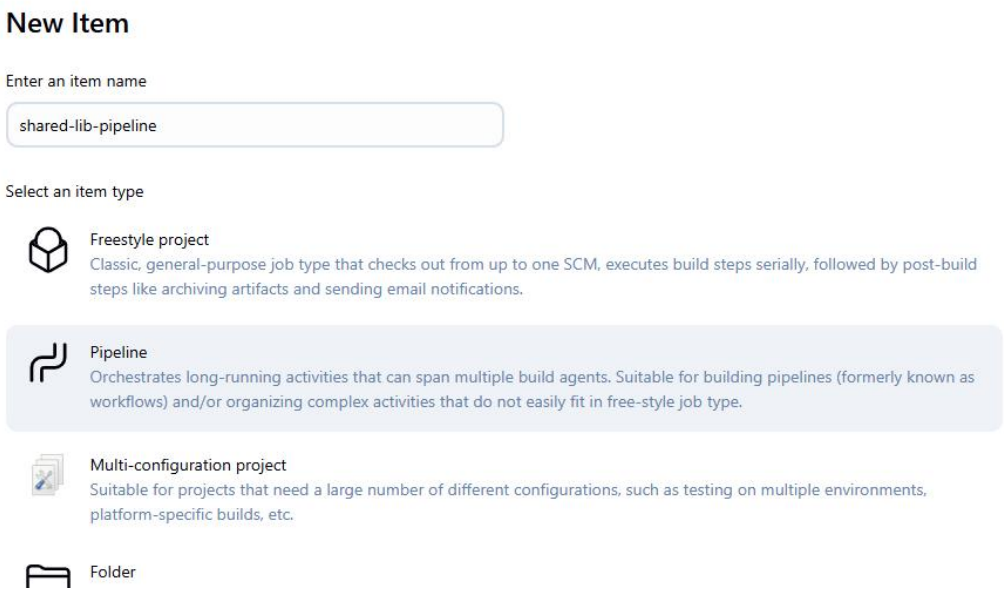
Retrieval method

Modern SCM

Credentials are not needed because it is a Public repo



Apply and Save




```
@Library('demo_shared_lib')
pipeline {
   agent any
```

```
    tools {
        maven "maven-3.9.10"
    }

    stages {
        stage('git clone') {
            steps {
                git branch: 'main', url: 'https://github.com/Haider7214/SpringApp.git'
            }
        }
        stage('demo message') {
            steps {
                telusko()
            }
        }
        stage('maven build') {
            steps {
                mavenBuild()
            }
        }
        stage('parallel stage') {
            parallel {
                stage('code-review'){
                    steps {
                        echo 'code review'
                        }
                }

                stage('nexus-upload'){
                    steps {
                        echo 'nexus upload'
                        }
                }
            }

        }
        stage('app deployed') {
            steps {
                echo 'Deploying App with Tomcat'
            }
        }
    }
}
```

Apply and Save

Build Now
It failed

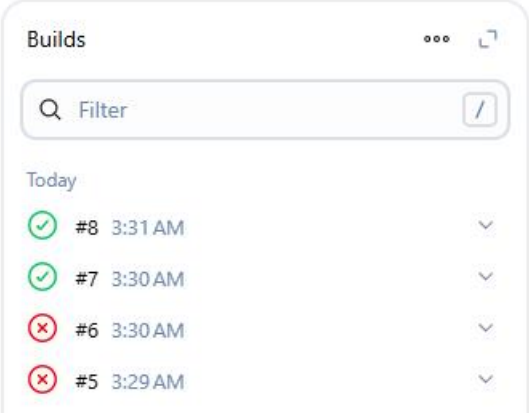
Console Output

```
Started by user demo
org.codehaus.groovy.control.MultipleCompilationErrorsException: startup failed:
WorkflowScript: 2: unexpected token: pipeline @ line 2, column 1.
   pipeline {
   ^

1 error

        at org.codehaus.groovy.control.ErrorCollector.failIfErrors(ErrorCollector.ja
        at org.codehaus.groovy.control.ErrorCollector.addFatalError(ErrorCollector.j
        at org.codehaus.groovy.control.ErrorCollector.addError(ErrorCollector.java:1
```

Added an _

```
@Library('demo_shared_lib')_
pipeline {
  agent any

  tools {
    maven "maven-3.9.10"
  }

  stages {
    stage('git clone') {
      steps {
        git branch: 'main', url: 'https://github.com/Haider7214/SpringApp.git'
      }
    }
    stage('demo message') {
      steps {
        telusko()
      }
    }
    stage('maven build') {
      steps {
        mavenBuild()
      }
    }
    stage('parallel stage') {
      parallel {
        stage('code-review'){
          steps {
            echo 'code review'
            }
        }

        stage('nexus-upload'){
          steps {
            echo 'nexus upload'
            }
        }
      }
```

```
        }
        stage('app deployed') {
            steps {
                echo 'Deploying App with Tomcat'
            }
        }
    }
}
```



Function runs fine

```
[Pipeline] withEnv
[Pipeline] {
[Pipeline] echo
Welcome to Shared LIBRARY concept
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (maven build)
```

Pipeline overview