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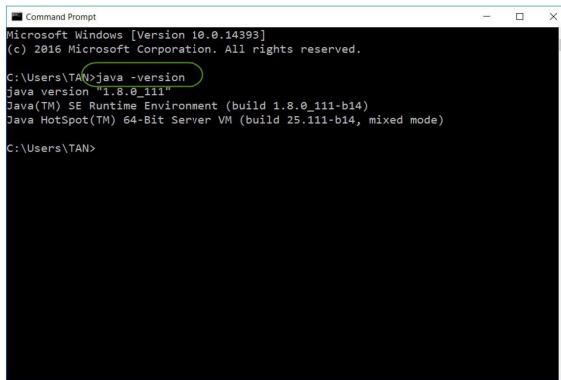
## Jenkins Installation

In this chapter, we will jump into how to install and start up Jenkins in 3 environment : Window, Ubuntu and Mac.

In all environment, Jenkins will be installed as service, it mean Jenkins will automatically start up every time you machine power on or restart machine.

# Jenkins on Windows

**Check if java is installed :** Java should be installed in Windows machine, to check if Java is installed, start a command prompt and typing in **java -version** Java version show up as below. Incase java not yet install, please install java before process to installation.



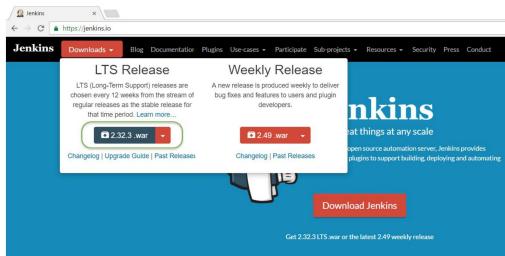
```
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.

C:\Users\TAN>java -version
java version "1.8.0_111"
Java(TM) SE Runtime Environment (build 1.8.0_111-b14)
Java HotSpot(TM) 64-Bit Server VM (build 25.111-b14, mixed mode)

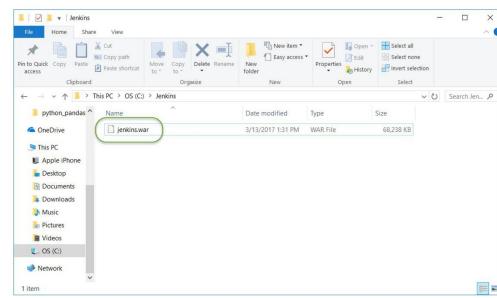
C:\Users\TAN>
```

## Install process

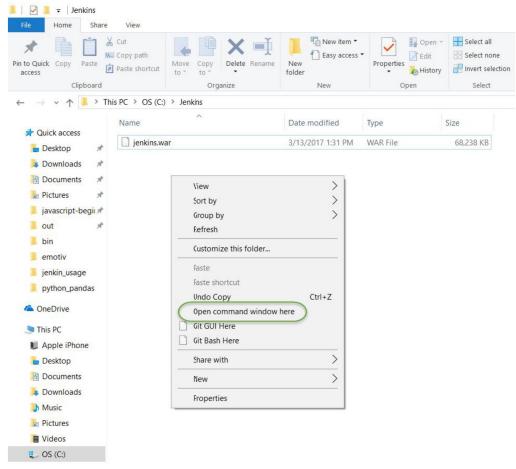
**Step 1 :** Go to <https://jenkins.io/> and download for stable version of Jenkins



**Step 2 :** Create a new folder for Jenkins (for example **C:\Jenkins**) and put file **jenkins.war** inside this folder

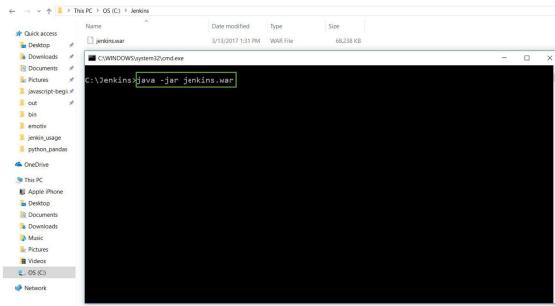


**Step 3 :** Press to shift and right click at same time to open context menu and select **Open command window here**



#### Step 4 : Typing in command prompt following to start installation `java -jar jenkins.war`

Then wait a while for complete running.



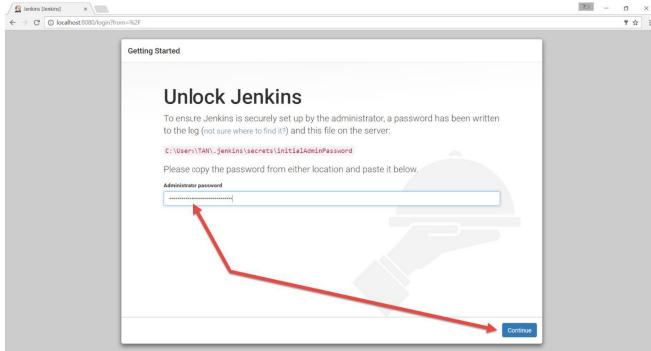
In the output log, you will see default password for first login of admin user, copy this password to notepad and save it for use on next step.

```

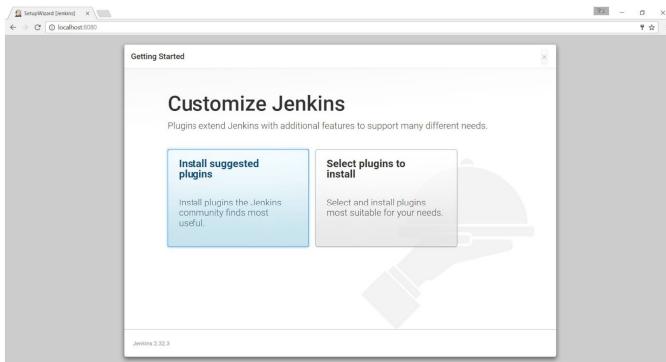
INFO:
*****
***** Jenkins initial setup is required. An admin user has been created and a password generated.
***** Please use the following password to proceed to installation:
***** 6043cce10c554047a3e958b60a4b427b
***** This may also be found at: C:\Users\TAN\.jenkins\secrets\initialAdminPassword
*****

```

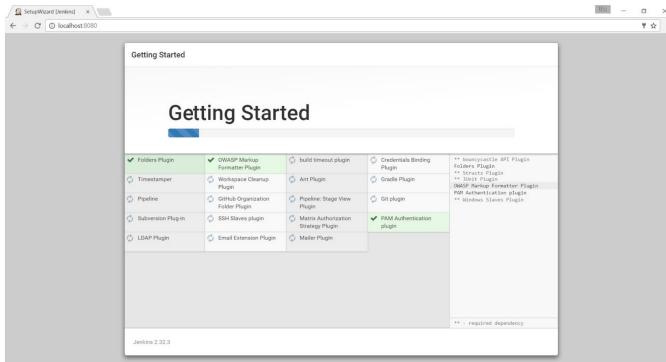
#### Step 5 : Now open browser and access to <http://localhost:8080> and then paste admin password to unlock Jenkins



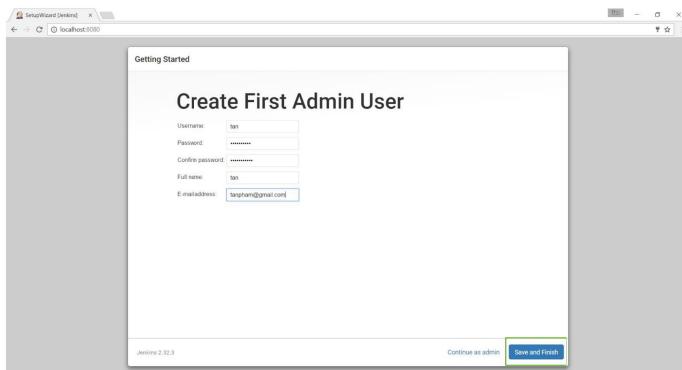
Wait a while and following screen show up, select default option **Install suggested plugins**



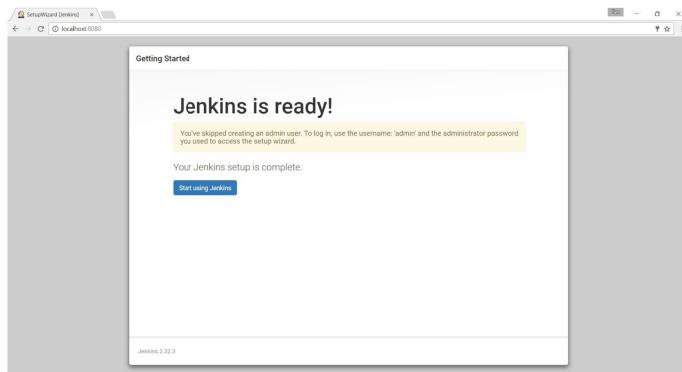
At this step default plugins will be installed.



**Step 6 :** Enter your user name, password for a new admin, then click to **Save and Finish**



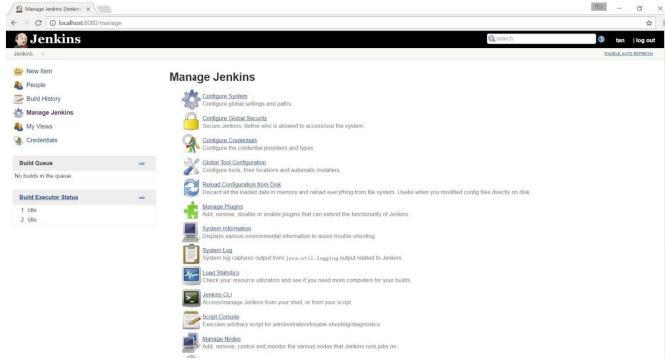
**Step 7 :** Click to **Start using Jenkins**, Congregation at this step you already complete for Jenkins installation



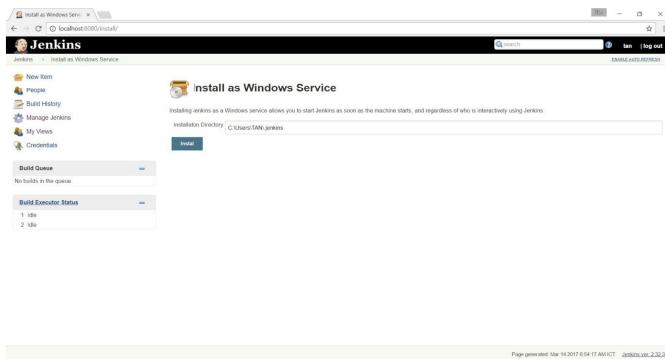
Jenkins auto login by new admin user already created



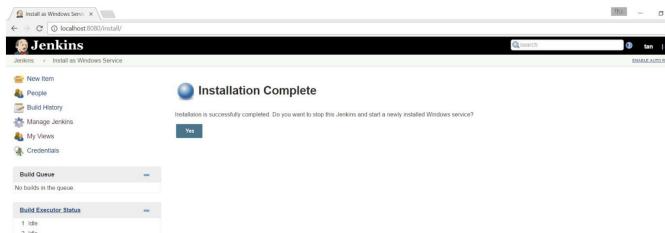
**Step 8 :** Click to **Manage Jenkins** from main screen, scroll down and click to **Install as Windows Service**



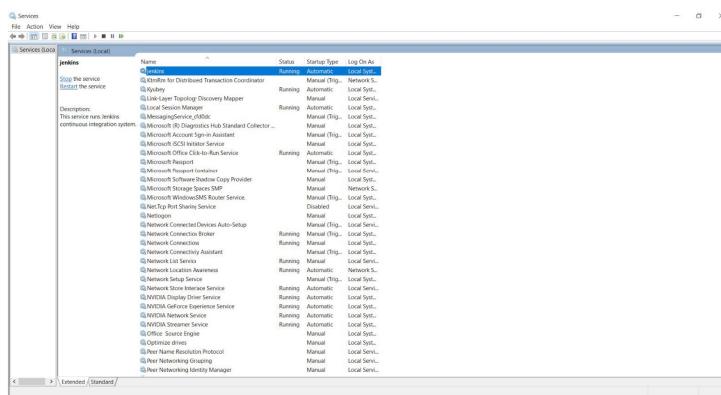
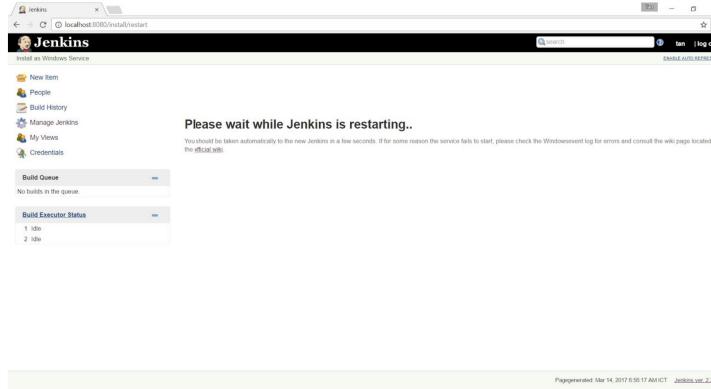
Click to **Install**



Click to **Yes**

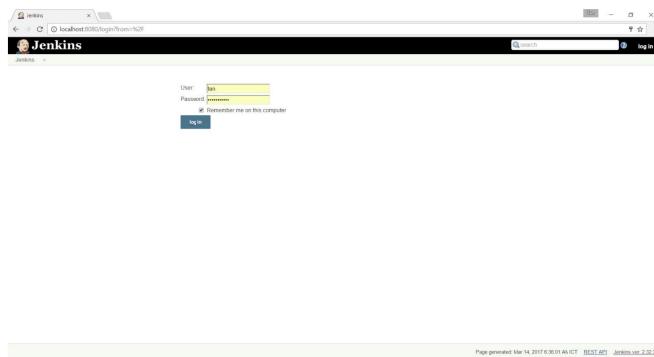


Wait some time and you will see jenkins service is running from windows service manager



That it, You complete install Jenkins on Windows as service. From now on every time Windows power up or restart, Jenkins will ready to access at <http://localhost:8080>

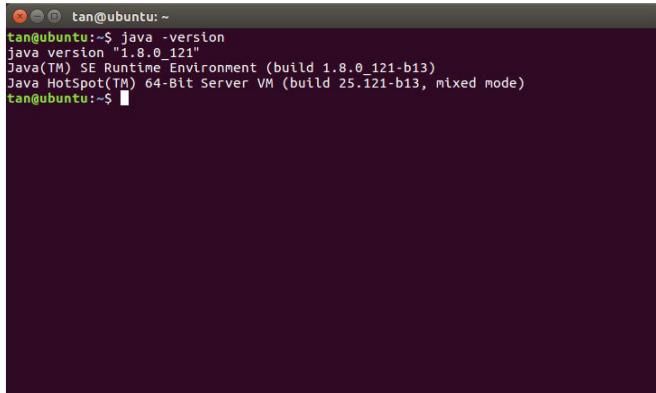
You can try to login Jenkins with above user created.



# Jenkins on Ubuntu

## Check if java is installed

Java should be installed in Ubuntu machine, to check if Java is installed, start a terminal and typing in **java -version** , If Java already installed, you will see Java version show up.

A screenshot of a terminal window on an Ubuntu system. The window title bar says "tan@ubuntu:~". Inside the terminal, the command "java -version" is run, and the output shows Java version 1.8.0\_121 and the Java HotSpot(TM) 64-Bit Server VM build information.

```
tan@ubuntu:~$ java -version
java version "1.8.0_121"
Java(TM) SE Runtime Environment (build 1.8.0_121-b13)
Java HotSpot(TM) 64-Bit Server VM (build 25.121-b13, mixed mode)
tan@ubuntu:~$
```

## Install Process

**Step 1 :** Open terminal and typing in following command

```
wget -q -O - https://pkg.jenkins.io/debian/jenkins-ci.org.key | sudo apt-key add

sudo sh -c 'echo deb http://pkg.jenkins.io/debian-stable binary/ >
/etc/apt/sources.list.d/jenkins.list'

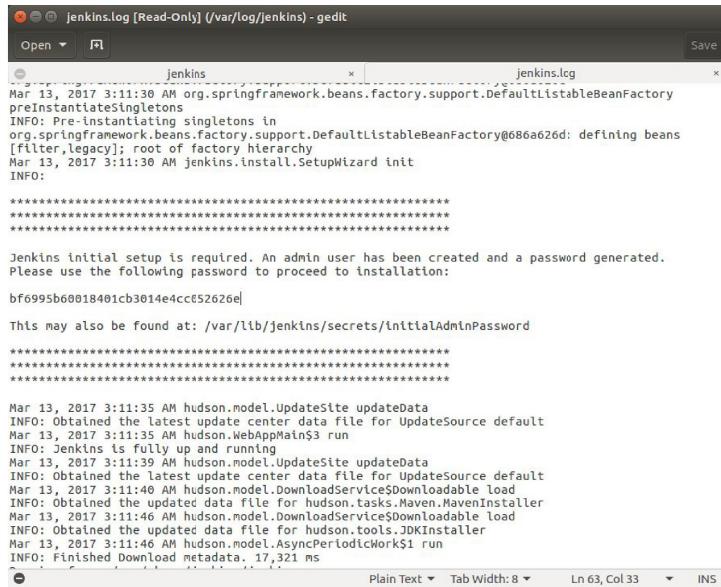
sudo apt-get update

sudo apt-get install jenkins
```

The above code do following job :

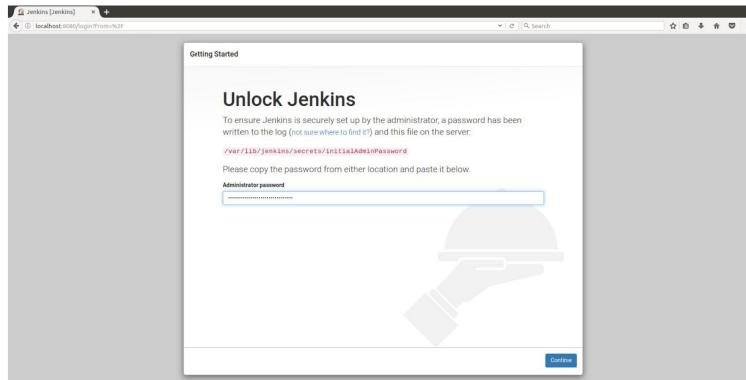
- Jenkins will be launched as a daemon up on start. See /etc/init.d/jenkins for more details.
- The 'jenkins' user is created to run this service.
- Log file will be placed in /var/log/jenkins/jenkins.log. Check this file if you are troubleshooting Jenkins.
- /etc/default/jenkins will capture configuration parameters for the launch like e.g JENKINS\_HOME
- By default, Jenkins listen on port 8080. Access this port with your browser to start configuration.

**Step 2 :** Open the file **/var/log/jenkins/jenkins.log** and copy the default password which is automatically generated during installation

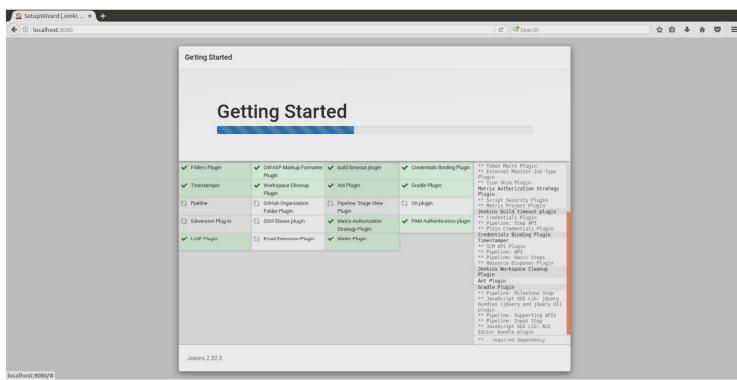
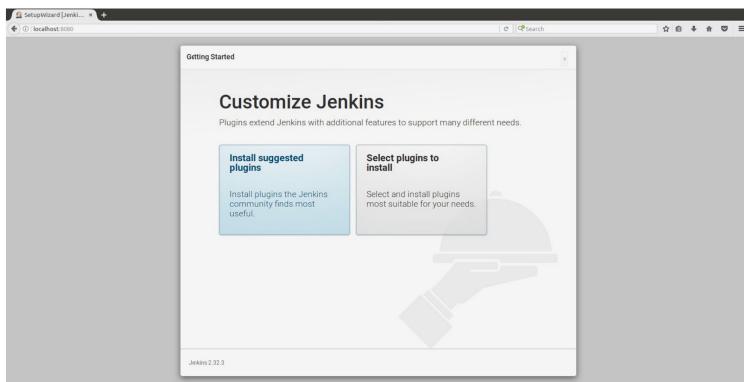


```
jenkins.log [Read-Only] (/var/log/jenkins) - gedit
Open Save
jenkins jenkins.log
Mar 13, 2017 3:11:30 AM org.springframework.beans.factory.support.DefaultListableBeanFactory
preInstantiateSingletons
INFO: Pre-instantiating singletons in
org.springframework.beans.factory.support.DefaultListableBeanFactory@686a626d: defining beans
[filter,legacy]; root of factory hierarchy
Mar 13, 2017 3:11:30 AM jenkins.install.SetupWizard init
INFO:
*****
Jenkins initial setup is required. An admin user has been created and a password generated.
Please use the following password to proceed to installation:
bf6995b60018401cb3014e4cc652626e
This may also be found at: /var/lib/jenkins/secrets/initialAdminPassword
*****
Mar 13, 2017 3:11:35 AM hudson.model.UpdateSite updateData
INFO: Obtained the latest update center data file for UpdateSource default
Mar 13, 2017 3:11:35 AM hudson.WebAppMain$3 run
INFO: Jenkins is fully up and running
Mar 13, 2017 3:11:39 AM hudson.model.UpdateSite updateData
INFO: Obtained the latest update center data file for UpdateSource default
Mar 13, 2017 3:11:40 AM hudson.model.DownloadService$Downloadable load
INFO: Obtained the updated data file for hudson.tasks.Maven.MavenInstaller
Mar 13, 2017 3:11:46 AM hudson.model.DownloadService$Downloadable load
INFO: Obtained the updated data file for hudson.tools.JDKInstaller
Mar 13, 2017 3:11:46 AM hudson.model.AsyncPeriodicWork$1 run
INFO: Finished Download metadata. 17,321 ms
Plain Text Tab Width: 8 Ln 63, Col 33 INS
```

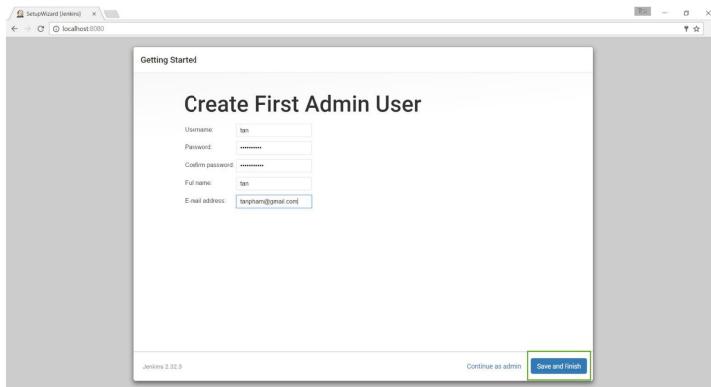
**Step 3 :** Open browser and access to Jenkins at <http://localhost:8080/> then paste the password above to unlock jenkins. Click to **Continue** button



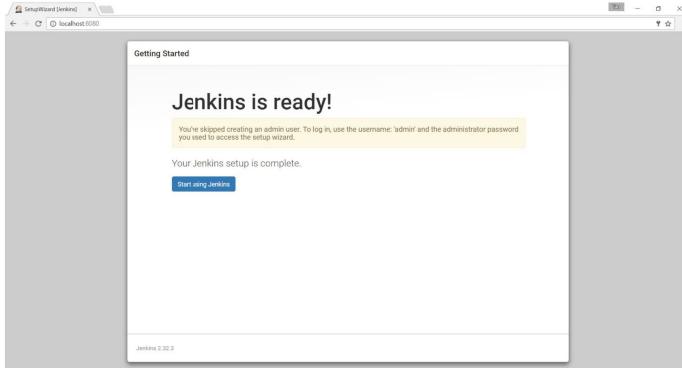
**Step 4 :** Click on **Install suggested plugins**



**Step 5 :** Enter your user name, password for a new admin.



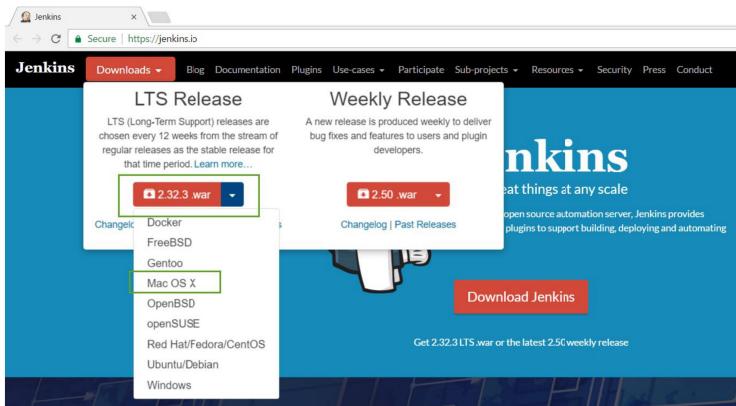
**Step 6 :** That it, now jenkins ready to use, click to ***Start using Jenkins***



From now Jenkins already installed in Ubuntu as daemon service, so every time you power on machine, Jenkins will start and ready to access at <http://localhost:8080/>

## Jenkins on Mac

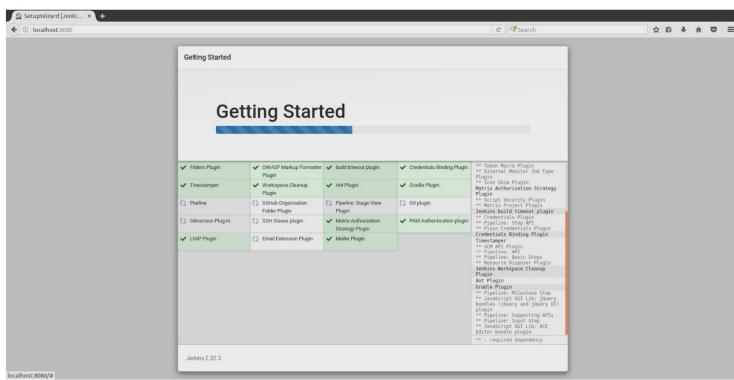
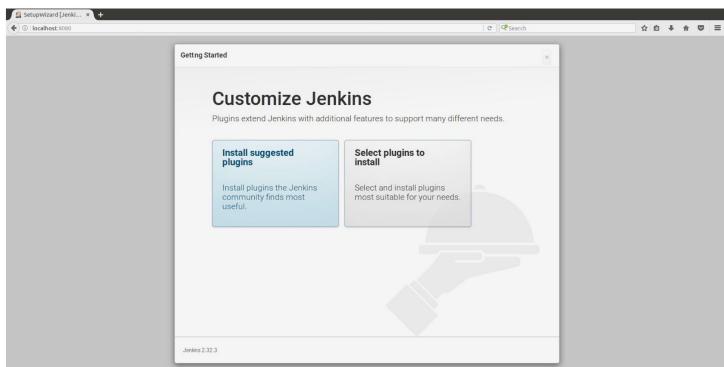
**Step 1 :** Download installer for Mac from <https://jenkins.io/> . Then run the installer file.



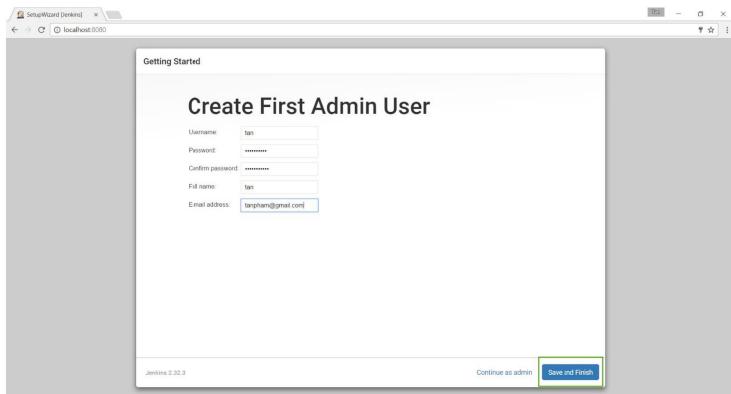
**Step 2 :** After complete install, you access Jenkins at <http://localhost:8080/>

**Step 3 :** Open file **/Users/Shared/Jenkins/Home/secrets/initialAdminPassword** and copy password use for unlock Jenkins

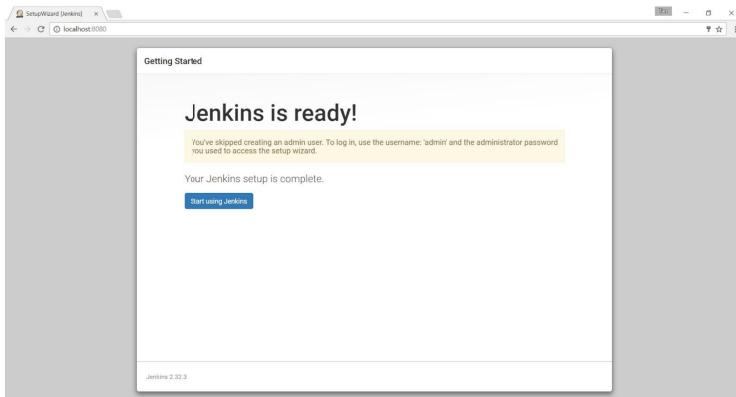
**Step 4 :** Click on *Install suggested plugins*



**Step 5 :** Enter your user name, password for a new admin.



**Step 6 :** That it, now jenkins ready to use, click to ***Start using Jenkins***



From now Jenkins already installed in Mac as a service, so every time you power on machine, Jenkins will start and ready to access at <http://localhost:8080/>

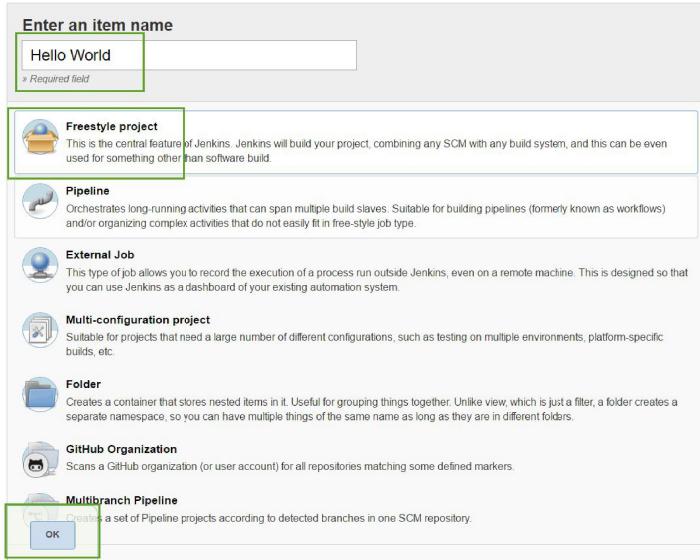
## Jenkins the Basic

In this section I will explain Jenkins role in the world of continuous integration, continuous delivery and devops. And then we will go through steps in order to create “Hello World” Jenkins job.

### Create “Hello world” Job

From Jenkins home page, click to **New Item**

In create project page, typing in “Hello World” to project name, select **Freestyle project** and then click to save button.



## Add Build Step

In configure job page, select **Build** tab, click to **Add build step** and select **Execute Windows batch command** (in case you are using Linux please select **Execute shell**)

Typing in command “echo Hello World”. The purpose of this job is just echo to log message “Hello World” text.



Click **Save** button and we complete the first job!

## Start the First Build

From job dashboard, click **Build Now** and you will see job run. This job just do one thing, invoke the command "echo hello world"

A screenshot of the Jenkins project dashboard for 'Hello World'. The top navigation bar shows 'Hello World [Jenkins]'. The main content area has a 'Jenkins' logo and the title 'Project Hello World'. On the left, there's a sidebar with links: 'Back to Dashboard', 'Status', 'Changes', 'Workspace', 'Build Now' (which is highlighted with a green border), 'Delete Project', 'Configure', and 'Move'. To the right, there are two sections: 'Workspace' (with a folder icon) and 'Recent Changes' (with a document icon). At the bottom, there's a 'Permalinks' section with a 'Build History' table and RSS feed links for 'RSS for all' and 'RSS for failures'.

The screenshot shows the Jenkins interface for the 'Hello World' project. At the top, there's a navigation bar with links for 'Back to Dashboard', 'Status', 'Changes', 'Workspace', 'Build Now', 'Delete Project', 'Configure', and 'Move'. Below this is a section titled 'Project Hello World' with a 'Workspace' link and a 'Recent Changes' link. A 'Permalinks' section follows. On the left, a 'Build History' panel displays a single build entry: '#1 Mar 19, 2017 9:14 PM'. At the bottom of the history panel are 'RSS for all' and 'RSS for failures' links.

## Console Output

Now job run completely, click to build number and select **Console Output**. You will see message "Hello World" show up inside build log. That it you just complete the first Jenkins job.

This screenshot is identical to the one above, but it includes a callout box highlighting the 'Console Output' option in the dropdown menu that appears when hovering over the '#1' build entry in the 'Build History' list.

The screenshot shows the Jenkins interface for a 'Hello World' project. The left sidebar has links for 'Back to Project', 'Status', 'Changes', 'Console Output' (which is selected and highlighted in blue), 'View as plain text', 'Edit Build Information', and 'Delete Build'. The main area is titled 'Console Output' and shows the following log:

```

Started by user tan
Building in workspace C:\Users\TAN\jenkins\workspace\Hello World
[Hello World] $ cd /c /call C:\Windows\TEMP\hudson914128556312016941.bat
C:\Users\TAN\jenkins\workspace\Hello World>echo Hello World
Hello World
C:\Users\TAN\jenkins\workspace\Hello World>exit 0
Finished: SUCCESS

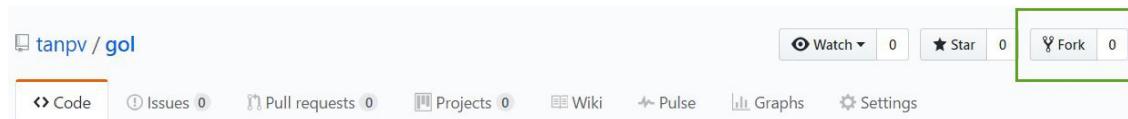
```

## Intro GOL Project (or World without Jenkins)

In this book, project called GOL (game of life) is used to express the features related to Jenkins. So it will be helpful to review some information related to this project.

### Git Installation and Clone GOL Repository

GOL project is hosted on Github at <https://github.com/tanpv/gol>. Please **fork** this repo to your Github account so you can try Jenkins features by yourself later.



To install Git, download software at <https://git-scm.com/>, and install with default option.

After install, open a cmd prompt and typing in **git --help** to check if install successfully

The screenshot shows a Windows Command Prompt window. The title bar says 'Command Prompt'. The command 'git --help' is run, displaying the usage information for the Git command-line interface. The output includes various options and sub-commands available.

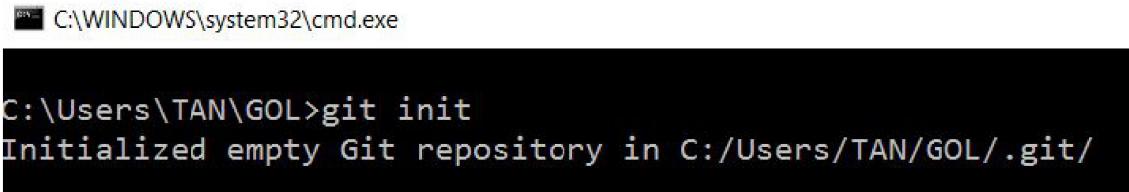
```

Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.

C:\Users\TAN>git --help
usage: git [--version] [--help] [-C <path>] [-c name=value]
           [--exec-path[=<path>]] [--html-path] [--man-path] [--info-path]
           [-p | --paginate | --no-pager] [--no-replace-objects] [--bare]
           [--git-dir=<path>] [--work-tree=<path>] [--namespace=<name>]
           <command> [<args>]

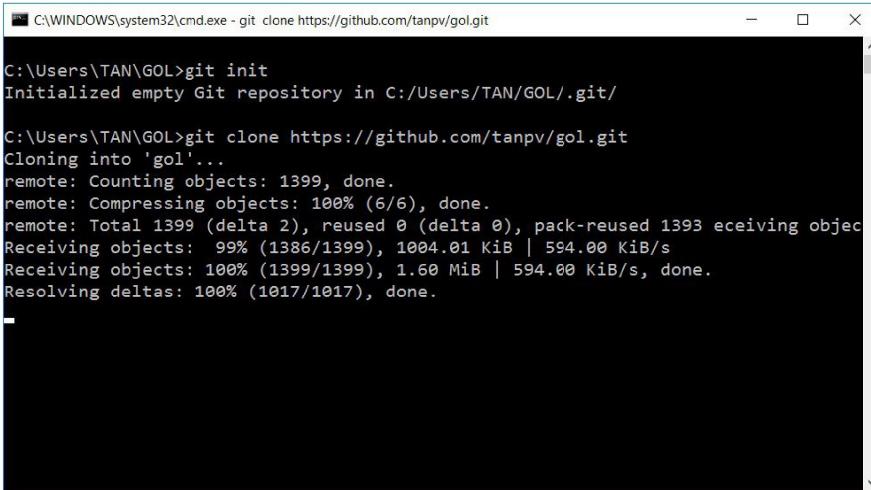
```

Now create a folder name GOL and init it with command **git init**



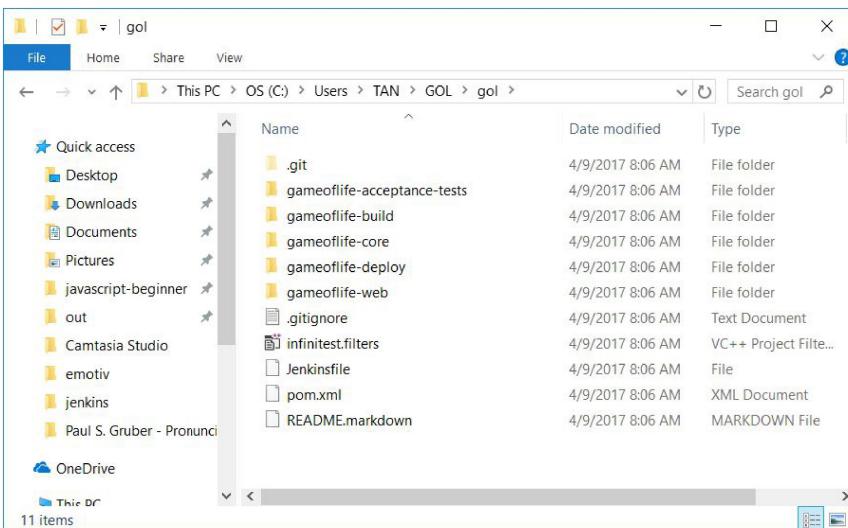
```
C:\Users\TAN\GOL>git init
Initialized empty Git repository in C:/Users/TAN/GOL/.git/
C:\Users\TAN\GOL>git clone https://github.com/tanpv/gol.git
```

And finally, clone the repo from Github to local with command **git clone**  
<https://github.com/tanpv/gol.git>



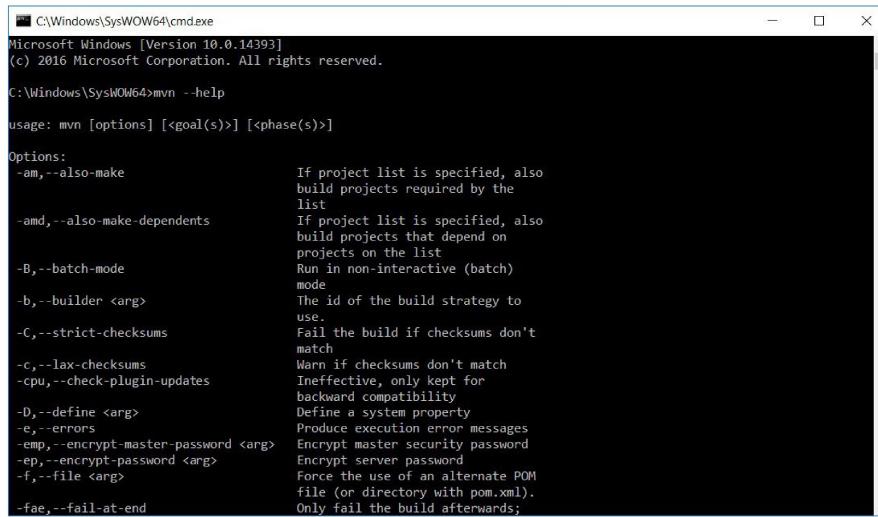
```
C:\Users\TAN\GOL>git init
Initialized empty Git repository in C:/Users/TAN/GOL/.git/
C:\Users\TAN\GOL>git clone https://github.com/tanpv/gol.git
Cloning into 'gol'...
remote: Counting objects: 1399, done.
remote: Compressing objects: 100% (6/6), done.
remote: Total 1399 (delta 2), reused 0 (delta 0), pack-reused 1393 receiving objects
Receiving objects: 99% (1386/1399), 1004.01 KiB | 594.00 KiB/s
Receiving objects: 100% (1399/1399), 1.60 MiB | 594.00 KiB/s, done.
Resolving deltas: 100% (1017/1017), done.
```

And finally, you will see GOL project is completely clone to local



# Maven Installation

First step, maven should be installed in machine which running Jenkins job. To check this, just open command prompt and typing in **mvn --help**, you will see some all available maven command.



```
C:\Windows\SysWOW64\cmd.exe
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.

C:\Windows\SysWOW64>mvn --help

usage: mvn [options] [<goal(s)>] [<phase(s)>]

Options:
-am,--also-make           If project list is specified, also
                          build projects required by the
                          list
-amd,--also-make-dependents   If project list is specified, also
                          build projects that depend on
                          projects on the list
-B,--batch-mode          Run in non-interactive (batch)
                          mode
-b,--builder <arg>       The id of the build strategy to
                          use
-C,--strict-checksums    Fail the build if checksums don't
                          match
-c,--lax-checksums       Warn if checksums don't match
                          Ineffective, only kept for
                          backward compatibility
-cpu,--check-plugin-updates Define a system property
-D,--define <arg>        Define a system property
-e,--errors              Produce execution error messages
-emp,--encrypt-master-password <arg> Encrypt master security password
-ep,--encrypt-password <arg> Encrypt server password
-f,--file <arg>          Force the use of an alternate POM
                          file (or directory with pom.xml).
-fae,--fail-at-end      Only fail the build afterwards;
```

In case maven not yet install follow these steps to do maven installation (for Window)

- Download maven from link <http://maven.apache.org/download.cgi>

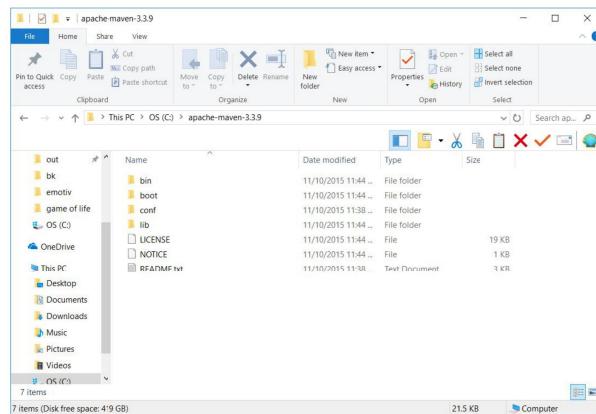
## Files

Maven is distributed in several formats for your convenience. Simply pick a ready-made binary distribution archive and follow the [Installation instructions](#). Use a source archive if you intend to build Maven yourself.

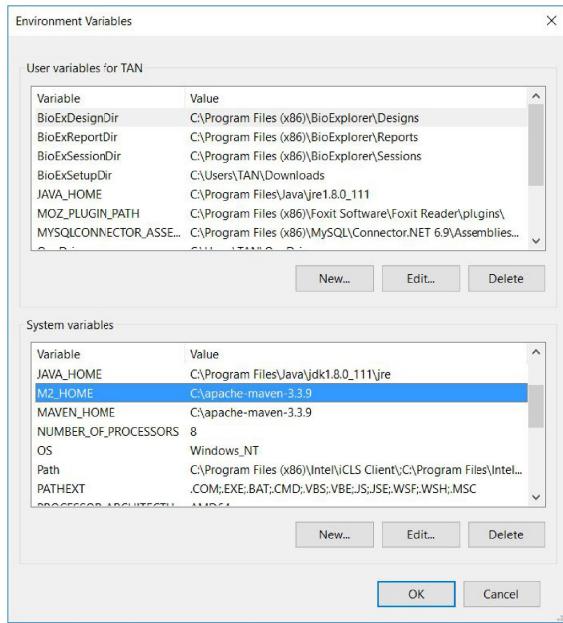
In order to guard against corrupted downloads/installations, it is highly recommended to verify the signature of the release bundles against the public [KEYS](#) used by the Apache Maven developers.

Link	Checksum	Signature
Binary tar.gz archive	apache-maven-3.3.9-bin.tar.gz	apache-maven-3.3.9-bin.tar.gz.md5
Binary zip archive	apache-maven-3.3.9-bin.zip	apache-maven-3.3.9-bin.zip.md5
Source tar.gz archive	apache-maven-3.3.9-src.tar.gz	apache-maven-3.3.9-src.tar.gz.md5
Source zip archive	apache-maven-3.3.9-src.zip	apache-maven-3.3.9-src.zip.md5

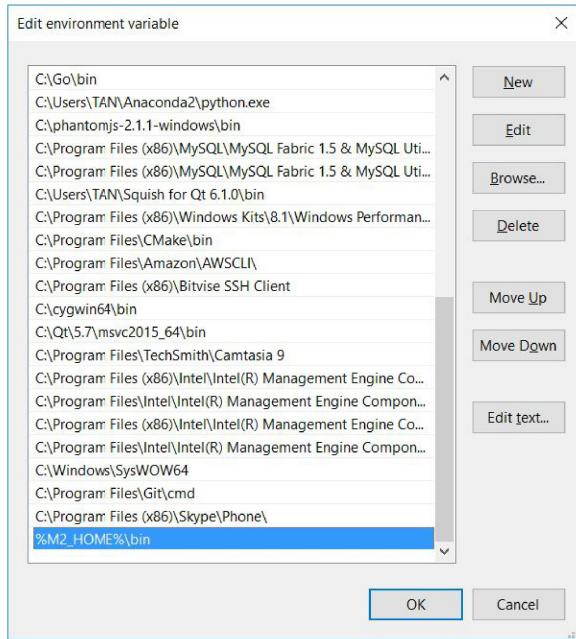
- Unzip zip file to one folder (for example I unzip to C:\apache-maven-3.3.9)



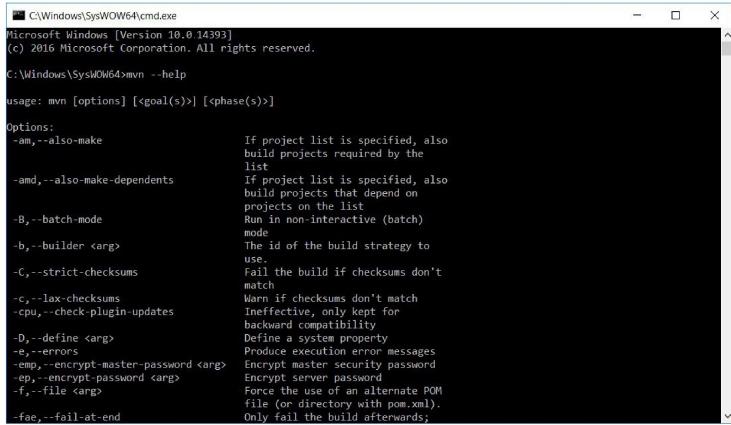
- Add M2\_HOME and MAVEN\_HOME variable point to above folder



- Add mavin bin to Path variable so you can call maven from any place



That it, to check maven installed successfully, open cmd and typing in ***mvn --help***  
Help content for mvn should show up correctly



```
C:\Windows\SysWOW64\cmd.exe
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.

C:\Windows\SysWOW64>mvn --help

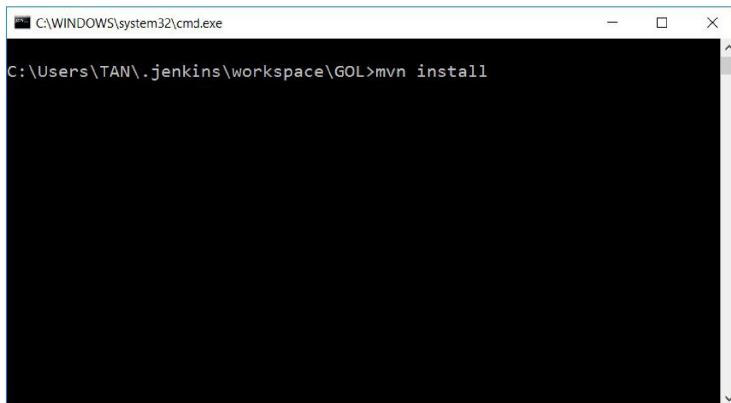
usage: mvn [options] [<goal(s)>] [<phase(s)>]

Options:
  -am,--also-make           If project list is specified, also
                           build projects required by the
                           list
  -amd,--also-make-dependents If project list is specified, also
                           build projects that depend on
                           projects on the list
  -B,--batch-mode           Run in non-interactive (batch)
                           mode
  -b,--builder <arg>        The id of the build strategy to
                           use.
  -C,--strict-checksums    Fail the build if checksums don't
                           match
  -c,--lax-checksums       Warn if checksums don't match
  -cpu,--check-plugin-updates Ineffective, only kept for
                           backward compatibility
  -D,--define <arg>         Define a system property
  -e,--errors               Produce execution error messages
  -emp,--encrypt-master-password <arg> Encrypt master security password
  -ep,--encrypt-password <arg> Encrypt server password
  -f,--file <arg>           Force the use of an alternate POM
                           file (or directory with pom.xml).
  -fae,--fail-at-end        Only fail the build afterwards;
```

## Run Maven Build Manually

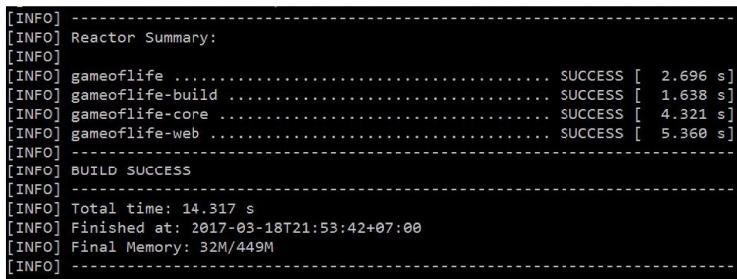
Now maven is ready, we can try to run the build for source code which we just clone from Github repository at **source code management** step.

Open **cmd** and change directory to repository GOL folder. And then typing in **mvn install**. This command will run java source unit test and then build this web application to a .war file



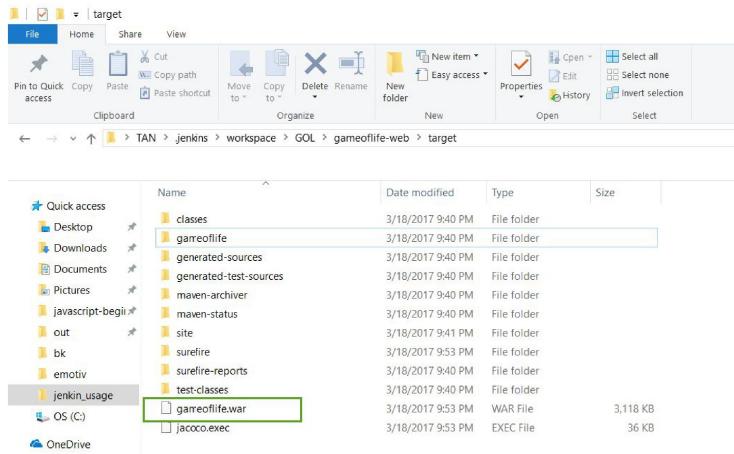
```
C:\WINDOWS\system32\cmd.exe
C:\Users\TAN\.jenkins\workspace\GOL>mvn install
```

You will build result from command prompt



```
[INFO] -----
[INFO] Reactor Summary:
[INFO]
[INFO] gameoflife ..... SUCCESS [ 2.696 s]
[INFO] gameoflife-build ..... SUCCESS [ 1.638 s]
[INFO] gameoflife-core ..... SUCCESS [ 4.321 s]
[INFO] gameoflife-web ..... SUCCESS [ 5.360 s]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 14.317 s
[INFO] Finished at: 2017-03-18T21:53:42+07:00
[INFO] Final Memory: 32M/449M
[INFO] -----
```

And can see actual .war file inside target folder of **gameoflife-web**. This folder could be used to deploy with web application server.



## Install Tomcat Server as Service

To install Tomcat 7 server, you just follow these steps:

- Download Tomcat 7 from this page <http://tomcat.apache.org/download-70.cgi>, note that we will download version [Windows Service Installer](#) so Tomcat will be installed as window service

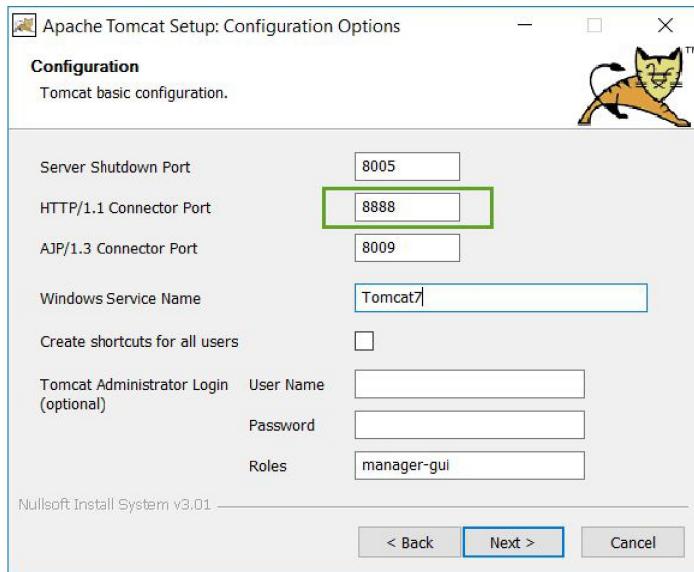
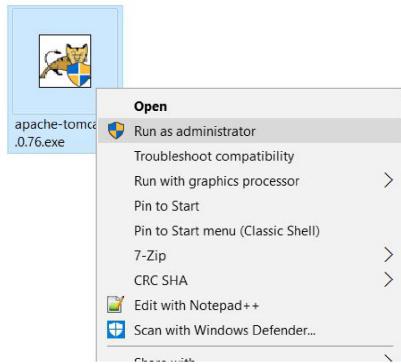
7.0.76

Please see the [README](#) file for packaging information. It explains what every distribution contains.

**Binary Distributions**

- Core:
  - zip (pgp, md5, sha1)
  - tar.gz (pgp, md5, sha1)
  - 32-bit Windows zip (pgp, md5, sha1)
  - 64-bit Windows zip (pgp, md5, sha1)
  - 32-bit/64-bit Windows Service Installer (pgp, md5, sha1)
- Full documentation:
  - tar.gz (pgp, md5, sha1)
- Deployer:
  - zip (pgp, md5, sha1)
  - tar.gz (pgp, md5, sha1)
- Extras:
  - JMX Remote jar (pgp, md5, sha1)
  - Web services jar (pgp, md5, sha1)
  - JULI adapters jar (pgp, md5, sha1)
  - JULI log4j jar (pgp, md5, sha1)
- Embedded:
  - tar.gz (pgp, md5, sha1)
  - zip (pgp, md5, sha1)

- Run installer and select port 8888 for running Tomcat (We already use 8080 for Jenkins installation)



- After install successfully, a Tomcat service will running and you can access Tomcat server from localhost

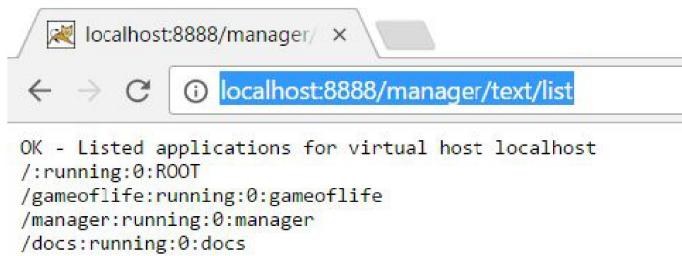
Name	Status	Startup Type	Log On As
Apache Tomcat 7.0 Tomcat7	Running	Automatic	Local Syst...
Stop the service			
Restart the service			
Description:			
Apache Tomcat 7.0.75 Server - http://tomcat.apache.org/			

- To control Tomcat from Jenkins, one user with role "manager-script" should be added to file **conf/tomcat-users.xml**. Then restart Tomcat server by service.

```
tomcat-users.xml [3]
1 <?xml version='1.0' encoding='cp1252'?>
2 <!--
3   Licensed to the Apache Software Foundation (ASF) under one or more
4   contributor license agreements. See the NOTICE file distributed with
5   this work for additional information regarding copyright ownership.
6   The ASF licenses this file to You under the Apache License, Version 2.0
7   ('the "License"); you may not use this file except in compliance with
8   the License. You may obtain a copy of the License at
9
10    http://www.apache.org/licenses/LICENSE-2.0
11
12 Unless required by applicable law or agreed to in writing, software
13 distributed under the License is distributed on an "AS IS" BASIS,
14 WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
15 See the License for the specific language governing permissions and
16 limitations under the License.
17 -->
18
19 <tomcat-users>
20   <role rolename="manager-script"/>
21   <user username="admin" password="admin" roles="manager-script"/>
22 </tomcat-users>
```

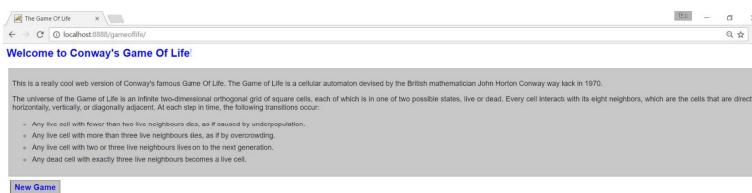
Services (Local)	Name	Status	Startup Type	Log On As
<b>Apache Tomcat 7.0 Tomcat7</b>	Apache Tomcat 7.0 Tomcat7	Running	Automatic	Local Syst...
<a href="#">Stop the service</a>	Start	unning	Manual (Trigger Start)	Local Servi...
<a href="#">Restart the service</a>	Stop	unning	Automatic	Local Syst...
	Pause	unning	Automatic	Local Syst...
	Resume	unning	Automatic	Network S...
	<b>Restart</b>	unning	Manual	Network S...
	All Tasks	>	Automatic (Trigger Start)	Local Syst...
	Refresh	unning	Automatic	Local Syst...
	<b>Properties</b>	unning	Automatic (Delayed Start)	Local Syst...
	Help	unning	Manual (Trigger Start)	Local Servi...
Apache Tomcat 7.0.75 Server	Running	Manual	Local Syst...	
<a href="http://tomcat.apache.org/">http://tomcat.apache.org/</a>	Running	Manual	Local Servi...	
	Secure Socket Tunneling Protocol Service	Running	Manual	Local Servi...
	SSDP Discovery	Running	Manual	Local Servi...

To check if admin user working, access to <http://localhost:8888/manager/text/list> and then put on user / password you just specify



# Deploy GOL to Tomcat Server

Deploy this application to Tomcat server, and you will see some the app from browser and actually start a new game !.





## Continuous Integration with Jenkins

This chapter will show you how to automate software build with Jenkins.

### Jenkins in the Big Picture of CI, CD and DevOps

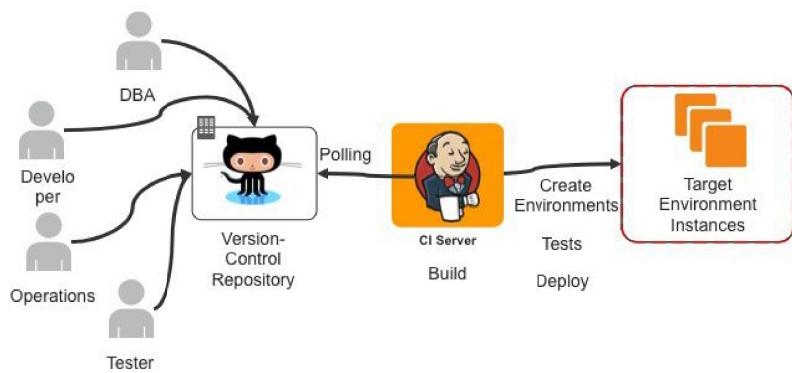
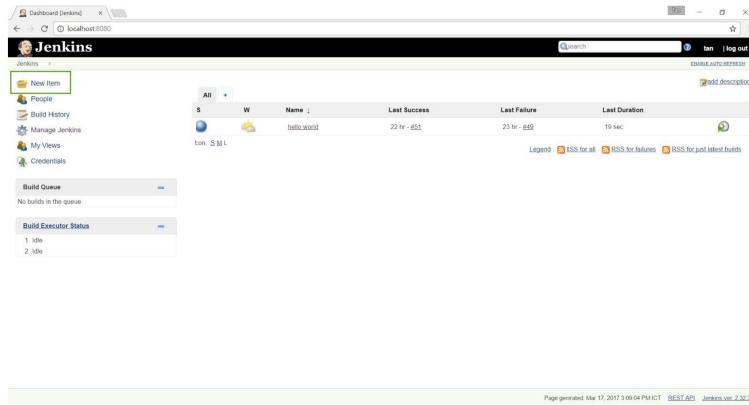


Image above show quite clear about Jenkins role in software development process.

- Developer do coding and commit their code to a version control repository like Github
- Jenkins actively check Github to see if have any change, in case has code change, Jenkins will pull the last code from Github to build machine (machine which run Jenkins job)
- Jenkins build software artifact from pulled source code (for example war file from .java source file)
- Jenkins run and show up unit test report
- Jenkins deploy artifact to target environment (for example a web server like : Tomcat, JBoss, WebSphere...)

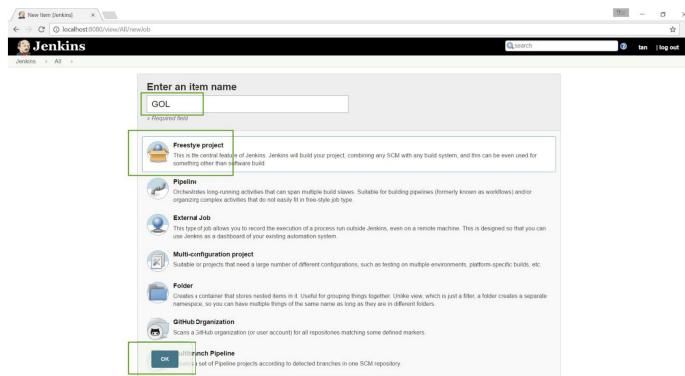
### Create GOL Job

From home page, click to **New Item** link



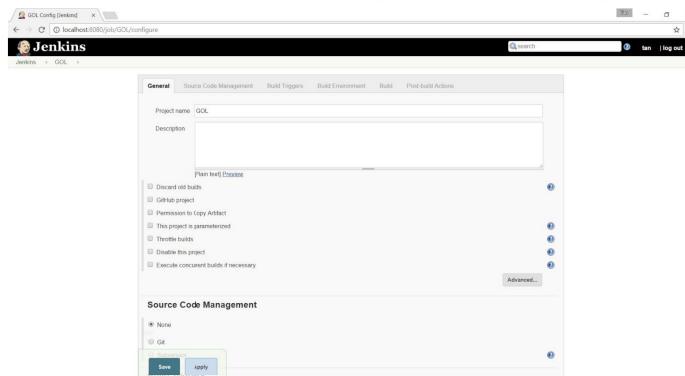
The screenshot shows the Jenkins dashboard. On the left sidebar, there is a 'New Item' link under the 'People' section, which is highlighted with a green box. The main content area displays a table of build jobs, with one job named 'hello world' listed. The bottom of the page includes standard footer links like 'Page generated...', 'REST API...', and 'Jenkins ver. 2.32.3'.

Enter **GOL** for project name and then chose **Freestyle project** and finally click to **OK** button to create a new job with name is **GOL**



The screenshot shows the 'New Item' creation dialog. In the 'Enter an item name' field, 'GOL' is typed. Below the field, a 'Freestyle project' option is selected, indicated by a green box. A tooltip for 'Freestyle project' explains it's suitable for building projects using SCM and build systems. At the bottom right, the 'OK' button is highlighted with a green box.

Then a new screen will show up allow us to configure everything for **GOL** job.

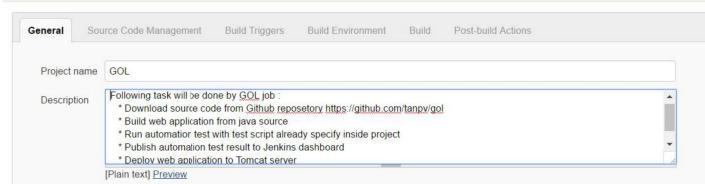


The screenshot shows the 'GOL Config' configuration page. The 'General' tab is selected. In the 'Project name' field, 'GOL' is entered. Under 'Description', there is a text area with placeholder text 'Plan next [branches]'. Below this, several build triggers are listed with checkboxes: 'Discard old builds', 'GitHub project', 'Permission to copy Artifact', 'This project is parameterized', 'Throttle builds', 'Delete this project', and 'Execute concurrent tasks if necessary'. At the bottom, there are 'Save' and 'Apply' buttons.

**Description** is place to describe what mission of this job and steps inside the job. Put follow text into **Description** session.

“ Following task will be done by GOL job :

- Check change on Github repo and automatically download source code from Github repository <https://github.com/tanpv/gol>
- Build web application from java source
- Run automation test with test script already specify inside project
- Publish automation test result to Jenkins dashboard
- Deploy web application to Tomcat server ”



## Source Code Management

Purpose of this part is answer for question **Where to get source code ?** for our software build. From job configure, click into **Source Code Management** tab



## Check if git is installed in local machine

In order to clone source code from Github, local machine should install Git.

To check if local machine already install **git** or not, open command prompt and typing  
**git --help**

```
C:\Windows\SysWOW64\cmd.exe
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.

C:\Windows\SysWOW64>git --help
usage: git [-v] [--help] [-C <path>] [-c name=value]
           [-e <path>] [-H <path>] [-M <path>] [-I <path>]
           [-p] [-P] [-n] [-N] [-r] [-R] [-B <name>]
           [-d <path>] [<command> [<args>]]

These are common Git commands used in various situations:

start a working area (see also: git help tutorial)
  clone   Clone a repository into a new directory
  init    Create an empty Git repository or reinitialize an existing one

work on the current change (see also: git help everyday)
  add     Add file contents to the index
  mv      Move or rename a file, a directory, or a symlink
  reset   Reset current HEAD to the specified state
  rm      Remove files from the working tree and from the index

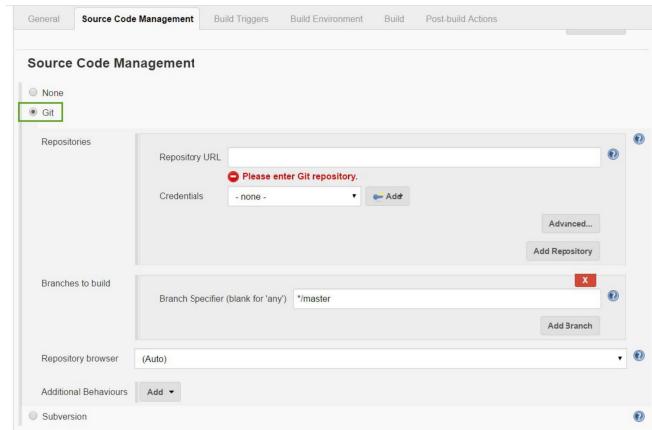
examine the history and state (see also: git help revisions)
  bisect  Use binary search to find the commit that introduced a bug
  grep    Print lines matching a pattern
  log    Show commit logs
  show   Show various types of objects
  status  Show the working tree status

grow, mark and tweak your common history
  commit  Record changes to the repository
  merge  Join two or more development histories together
  rebase  Rewrite the local history while保留远程历史记录
```

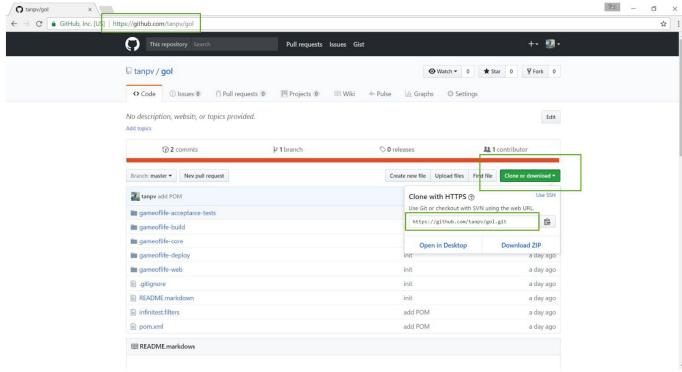
To download and install git, please refer to this link <https://git-scm.com/downloads>

## Specify source code repository

Because we host project source code on Github, so you will choose **Git** as below.



To get repo link, go to Github <https://github.com/tanpv/gol> then click to **Clone or download** button, you will see the repo link. Copy this link.



Put the repo link <https://github.com/tanpv/gol.git> in to **Repository URL** section. The branch will be default as **\*/master**

Click to **Save** button and that it, we already tell to Jenkins where to get source code.

Check if setting working fine

This is the time to try for first running and see if source code from Github is clone or not.  
Go back to home page then click to GOL job

The dashboard for GOL will show up, you will see describe which we just added before

The screenshot shows the Jenkins Project GOL dashboard. On the left, there is a sidebar with links: Back to Dashboard, Status, Changes, Workspace, Build Now (which is highlighted with a green border), Delete Project, Configure, and Move. The main content area is titled "Project GOL" and contains a list of tasks: Download source code from Github repository https://github.com/tanpv/gol, Build web application from java source, Run automation test with test script already specify inside project, Publish automation test result to Jenkins dashboard, and Deploy web application to Tomcat server. Below this is a "Build History" section with a search bar and RSS links.

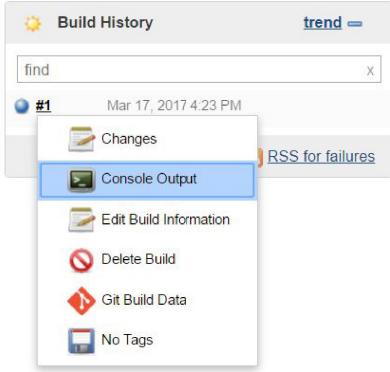
Click in to **Build Now** to activate job run immediately.

The screenshot shows the Jenkins Project GOL dashboard after a build has been triggered. The "Build Now" button in the sidebar is now grayed out, indicating it has been used. The main content area shows a single build entry: "#1 Mar 17, 2017 4:23 PM". A progress bar indicates the build is in progress. Below the build history is a "Build History" section with a search bar and RSS links.

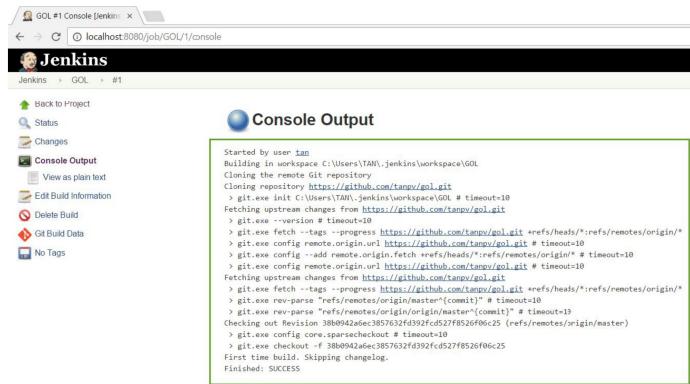
You will see GOL start running as expected

The screenshot shows the Jenkins Build History page. It displays one build entry: "#1 Mar 17, 2017 4:23 PM". The status of the build is shown as a blue progress bar. Below the build history is a "Build History" section with a search bar and RSS links.

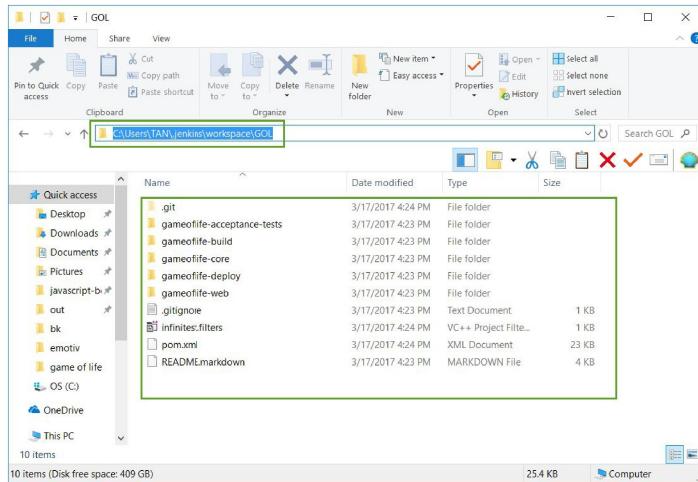
To see how job running, select **Console Output** from context menu while you click to build number



Then the job log will show up every thing happen in order to clone source code from Github repository. You can see that the build already success running.

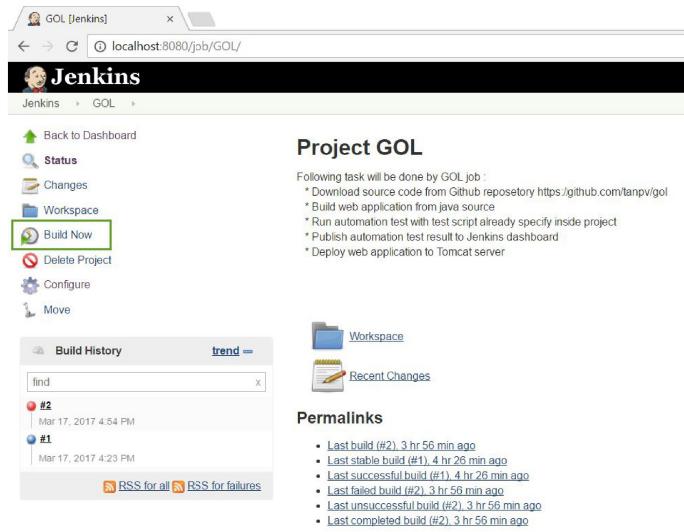


Now we could go to local repository to see the source code already downloaded. Each job will have it's own folder inside **workspace** folder



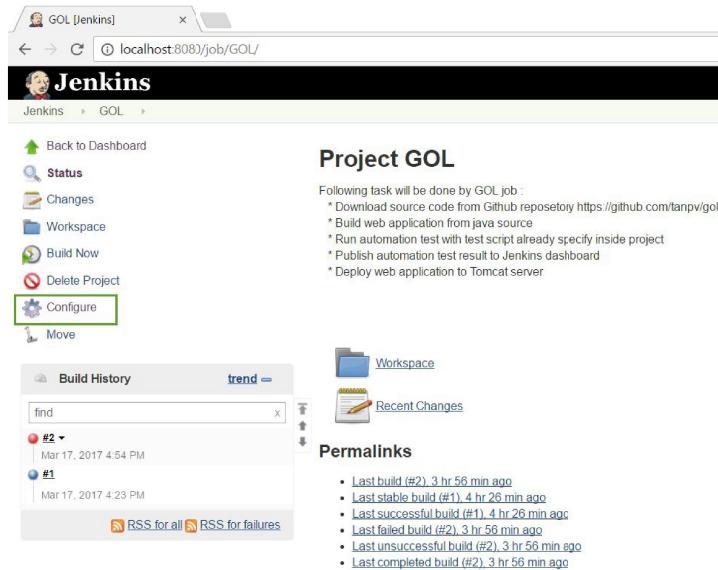
That it, we complete the first step of this job.

## Build Triggers



The screenshot shows the Jenkins Project GOL dashboard. On the left, there is a sidebar with links: Back to Dashboard, Status, Changes, Workspace, Build Now (which is highlighted with a green border), Delete Project, Configure, and Move. Below the sidebar is a 'Build History' section with two entries: #2 (Mar 17, 2017 4:54 PM) and #1 (Mar 17, 2017 4:23 PM). At the bottom of the history section are links for RSS feeds. To the right of the sidebar, there is a 'Project GOL' summary with sections for Workspace, Recent Changes, and Permalinks. The Permalinks section lists various build logs.

The first way and most simple way to start LOG job is just click in to **Build Now** button. But this way is manually and not so cool. We want to trigger Jenkins job running automatically, so to do this, click to **Configure** from LOG dashboard.

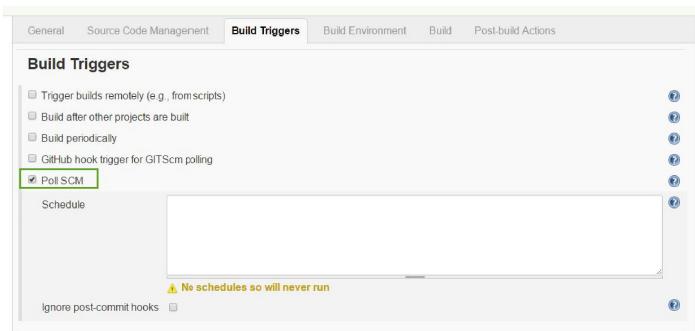


This screenshot is identical to the one above, showing the Jenkins Project GOL dashboard. The 'Configure' button in the sidebar is highlighted with a green border. The rest of the interface, including the build history, workspace, and permalinks sections, remains the same.

Then select to **Build Triggers** tab you will some option to configure so job could trigger automatically



Have 5 ways to automate trigger Jenkins job as show above. In this book I will focus on **Poll SCM**, the good way in configure for a continuous system. Now you click on **Poll SCM**, you will see a text box show up for setting schedule



So following are steps show up how **Poll SCM** work :

- Base on schedule setting, Jenkins will actively check Github repository to see if have any change from repository
- If have any change on Github repo Jenkins job will trigger

Entry	Description	Equivalent To
@yearly (or @annually)	Run once a year at midnight in the morning of January 1	0 0 1 1 *
@monthly	Run once a month at midnight in the morning of the first of the month	0 0 1 * *
@weekly	Run once a week at midnight in the morning of Sunday	0 0 * * 0
@daily	Run once a day at midnight	0 0 * * *
@hourly	Run once an hour at the beginning of the hour	0 * * * *
@reboot	Run at startup	@reboot

\* \* \* \* \* command to be executed

day of week (0 - 7) (0 or 7 are Sunday, or use names)  
month (1 - 12)  
day of month (1 - 31)  
hour (0 - 23)  
min (0 - 59)

Schedule with **Poll SCM** work follow cron schedule rule, above image show some cron schedule example. Basically, we want to catch the change on Github repository as soon as possible, so follow text will be add to **Schedule** \* \* \* \* \*. This mean we want to check change on Github every minute !

Click to **Save** and Jenkins will move you back to job dashboard



Now is the time to check if this setting really work ?

I will go to my GOL project repo on Github and change content of file **README.markdown** right from web browser (Github support commit change right from web browser)

File	Commit Message	Time Ago
temp add POM	temp add POM	a day ago
gantfile-acosance-tests		a day ago
gantfile-build		a day ago
gantfile-core		a day ago
gantfile-deploy		a day ago
gantfile-web		a day ago
.gitignore		a day ago
README.markdown	temp add POM	a day ago
infobest.filters	temp add POM	a day ago
pom.xml	temp add POM	a day ago
README.markdown		

The screenshot shows a GitHub repository page for 'tanpv/gol'. A pull request is open for the 'gol' branch. The commit message in the dialog box is 'Test change'. The 'Commit changes' button is highlighted with a red arrow.

Now come back to job dash board, wait for about 1 minute, you will see new job is planning and run.

The Jenkins dashboard for 'Project GOL' shows the following information:

- Build History:**
  - #4 (pending—In the quiet period. Expires in 1.4 sec)
  - #3 Mar 17, 2017 10:07 PM
  - #2 Mar 17, 2017 4:54 PM
  - #1 Mar 17, 2017 4:23 PM
- Workspace:** Link to workspace
- Recent Changes:** Link to recent changes
- Permalinks:**
  - Last build (#3) 6.1 sec ago
  - Last stable build (#1) 5 hr 43 min ago
  - Last successful build (#1) 5 hr 43 min ago
  - Last failed build (#2) 5 hr 13 min ago
  - Last unsuccessful build (#2) 5 hr 13 min ago
  - Last completed build (#2) 5 hr 13 min ago

That it, it work !!!, to practice by yourself, just clone GOL project to your account by **Fork** button and then change the GOL configuration point to your github account as show below.

No description, website, or topics provided.

Add topics

4 commits 1 branch 0 releases 1 contributor

Branch: master New pull request Create new file Upload files Find file Clone or download

Source Code Management

Repositories

Repository URL: https://github.com/tanpv/gol.git

Credentials: none

Branch Specifier (blank for any): \*master

Build Triggers

- Trigger builds immediately (e.g., from scripts)
- Build after other projects are built
- Build periodically

Scanning for changes

Save Apply

## Build

In this section, We will setting to build java web app with maven.

### Configure Build Step

From GOL job dashboard, click to **Configure** link, the configure page will show up

Project GOL

Following task will be done by GOL job

- Download source code from Github repository https://github.com/tanpv/gol
- Build web application from java source
- Run automation test with test script already specify inside project
- Publish automation test result to Jenkins dashboard
- Deploy web application to Tomcat server

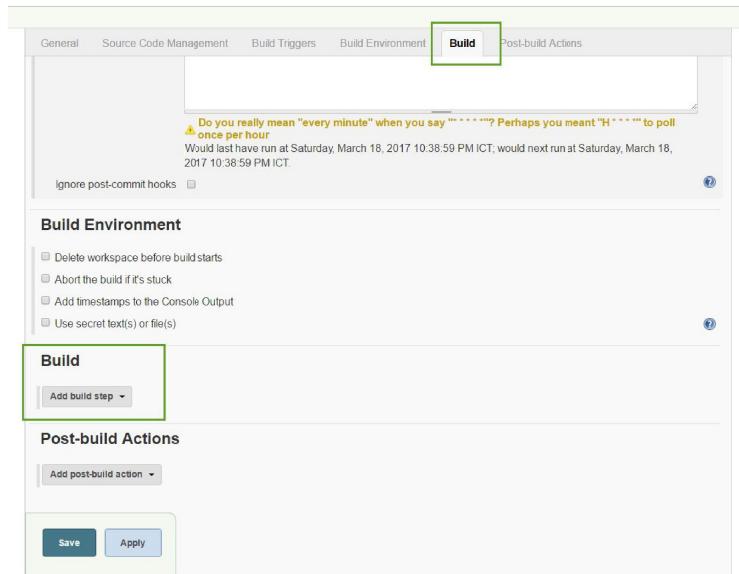
Workspace Recent Changes

Permalinks

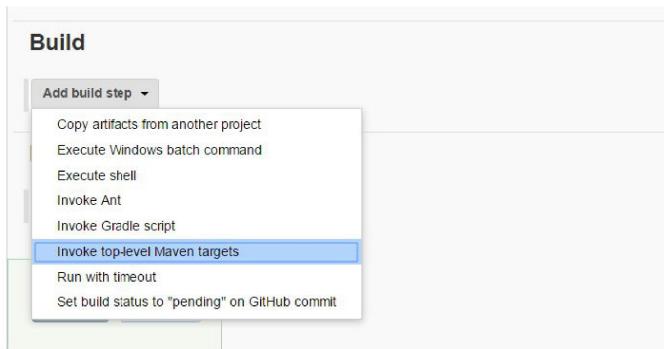
- Last build (#4), 1 day 0 hr ago
- Last stable build (#4), 1 day 0 hr ago
- Last successful build (#4), 1 day 0 hr ago
- Last failed build (#2), 1 day 5 hr ago
- Last unsuccessful build (#2), 1 day 5 hr ago
- Last completed build (#4), 1 day 0 hr ago

RSS for all RSS for failures

From configure page, select **Build** tab, page will scroll down to **Add build step**



Click to **Add build step** and select **Invoke top-level Maven targets**



Section to adding maven command will show up as below



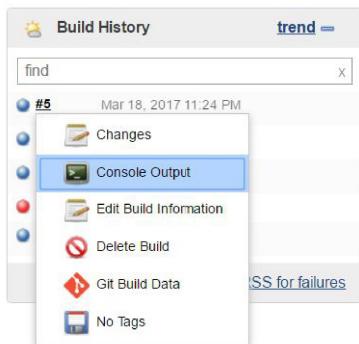
Put **Goals** maven command **clean install**



Then finally click in to **Save** button. That it we already complete configure for build maven step.

## Check Log and Workspace

Now from dashboard of GOL, just click to **Build Now** to see how Jenkins job work by open console log



Scroll this log to bottom you will see build job run successfully

```
/console
-----
Results :
Tests run: 0, Failures: 0, Errors: 0, Skipped: 0

[INFO]
[INFO] ... jacoco-maven-plugin:0.7.2.201409121644:report (jacoco-site) @ gameoflife-web ...
[INFO] Analyzed bundle 'gameoflife-web' with 2 classes
[INFO]
[INFO] ... maven-thucydides-plugin:0.9.26@aggregate (thucydides-reports) @ gameoflife-web ...
log4j:WARN No appenders could be found for logger (org.jboss.logging).
log4j:WARN Please initialize the log4j system properly.
[INFO] Reading requirements from net.thucydides.core.requirements.FileSystemRequirementsTagProvider@2d64dd7
[INFO] Reading requirements from net.thucydides.core.requirements.PackageDeclarationBasedTagProvider@736bd41
[INFO] Requirements found: []
[INFO] Generating release reports for: []
[INFO]
[INFO] ... maven-install-plugin:2.4:install (default-install) @ gameoflife-web ...
[INFO] Installing C:\Users\TAW\jenkins\workspace\GO\gameoflife-web\target\gameoflife_web_to_C:\Windows\system32\config\systemtemp\file.m2\repository\com\wakaleo\gameoflife\gameoflife-web\1.0-SNAPSHOT\gameoflife-web-1.0-SNAPSHOT.war
[INFO] Installing C:\Users\TAW\jenkins\workspace\GO\gameoflife-web\pom.xml to C:\Windows\system32\config\systemtemp\file.m2\repository\com\wakaleo\gameoflife\gameoflife-web\1.0-SNAPSHOT\gameoflife-web-1.0-SNAPSHOT.pom
[INFO] -----
[INFO] Reactor Summary:
[INFO]
[INFO] gameoflife ..... SUCCESS [ 10.519 s]
[INFO] gameoflife-build ..... SUCCESS [ 4.444 s]
[INFO] gameoflife-core ..... SUCCESS [ 7.861 s]
[INFO] gameoflife-web ..... SUCCESS [ 14.009 s]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 38.349 s
[INFO] Finished at: 2017-03-18T23:25:21+00:00
[INFO] Final Memory: 38M/249M
[INFO] -----
Finished: SUCCESS
```

Page generated: Mar 18, 2017 11:31:19 PM

From GOL home page, click to **Workspace**



You will access directory where build happen and actually could see the war file inside **Gameoflife-web/target/**. You could actually download war file from here.

A screenshot of the Jenkins workspace view for the 'GOL' project. The title is 'Workspace of GOL on Windows\_Agent'. The left sidebar includes 'Back to Dashboard', 'Status', 'Changes', 'Workspace' (highlighted with a green border), 'Build Now', 'Delete Project', 'Configure', 'Git Polling Log', and 'Move'. The main area shows the directory structure under 'gameoflife-web / target /': classes, gameoflife, generated-sources/annotations, generated-test-sources/test-annotations, maven-archiver, maven-status/maven-compiler-plugin, site, surefire, surefire-reports, test-classes/com/wakaleo/gameoflife/webtests/controllers. A file named 'gameoflife.war' is highlighted with a green border, showing its size as 3.04 MB and a 'view' link. Other files visible include 'jacoco.exec' (17.93 KB) and '(all files in zip)'.

That it, We already finish setting up build step.