SE489 DevOps Engineering

Lab 4



Lab 4: Continuous Integration and Continuous Release

Preambles: Jenkins is a tool to achieve continuous integrations and continuous delivery



Just google for jenkins download, <u>www.jenkins.io</u> is the official website for the jenkins. Click the first link to download jenkins.

nkins <mark>cd</mark>		
	Jenkins download and deploy	rment
	The Jenkins project produces two release lines: Stable (LTS) and regular (We other. See the links below for more information and recommendations about	ekly). Depending on your organization's needs, one may be prefer It the release lines.
	Stable (LTS)	Regular releases (Weekly)
	Long-Term Support (LTS) release baselines are chosen every 12 weeks from the stream of regular releases. Every 4 weeks we release stable releases which include bug and security fix backports. Learn more	This release line delivers bug fixes and new features rapidly to plugin developers who need them. It is generally delivered or cadence. Learn more
	Changelog Upgrade Guide Past Releases	Changelog Past Releases
	Jenkins is distributed as WAR files, native packages, installers, and Docker in	nages. Follow these installation steps:
	Jenkins is distributed as WAR files, native packages, installers, and Docker in 1. Before downloading, please take a moment to review the Hardware a 2. Select one of the packages below and follow the download instructior 3. Once a Jenkins package has been downloaded, proceed to the Install 4. You may also want to verify the package you downloaded. Learn more b Download Jenkins 2.346.3 LTS for:	nages. Follow these installation steps: nd Software requirements section of the User Handbook. Is, ing Jenkins section of the User Handbook. about verifying Jenkins downloads. Download Jenkins 2.365 for:
	Jenkins is distributed as WAR files, native packages, installers, and Docker in 1. Before downloading, please take a moment to review the Hardware a 2. Select one of the packages below and follow the download instructior 3. Once a Jenkins package has been downloaded, proceed to the Install 4. You may also want to verify the package you downloaded. Learn more	nages. Follow these installation steps: nd Software requirements section of the User Handbook. Is: ing Jenkins section of the User Handbook. about verifying Jenkins downloads. Download Jenkins 2.365 for: Generic Java package (war) SHW-256 7H81981778-286505778-136811805818965184986c14c886637286578-1991
	Jenkins is distributed as WAR files, native packages, installers, and Docker in 1. Before downloading, please take a moment to review the Hardware a 2. Select one of the packages below and follow the download instructior 3. Once a Jenkins package has been downloaded, proceed to the Install 4. You may also want to verify the package you downloaded. Learn more (*) Download Jenkins 2.346.3 LTS for: Generic Java package (war) SHA-256 TATEGERBOATINGTORENTS770107881527311C7881579443873865511C45847889 Docker	nages. Follow these installation steps: nd Software requirements section of the User Handbook. Is. ing Jenkins section of the User Handbook. about verifying Jenkins downloads. Download Jenkins 2.365 for: Generic Java package (war) SHA-256 714869277ac2850577be13651ab016645b961ba99ec1ac88663725b657ac1951 Docker
	Jenkins is distributed as WAR files, native packages, installers, and Docker in 1. Before downloading, please take a moment to review the Hardware a 2. Select one of the packages below and follow the download instructior 3. Once a Jenkins package has been downloaded, proceed to the Install 4. You may also want to verify the package you downloaded. Learn more	Aages. Follow these installation steps: and Software requirements section of the User Handbook. Is: ing Jenkins section of the User Handbook. about verifying Jenkins downloads. Download Jenkins 2.365 for: Generic Java package (war) swi-356 7488982736286937be13681ab0861bb081bb081bb081bb081bb081bb081bb081
	Jenkins is distributed as WAR files, native packages, installers, and Docker in 1. Before downloading, please take a moment to review the Hardware a 2. Select one of the packages below and follow the download instructior 3. Once a Jenkins package has been downloaded, proceed to the Install 4. You may also want to verify the package you downloaded. Learn more (b) Download Jenkins 2.346.3 LTS for: Generic Java package (war) SHA-256-1418658004146/178700815273c1c1488759645873865511c306-0788 Docker Ubuntu/Debian CentOS/Fedora/Red Hat	nages. Follow these installation steps: nd Software requirements section of the User Handbook. is, ing Jenkins section of the User Handbook. about verifying Jenkins downloads. Download Jenkins 2.365 for: Generic Java package (war) suk-256 71686627362650377be13811b0166641566115690E1ac68663723b657ab191 Docker Ubuntu/Debian CentOS/Fedora/Red Hat
	Jenkins is distributed as WAR files, native packages, installers, and Docker in 1. Before downloading, please take a moment to review the Hardware a 2. Select one of the packages below and follow the download instructior 3. Once a Jenkins package has been downloaded, proceed to the Install 4. You may also want to verify the package you downloaded. Learn more (b) Download Jenkins 2.346.3 LTS for: (c) Download Jenkins 2.346.3 LTS for: (c) Download Jenkins 2.346.3 LTS for: (c) Download Jenkins 2.346.4 LTS for: (c) Download	Arages. Follow these installation steps: Ind Software requirements section of the User Handbook. Is: Ing Jenkins section of the User Handbook. about verifying Jenkins downloads. Download Jenkins 2.365 for: Generic Java package (war) SHA-256 7H859271428550877be13651ab19641ba996c1ac886937236657ae1991 Docker Ubuntu/Debian CentOS/Fedora/Red Hat Windows

Go for LTS (Long Term Support) version, Out of several options listed select windows, Automatic download of installer file will start. Once done, you can check it's a msi installer.

There are some software requirements also for jenkins, website puts them like this

Software Requirement:



Let's check java's version first, open command window and run the following command to confirm the version of the java



If it is 8,11 or 17, it will work fine.

Hardware Requirements: As mentioned at the jenkins website, followings are requirements

Jenkins	cd *	Blog Documentation ▼ Plugins Community ▼ Subprojects ▼ A
	> User Documentation Home	Windows
	User Handbook	The simplest way to install Jenkins on Windows is to use the Jenkins
	User Handbook overview Installing Jenkins Ocker Kubernetes Linux macOS	Windows installer. That program will install Jenkins as a service using a 64 bit JVM chosen by the user. Keep in mind that to run Jenkins as a service, the account that runs Jenkins must have permission to login as a service.
	WAR filesWindows	Prerequisites
	Other Systems Offline Installations Initial Softings	Minimum hardware requirements:
	Using Jenkins Pipeline	 256 MB of RAM 1 GB of drive space (although 10 GB is a recommended minimum if
	Blue OceanManaging Jenkins	Recommended hardware configuration for a small team:
	Securing Jenkins	• 4 GB+ of RAM
	System Administration	• 50 GB+ of drive space
	Scaling JenkinsTroubleshooting Jenkins	Comprehensive hardware recommendations:
	 Appendix Glossary	Hardware: see the Hardware Recommendations page

If these requirements are fulfilled, then proceed for the installation of the jenkins, browse to the download location of the jenkin setup file, double click on it to starting the installation process



Following screen will appear



To proceed with the installation process, click on next

Accept the default location, if you don't want to change it

Jenkins 2.332.3 Setup		_		×
Destination Folder		Jer	ıkins	0
Click Next to install to the default folder or clic	ck Change to cho	ose another.		P
Install Jenkins 2.332.3 to:				
C:\Program Files\Jenkins\ Change				
	Back	Next	Cano	cel

To avoid other overheads, choose first option on the next screen presented.

Jenkins 2.332.3 Setup		•		×
Service Logon Credentials Enter service credentials for the service.	Jei	ıki	ns	
Jenkins 2.332.3 installs and runs as an independent Windows se manner, you must supply the user account credentials for Jenkir	ervice. To ope ns 2.332.3 to 1	rate in tl run suco	his essfully.	
Logon Type:				
 Run service as LocalSystem (not recommended) 				
◯ Run service as local or domain user:				
Account: LAPTOP-F33P6UO6\Administrator				
Password:				
Test Credentials				
Back	Next		Cance	ł

By default, jenkins runs on port 8080, you may test port as well

Jenkins 2.332.3 Setup	- 🗆 🗙
Port Selection Choose a port for the service.	Jenkins
Please choose a port.	
Port Number (1-65535): 8080 Test Port	
It is recommended that you accept the selected default port.	
Back	Next Cancel

Click next, and let Jenkin select version of java for it, although, jenkins recommends, Java version 11, for sake of compatibility with other tools installed on laptop, I will continue with version 8.

Jenkins 2.332.3 Setup	- 🗆 X
Jenkins 2.332.3 Setup	Jenkins 🙆
Select Java home directory (JDK or JRE)	(
Please select the path of a Java Development Kit or Java Java 1.8 and 11 are supported by Jenkins.	va Runtime Environment. Only
C:\PROGRA~1\Java\JDK18~1.0_1\	
Change	
	ark Next Cancel
be	dox max Caliber

Simply click Ok, if you receive this



Leave the firewall services off, and select next to the next screen

Jenkins 2.332.3 Setu	q			Je	- enl	 cins	×
Select the way you	want features to be installed.						Ğ
Click the icons in the	tree below to change the way	/ fea	atures will	be instal	led.		
		Enables a Java runr (not reco	a firewal ning Jenk mmende	l except tins on ed).	tion for the port 8080	2	
			This feat hard driv	ure requ e.	ires OKI	B on your	
L						Brows	e
Reset	Disk Usage		Back	N	ext	Can	cel

Click on install, to complete the installation process.

🔁 Jenkins 2.332.3 Setup		-		×
	Completed the Jenkins Wizard	2.332.3	Setup	
	Click the Finish button to exit the Set	up Wizard.		
	Back Fi	nish	Canc	el

Now Jenkins, has been installed at your computer, let's unlock and configure it a bit.

Running, Unlocking and Using Jenkins

As Jenkins runs at local port 8080, enter url http://localhost:8080 at your browser

$\leftarrow \rightarrow C \ O \ O \ localhost i$	090
	This site can't be reached
	localhost unexpectedly closed the connection.
	Try: • Checking the connection • Checking the proxy and the firewall • Running Windows Network Diagnostics
	ERR_CONNECTION_CLOSED

Because for security reasons, we didn't add, firewall exception while installing jenkin, this window will appear, just click on the Checking the proxy and the firewall options and you will be taken to below window

Getting Started
Unlock Jenkins
To ensure Jenkins is securely set up by the administrator, a password has been written to the log (not sure where to find it?) and this file on the server:
C:\ProgramData\Jenkins\.jenkins\secrets\initialAdminPassword
Please copy the password from either location and paste it below.
Administrator password
Continue

Let's get the sought password from the given location, and paste it. Copy and paste, given location at windows explorer's address bar, select notepad at the subsequent window, to open password file.



Once in the file, copy the password



Paste the password and click on continue



At the subsequent screen it asks for plugins to be installed, select recommended plugins



Depending upon network speed, it may take few minutes to install recommended plugins

Getting Started				
Ge	etting Star	ted		
Folders	OWASP Markup Formatter	✓ Build Timeout	✓ Credentials Binding	OWN Serves OWASP Markup Formatter
 Timestamper 	Workspace Cleanup	🗘 Ant	🗘 Gradie	** Token Macro Build Timeout
2 Pipeline	GitHub Branch Source	Pipeline: GitHub Groovy Libraries	O Pipeline: Stage View	** Trilead API ** SSH Credentials ** Pipeline: Step API
2 Git	SSH Build Agents	Matrix Authorization Strategy	Q PAM Authentication	** Plain Credentials Credentials Binding ** SCM API
DAP	C Email Extension	O Mailer		** Pipeline: API Timestamper ** Caffeine API
				 Script Security JAXB SnakeYAML API Jackson 2 API Plaugin Utilities API Font Aussome API Popper, js 2 API Bootstrap 5 API
				** JQuery3 API ** ECharts API

After this jenkins asks for creation of an Administrative user accounts

Getting Started					
	Create First Admin User				
	Password:				
	Confirm password: Full name:				
	E-mail address:				

After completion of this step, Jenkins is ready for the use



Click on Start using Jenkins, and following **Dashboard** will be presented to you



Creating first job

To create a job, click **New Item**, first option on the left side pane, and provide a suitable name for the first project, select Freestlyle project, and click on Ok

\leftarrow \rightarrow C \triangle \bigcirc loc	alhost:8080/view/all/newJob
🧌 Jenkins	
Dashboard → All →	
	Enter an item name
	FirstJenkinsProject
	» 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
	Pipeline Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as we
	Multi-configuration project Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-
	Folder Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folde 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.
	ок

Provide some description for this project.

🏘 Jenkins		Q. Search	2 2 2	💄 Zafar Iqbal Kha
Dashboard + FirstJenkinsProject	,			
	General Source Code Management Build Triggers Build Environment Build Post-build Actions Description			
	Demo Project for the Jenkins		G	
	[Plain text] Preview Discard old builds ? GitHub project This project is parameterized ? Dirottle builds ? Bisable this project ? Execute concurrent builds if necessary ?		Advanced	

And Execute Windows batch command, in the build section and save

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

Onced saved, Dashboard will look like this



Now, click on **Build Now**, to check the output

All the builds are listed

🧛 Jenkins						
Dashboard > FirstJenkinsProject >						
 Back to Dashboard Status Changes 	Project FirstJenkinsProject					
🖿 Workspace	Workspace					
鑙 Configure 🚫 Delete Project	Recent Changes					
🔁 Rename	Permainks • Last build (#3), 40 sec ago • Last stable build (#3), 40 sec ago					
O Build History trend	 Last successful build (#3), 40 sec ago Last completed build (#3), 40 sec ago 					
Q Filter builds						
Atom feed for all Atom feed for failures						

Click on any build to check for console output



As evident from the below screen, we have successfully ran our first Jenkins build job.

← → C △ ① localhost:8080/job/FirstJenkinsProject/3/console				
🦂 Jenkins				
Dashboard > FirstJenkinsProject > #3				
 Back to Project Status 	Console Output			
Changes	Started by user Z afar Iqbal Khan Running as SYSTEM Building in workspace C:\ProgramData\Jenkins\.jenkins\workspace\FirstJenkinsProject			
Console Output	[FirstJenkinsProject] } cmd /c call C:\WINDOw5\TEMP\jenkins362995/44951/665290.dat			
View as plain text	C:\ProgramData\Jenkins\.jenkins\workspace\FirstJenkinsProject>java -version java version "1.8.0_341" Java (V) CC Duction Conjected (build 1.8.0.341.540)			
Edit Build Information	Java(in) SE Kuntime Environment (build 1.0.9_341-bl0) Java HotSpot(TM) 64-Bit Server VM (build 25.341-b10, mixed mode)			
S Delete build '#3'	C:\ProgramData\Jenkins\.jenkins\workspace\FirstJenkinsProject>date/t Wed 08/24/2022			
< Previous Build	C:\ProgramData\Jenkins\.jenkins\workspace\FirstJenkinsProject>echo "Jenkins makes life easier" "Jenkins makes life easier"			
	C:\ProgramData\Jenkins\.jenkins\workspace\FirstJenkinsProject>exit 0 Finished: SUCCESS			