## **SE489 DevOps Engineering**

Lab 5



## Lab 5: Integration of Jenkins with Git

Overview: we will learn in this lab, how to configure Jenkins to perform Continuous Integration with Github. While Git take care of source code, Jenkins provides continuous integration. To demonstrate this, we will adopt following strategy-

- a. We will first create a github repository
- b. We will then push some files into it
- c. We will then create a Jenkin job
- d. We will make changes into the source code
- e. Push this changed source code file to github repository
- f. Will observe the subsequent effects by Jenkins
- 1. Let's create a sample java source code file, and put it into the local working directory

```
Ë
   JenkinsWithGit.java - Notepad
                                                                               ණ
File
    Edit
         View
package miscelleneous;
/**
 * @author Zafar Iqbal Khan, zkhan@psu.edu.sa
 */
public class JenkinsWithGit {
    public static void main(String[] args) {
         //code to print Unicode characters
         int charPerLine=0;
         for (int i = 33; i < 256; i++, charPerLine++)</pre>
              System.out.print((char)i+((charPerLine%10==0)?"\n":"\t"));
              System.out.print();
         }
    }
}
Ln 1, Col 1
                                                   70%
                                                            Unix (LF)
                                                                           UTF-8
```

2. From the master directory, check status



3. Now, let's push JenkinsWithGit.java to staging area, with add command, and then check status again



4. Now commit this file for push operation

```
MINGW64;/d/DevOps Tools/Lab Manual (master)
$ git commit -a -m "Pushing JenkinsWithGit.java"
[master bbe19b8] Pushing JenkinsWithGit.java
1 file changed, 18 insertions(+)
create mode 100644 JenkinsWithGit.java
mzafa@BlackHole MINGW64 /d/DevOps Tools/Lab Manual (master)
$
```

5. Let's push JenkinsWithGit.java to the global repository



6. Cross check this on GitHub website

🖵 mzafa	arikhan / DevOps Public		<b>公</b> P	in 🕑 Unwatch 1 👻 🔮 Fork 0 💌 🛱 St
<> Code	⊙ Issues 11 Pull requests ⊙ Actions 🖽	Projects 🖽 Wiki 🛈 Security	🗠 Insights 🛛 🕸 Settings	
	master had recent pushes 2 minutes ago     master -      P 5 branches 0 0 tags		Compare & pull request	About This is repository created for learning and testing GitHub Services
	This branch is 15 commits ahead, 1 commit be	ehind main.	th Contribute ↓	Constant Consta
	Zafar Iqbal Khan Pushing JenkinsWithGit	t.java	bbe19b8 6 minutes ago 🕥 15 commits	
	README.md	Create README.md	2 months ago	Keleases No releases published Create a new release
	README.md		Ø	Packages
	DevOps			No packages published Publish your first package
	This is repository created for learning	and testing GitHub Services This is I	My First Repository Git is Amazing	

7. Before we create a Jenkins job, first check if the Git plugin is installed in the Jenkins, if it is not, we have to install it first, Open any web browser and enter url <u>http://localhost:8080</u>, Jenkins

dashboard will open, go to manage Jenkins

← → C ☆ ③ lo	calhost:808	80				Q 🖻 🛣	*	≓ 🛛 🌍 i
🏘 Jenkins		Q Search			⑦ ↓ 2	! 2 💄 Zaf	ar Iqbal I	(han → log out
Dashboard 🔸								
쯜 New Item 🍓 People 🎅 Build History		All	+					Add description
Manage Jenkins		s	w	Name ↓	Last Success	Last Failure	Last Dura	tion
New View		Icon: S	M	L lcon	Atom feed	Atom feed for		Atom feed for just
Build Queue	^			legend	••• for all	•••• failures		latest builds
No builds in the queue.								
Build Executor Status	^							
1 Idle								
2 Idle								

Then click on, manage plugins

$\leftarrow \rightarrow \mathbf{C}  \Delta  \odot  \text{localhost:8080}$	manage	오 년 ☆	) 🛪 💷 🗃 🕄
🧌 Jenkins		Q. Search 💿 👱 Zafar Ig	ıbal Khan 🖃 log out
Dashboard +			
😑 New Item	Manage Jenkins		
Seople			
Build History	New version of Jenkins (2.361.1) is available for <u>download</u> ( <u>changelog</u> ).	Or	Upgrade Automatically
🔆 Manage Jenkins			
🍓 My Views	Warnings have been published for the following currently installed components:	Configure which of the	ese warnings are shown
New View	Multiple security vulnerabilities in Jenkins 2.355 and earlier. LTS 2.332.3 and earlier		
Build Queue			
No builds in the queue.	System Configuration		
Build Executor Status	Configure System Sconfigure global settings and paths. Sconfigure tools, their locations and Add. m	ge Plugins emove. disable or enable plugins that Manage Nodes a Add. remove. conto	and Clouds trol and monitor the
1 Idle	automatic installers. can extend the functionality of Jenkins.	tend the functionality of Jenkins. various nodes that re are updates available	I Jenkins runs jobs on.
2 Idle			
	Security		
	Configure Global Security Secure Jenkins: define who is allowed to access/use the system.	gure Credential Providers and types An Anaage Users Create/deleta/moc to this Jenkins	dify users that can log in

On subsequent screen, look for Git plugin, if it is there, OK, Otherwise, search for it, and install it.

As in our case, it is already installed

Plugin Manager	Q git	×
Updates Available Installed Advanced		
Name 1	Enabled	
Git client plugin 3.11.2 Utility plugin for Git support in Jenkins Report an issue with this plugin		$\otimes$
Git plugin 4.11.5 This plugin integrates Git with Jenkins. Report an issue with this plugin		$\otimes$
GitHub API Plugin 1.303-400.v35c2d8258028 This plugin provides GitHub API for other plugins. Report an issue with this plugin		$\otimes$
GitHub Branch Source Plugin 1677.v731f745ea_0cf Multibranch projects and organization folders from GitHub. Maintained by CloudBees, Inc. Report an issue with this plugin		$\otimes$
GitHub plugin 1.34.3.1 This plugin integrates GitHub to Jenkins. Report an issue with this plugin		$\otimes$
Pipeline: GitHub Groovy Libraries 38.v445716ea_edda_ Allows Pipeline Groovy libraries to be loaded on the fly from GitHub. Report an issue with this plugin		$\otimes$

8. Now let's create a new **Jenkins Item**, give it a name, and select type as **Freestyle Project** and click Ok

🏘 Jenkins		Q Search	0	<b>!</b> 1	💄 Zafar Iqbal Khan
Dashboard → All →					
En Jer » Rev	<b>ter an item name</b> <u>nkinsGit</u> quired field				
~	Freestyle project This is the central feature of Jenkins. Jenkins will build you used for something other than software build.	pur project, combining any SCM with any	build system, and th	iis can be e	ven
and the second sec	Pipeline Orchestrates long-running activities that can span multij and/or organizing complex activities that do not easily f	ple build agents. Suitable for building pip it in free-style job type.	elines (formerly kno	wn as work	flows)
	Multi-configuration project Suitable for projects that need a large number of differe builds, etc.	nt configurations, such as testing on mult	iple environments, į	olatform-sp	vecific

9. On subsequent screen, click on Source Code Management tab, choose Git, and provide URL<sup>\*\*</sup> for the global repository, select Poll SCM under Build Triggers, provide schedule, \*/2 \*\*\*

//we want Jenkins to Poll after every 2 minutes, 2 is here an offset value
Hint: Scheduling in Jenkins follows standard CRON syntaxes
sample CRON schedule syntax is
{Minute} {Hour} {DayOfMonth} {Month} {DayofWeek}

General	Source Code Management	Build Triggers	Build Environment	Build	Post-build Actions	
Source C	Code Management					
O None						
Git ?     Reposito	ories ?					
Repos	sitory URL ?					
https	s://github.com/mzafarikhan/Dev0	Ops.git				
Crede	ntials ? ne - 💙 💽 Add 🔻					Advanced
Add F	Repository					
Branche	s to build ?					
Branc	h Specifier (blank for 'any') ?					X
*/ma	aster					

\*\*to know the URL of the global repository, login into GitHub account, browse to the required repository, click on Code tab, url to the repository is available there.

ויא master א גע אין א טער אין א גער אין א טער אין א טער אין א גער אין גער אין א גער אין א גער אין גער אין א גער אין א גער אין גער א	Go to file Add file - Code -
This branch is 15 commits ahead, 1 commit behind main.	E Clone
<b>Zafar Iqbal Khan</b> Pushing JenkinsWithGit.java	HTTPS SSH GitHub CLI Copied!
DienkinsWithGit.java Pushing Je	WithGit.java Use Git or checkout with SVN using the web URL.
Create README.md	E.md Cpen with GitHub Desktop
README.md	Download ZIP
DevOps	
This is repository created for learning and testin	tHub Services This is My First Repository Git is Amazing

At the end, click on apply, and all is set now.

10. Now, make some changes into the *JenkinsWithGit.java* file and repeat steps from 2 - 5, i.e. after changes, push this file into Global repository.



11. Now let's go to the Jenkins Dashboard, wait for at least, 2 minutes (as we have specified Polling schedule for every 2 minute), click on changes at the left pane, within 2 minutes, we will see, Jenkins starts a new build, and changes are listed automatically.

<b>e</b>	Jenkins			Q Search	0 🖡 1 😲 1 土
Dashb	ooard 🔸 JenkinsGit	,			
<ul> <li>▲ B4</li> <li>Q. St</li> <li>☑ CI</li> <li>☑ W</li> <li>☑ B4</li> <li>☑ CI</li> <li>☑ D</li> <li>☑ CI</li> <li< th=""><th>ack to Dashboard atus hanges /orkspace uild Now elete Project it Polling Log ename</th><th></th><th>Changes #3 (Sep 8, 2022 7:50:11 PM) 1. After adding Banner – Zafar Iqbal Khan / githubweb</th><th></th><th></th></li<></ul>	ack to Dashboard atus hanges /orkspace uild Now elete Project it Polling Log ename		Changes #3 (Sep 8, 2022 7:50:11 PM) 1. After adding Banner – Zafar Iqbal Khan / githubweb		
iội I	Build History	trend A			
Q Filte	er builds				
<i>⊘</i> <u>#3</u>	Sep 8. 2022 7:50 PM				
<i>⊘</i> <u>#2</u>	Sep 8, 2022 7:38 PM				
⊘ #1	Sep 8. 2022 6:16 PM				
2	Atom feed for all Atom f	feed for failures			

This is how continuous integration is achieved through GitHub and Jenkins