



DevOps Tools:

→ Log Monitoring Tools:

- Splunk
- SumoLogic
- LogStash
- Kibana
- PaperTrail
- Loggly

→ System Monitoring Tools:

- Graphite
- Ganglia
- Sensu

→ Network Monitoring Tools:

- Zabbix
- Nagios
- Cacti

→ Build & Test Tools:

- Jenkins
- Gradle
- Maven
- Ant & Lavy
- Cruise Control

→ Deployment and Configuration Tools:

- Puppet
- chef
- Rancid
- CFEngine
- Ansible

→ Version control:

- Git



Jenkins

30/12/2016

- Start learning Jenkins from <https://www.tutorialspoint.com/jenkins/index.htm>

Jenkins



- Jenkins is a powerful free source and cross-platform application that allows **continuous integration and continuous delivery** of projects, regardless of the platform you are working on.
- It can be integrated with a number of testing and deployment technologies.
- It is a **server-based** system running in a servlet container such as Apache Tomcat.

➤ What Jenkins does?

The primary job of the Jenkins is to execute a list of steps configured which is based on a trigger.

Below are the list of steps/tasks performed by Jenkins when triggered :

1. Perform the code compilation & build the software with ANT, Maven or Gradle.
2. Run an internal shell script
3. Archive the resultant builds
4. At last start the execution of the integration tests.
5. Monitoring the execution of the above tasks.
6. Provision to stop the build in case of failure in any of the steps.
7. Notifying the user about the success or failure of each build.

➤ What Jenkins focus on?

Jenkins mainly focuses on 2 important activities :

1. **Continuous build of the software** : Nothing but the creating a continuous integration environment
2. **Monitoring execution of external jobs** : This monitors the jobs defined – CRON jobs.

➤ Features of Jenkins

1. Easy to install & configure.
2. Permanent link – readable URLs for the build details.
3. Email integration for notifications.
4. JUnit tests reporting.
5. Tagging support for every successful builds.
6. Distributed builds.
7. File fingerprinting for managing dependencies
8. Plugin support



02/01/2017

How to Configure Jenkins:

System Requirements:

JDK	JDK 1.5 or above
Memory	2 GB RAM (recommended)
Disk Space	No minimum requirement. Note that since all builds will be stored on the Jenkins machines, it has to be ensured that sufficient disk space is available for build storage.
Operating System Version	Jenkins can be deinstalled Sun Windows, Ubuntu/Debian, Red Hat/Fedora/CentOS, Mac OS X, openSUSE, FReeBSD, OpenBSD, Gentoo.
Java Container	The WAR file can be run in any container that supports Servlet 2.4/JSP 2.0 or later. (An example is Tomcat 5).

The following prerequisites must be met for Jenkins setup :-

- ✓ Verifying Java Installation
- ✓ Set the JAVA_HOME environment variable
- ✓ Jenkins and Tomcat Setup
- ✓ Jenkins – Maven Setup

Installation process:

Step 1: Verifying Java Installation

- Open the cmd and execute the following java command.

java -version

- If Java has been installed properly on your system, then you should get one of the following outputs, depending on the platform you are working on.

Java version "1.7.0_60"

Java (TM) SE Run Time Environment (build 1.7.0_60-b19)

Java Hotspot (TM) 64-bit Server VM (build 24.60-b09, mixed mode)



Jenkins

```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\1368642>java -version
java version "1.7.0_51"
Java(TM) SE Runtime Environment (build 1.7.0_51-b13)
Java HotSpot(TM) 64-Bit Server VM (build 24.51-b03, mixed mode)

C:\Users\1368642>
```

- If you don't have it then download jdk from:

<http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html>

Java SE Development Kit 8u111

You must accept the Oracle Binary Code License Agreement for Java SE to download this software.

Product / File Description	File Size	Download
Linux ARM 32 Hard Float ABI	77.78 MB	jdk-8u111-linux-arm32-vfp-hflt.tar.gz
Linux ARM 64 Hard Float ABI	74.73 MB	jdk-8u111-linux-arm64-vfp-hflt.tar.gz
Linux x86	150.35 MB	jdk-8u111-linux-i586.rpm
Linux x86	175.04 MB	jdk-8u111-linux-i586.tar.gz
Linux x64	158.35 MB	jdk-8u111-linux-x64.rpm
Linux x64	173.04 MB	jdk-8u111-linux-x64.tar.gz
Mac OS X	227.39 MB	jdk-8u111-macosx-x64.dmg
Solaris SPARC 64-bit	131.62 MB	jdk-8u111-solaris-sparcv9.tar.Z
Solaris SPARC 64-bit	93.02 MB	jdk-8u111-solaris-sparcv9.tar.gz
Solaris x64	140.38 MB	jdk-8u111-solaris-x64.tar.Z
Solaris x64	96.82 MB	jdk-8u111-solaris-x64.tar.gz
Windows x86	189.22 MB	jdk-8u111-windows-i586.exe
Windows x64	194.64 MB	jdk-8u111-windows-x64.exe

Java SE Development Kit 8u112

You must accept the Oracle Binary Code License Agreement for Java SE to download this software.

Product / File Description	File Size	Download
Linux x86	162.42 MB	jdk-8u112-linux-i586.rpm
Linux x86	177.12 MB	jdk-8u112-linux-i586.tar.gz
Linux x64	159.97 MB	jdk-8u112-linux-x64.rpm
Linux x64	174.73 MB	jdk-8u112-linux-x64.tar.gz
Mac OS X	223.15 MB	jdk-8u112-macosx-x64.dmg
Solaris SPARC 64-bit	139.78 MB	jdk-8u112-solaris-sparcv9.tar.Z
Solaris SPARC 64-bit	99.06 MB	jdk-8u112-solaris-sparcv9.tar.gz
Solaris x64	140.46 MB	jdk-8u112-solaris-x64.tar.Z
Solaris x64	96.86 MB	jdk-8u112-solaris-x64.tar.gz
Windows x86	193.99 MB	jdk-8u112-windows-i586.exe
Windows x64	195.13 MB	jdk-8u112-windows-x64.exe

- Click on Jdk file according to your system configuration . The downloading will start.
- Install downloaded **.exe file** at your desired location.

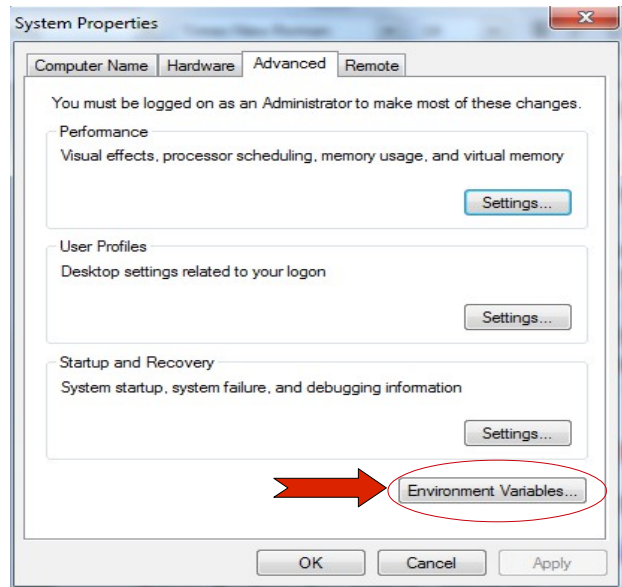


Jenkins

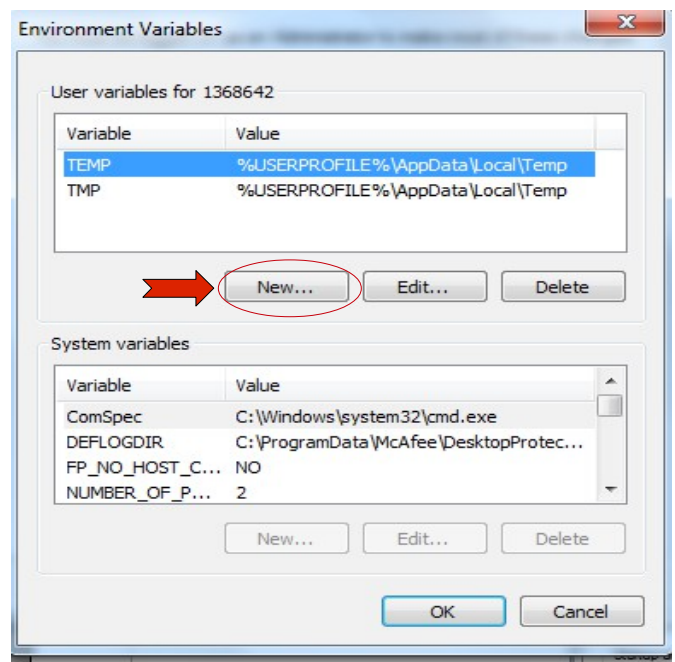
Step 2: Set the JAVA_HOME environment variable :

1. Go to : [Control Panel\All Control Panel Items\System\ advance system setting](#)

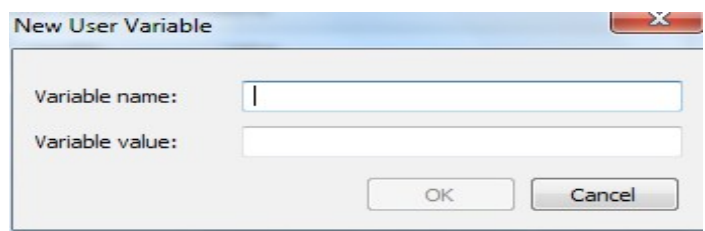
2. Click on environment variable



3. Click on new in user variables.



4. Set:
variable name: JAVA_HOME
variable value: your jdk location e.g. C:\ProgramFiles\java\jdk1.7.0_60





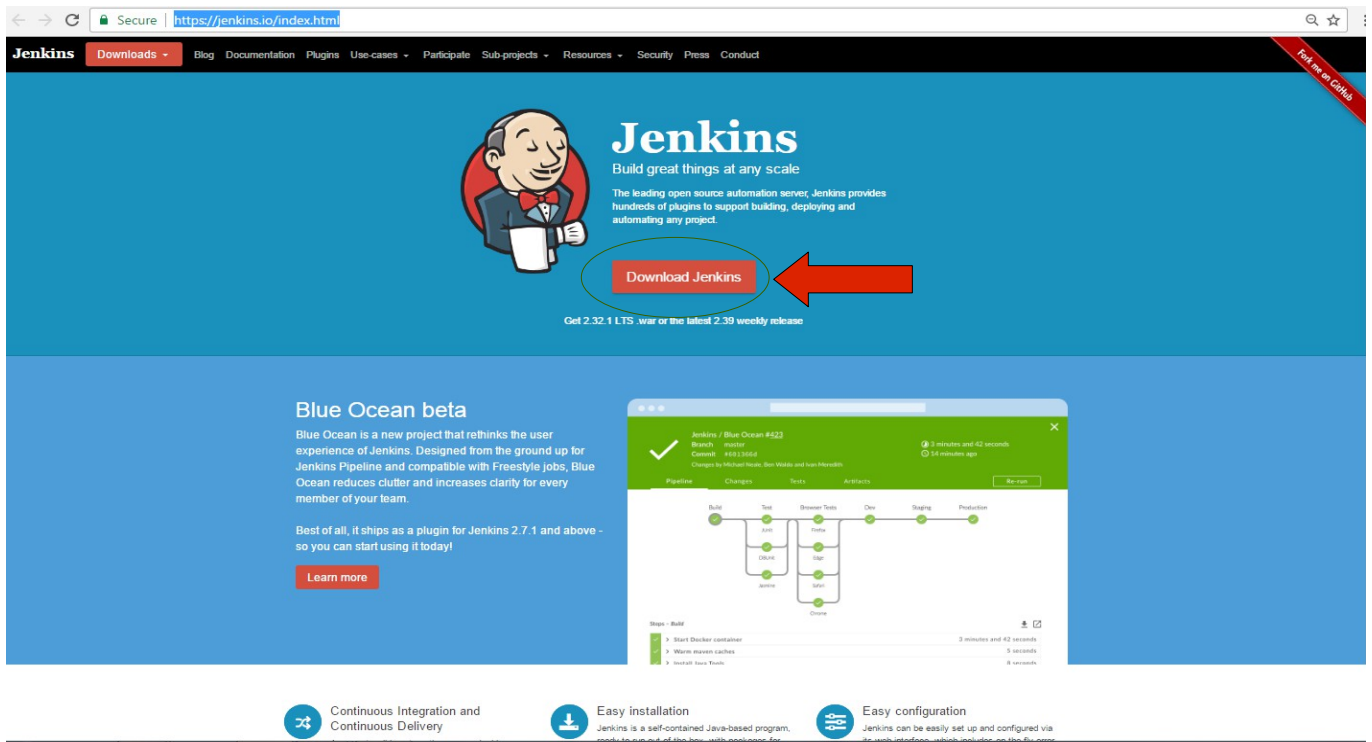
Jenkins

Step 3: Download and extracting Jenkins :

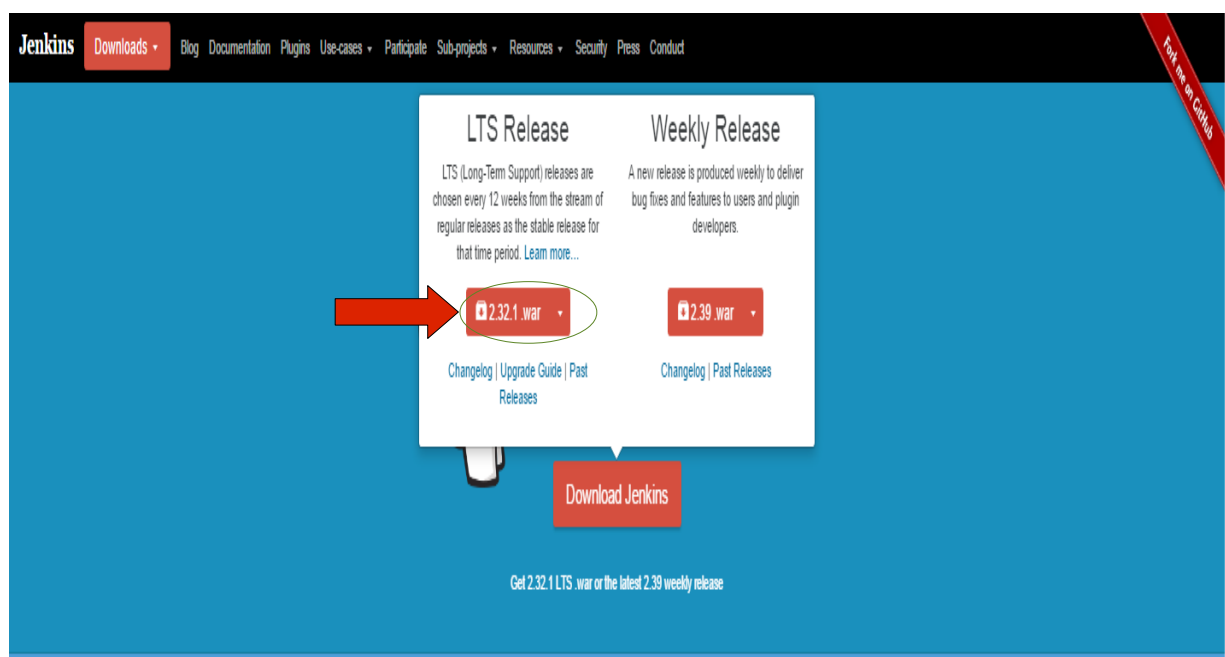
[Download](#) :

I) Open jenkins official website <https://jenkins.io/index.html>

II) Click on **Download Jenkins**



III) Click on **LTS Release war file**



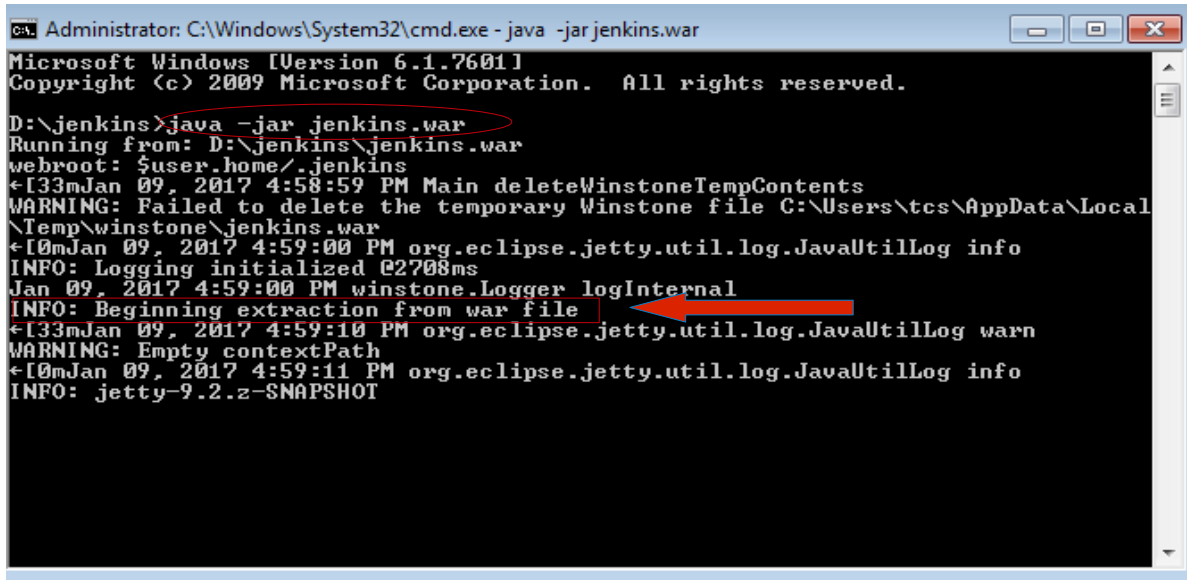


Jenkins

Starting Jenkins :

From the command prompt, browse to the directory where the jenkins.war file is present and Run the following command:

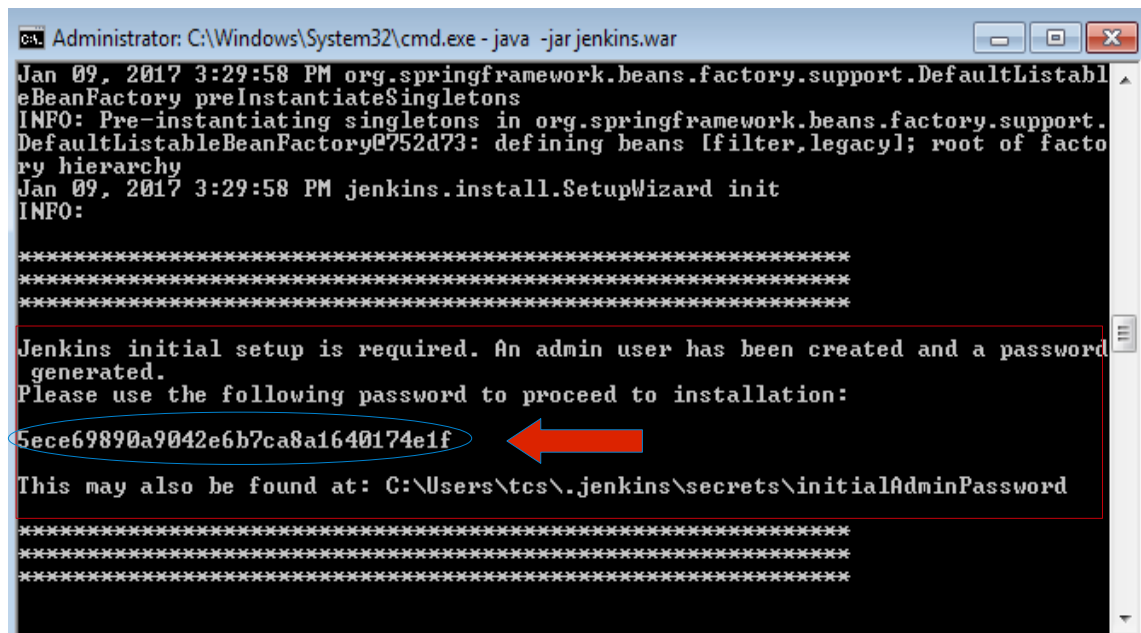
```
D:\>Java -jar Jenkins.war
```



```
C:\Windows\System32\cmd.exe - java -jar jenkins.war
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

D:\jenkins>java -jar jenkins.war
Running from: D:\jenkins\jenkins.war
webroot: $user.home/.jenkins
Jan 09, 2017 4:58:59 PM Main deleteWinstoneTempContents
WARNING: Failed to delete the temporary Winstone file C:\Users\tcs\AppData\Local\Temp\winstone\jenkins.war
Jan 09, 2017 4:59:00 PM org.eclipse.jetty.util.log.JavaUtilLog info
INFO: Logging initialized @2708ms
Jan 09, 2017 4:59:00 PM winstone.Logger logInternal
INFO: Beginning extraction from war file
Jan 09, 2017 4:59:10 PM org.eclipse.jetty.util.log.JavaUtilLog warn
WARNING: Empty contextPath
Jan 09, 2017 4:59:11 PM org.eclipse.jetty.util.log.JavaUtilLog info
INFO: Jetty-9.2.z-SNAPSHOT
```

Note down the password for installation generated during extration process of jenkins.war file.



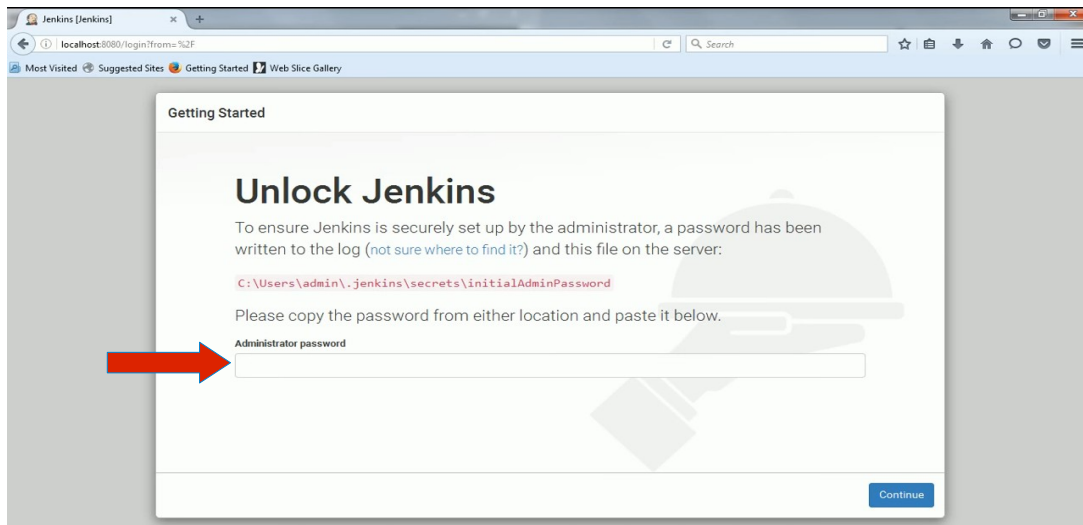
```
C:\Windows\System32\cmd.exe - java -jar jenkins.war
Jan 09, 2017 3:29:58 PM org.springframework.beans.factory.support.DefaultListabl
eBeanFactory preInstantiateSingletons
INFO: Pre-instantiating singletons in org.springframework.beans.factory.support.
DefaultListableBeanFactory@752d73: defining beans [filter,legacy]; root of facto
ry hierarchy
Jan 09, 2017 3:29:58 PM 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:
5ece69890a9042e6b7ca8a1640174e1f
This may also be found at: C:\Users\tcs\.jenkins\secrets\initialAdminPassword
*****
*****
*****
```



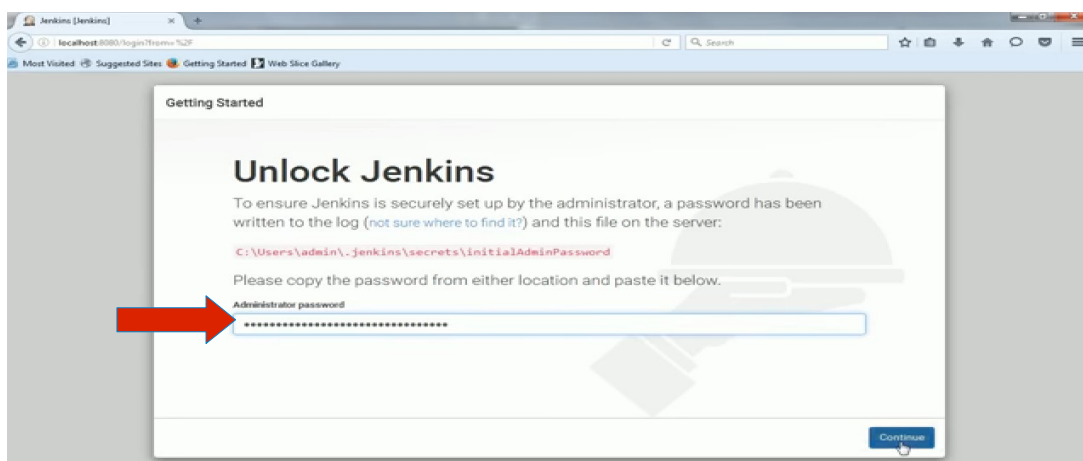

Jenkins

Accessing Jenkins :

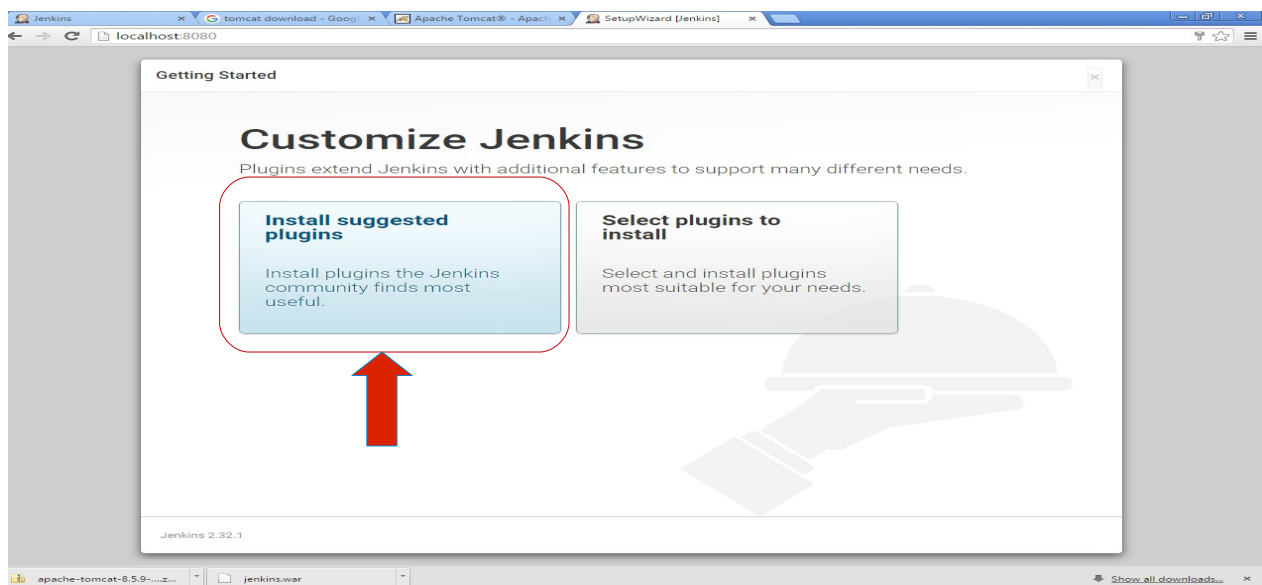
Once Jenkins is up and running, one can access Jenkins from the link—
<http://localhost:8080>.



- To **Unlock Jenkins**, Enter the **password** noted during **extraction** of **jenkins.war** file and click on **continue**.



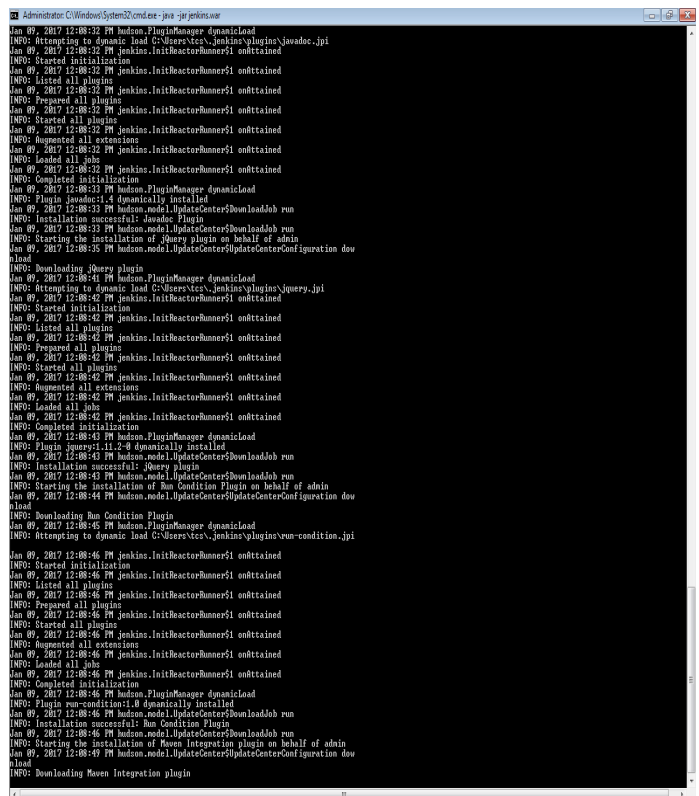
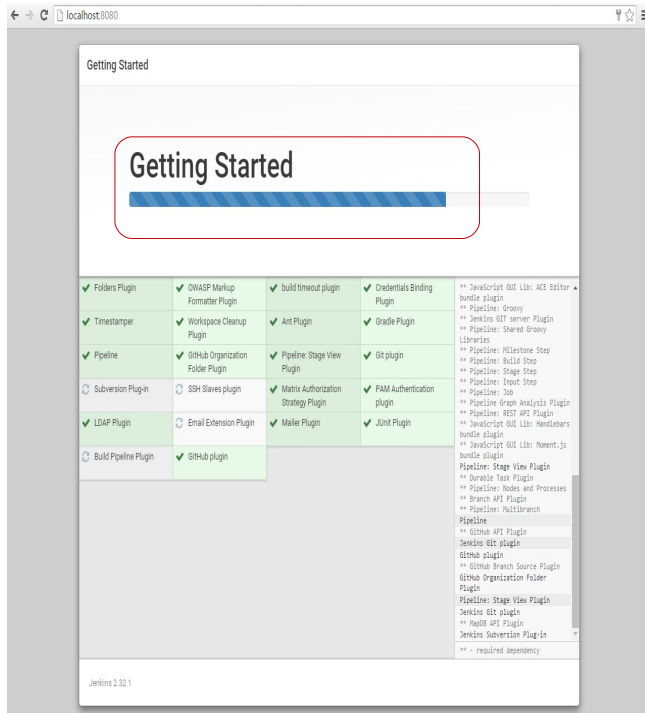
Click on **Install suggested plugins** options





Jenkins

- Wait for installation process done in dashboard as well as in background(cmd where jenkins.jar file is extracted)



- When the installation is completed :

Create the **First ADMIN User** by providing following details and click on **save and finish.**:

Getting Started

Create First Admin User

Username:

Password:

Confirm password:

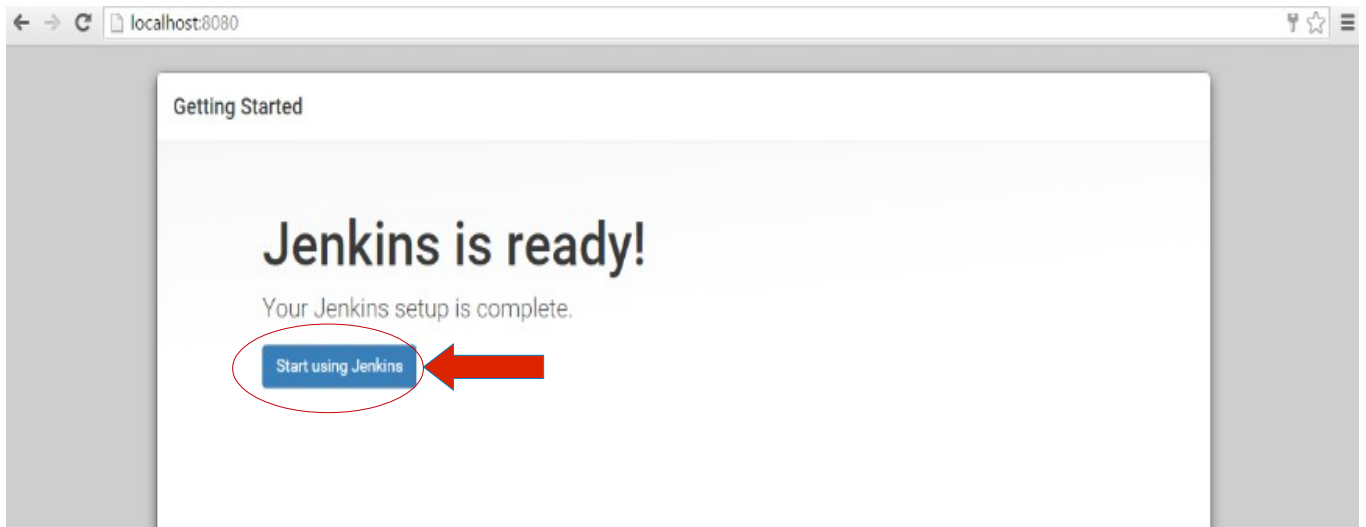
Full name:

E-mail address:

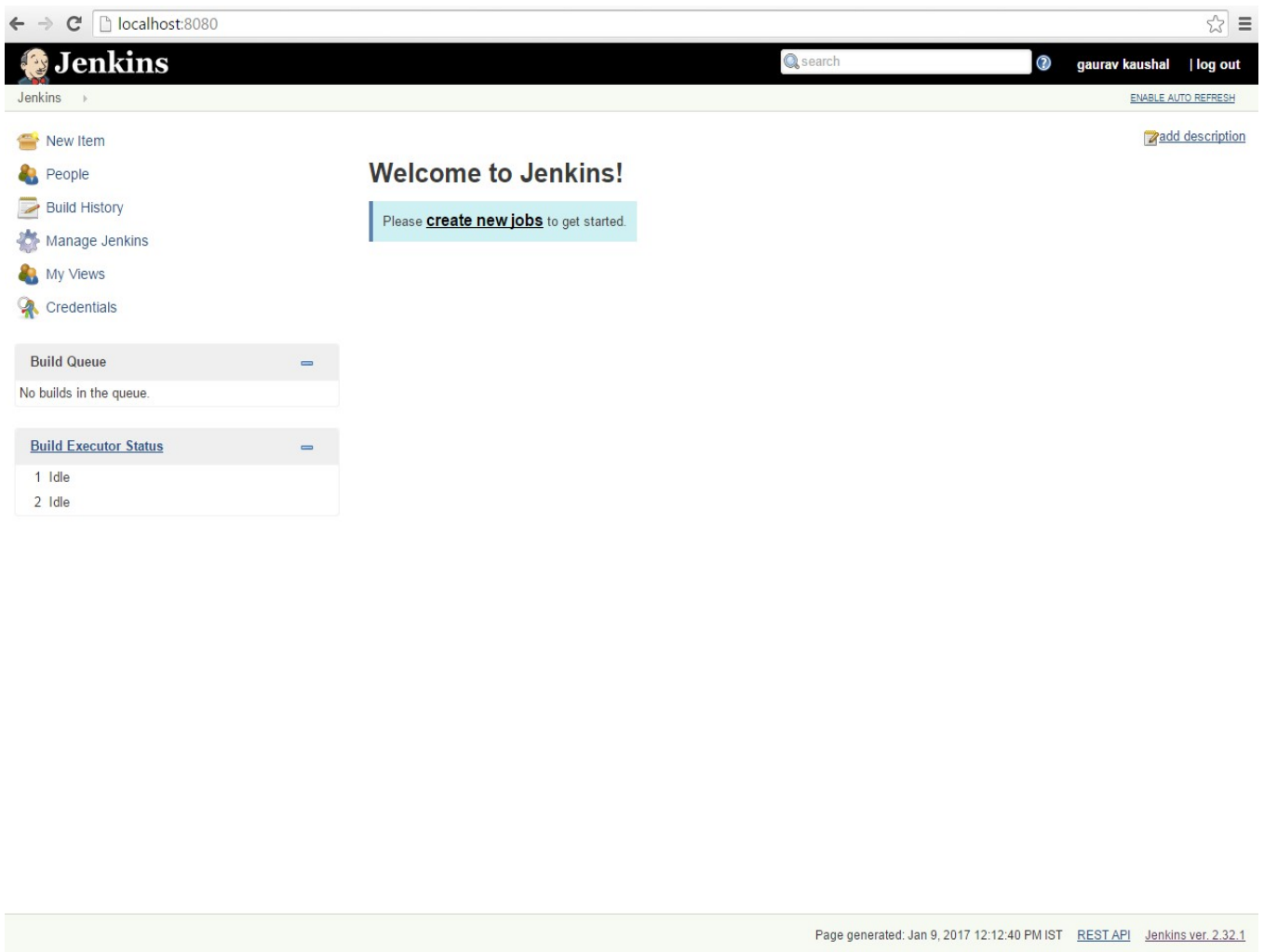
Jenkins 2.32.1

Continue as admin [Save and Finish](#)

- Click on *Start using Jenkins*



- Now Jenkin's *dashboard screen* will appear as:





Jenkins

- Now set the Jenkins as Windows Service

Go to *Jenkin's Dashboard* >> *Manage Jennkins tab* >> **Install as Windows Service:**

The screenshot shows the Jenkins Manage Jenkins page at localhost:8080/manage. The left sidebar contains a list of options: Global Tool Configuration, Reload Configuration from Disk, Manage Plugins, System Information, System Log, Load Statistics, Jenkins CLI, Script Console, Manage Nodes, About Jenkins, Manage Old Data, **Install as Windows Service** (highlighted with a red arrow), Manage Users, In-process Script Approval, and Prepare for Shutdown. The main content area displays descriptions for each option. The footer indicates the page was generated on Jan 9, 2017, at 12:13:25 PM IST, using Jenkins ver. 2.32.1.

- Click on *Install*

The screenshot shows the Jenkins Install as Windows Service page at localhost:8080/install/. The page title is "Install as Windows Service". Below the title, it says "Installing Jenkins as a Windows service allows you to start Jenkins as soon as the machine starts, and regardless of who is interactively using Jenkins." The "Installation Directory" field is set to "C:\Users\tcs\jenkins". A red arrow points to the "Install" button. The left sidebar contains links for New Item, People, Build History, Manage Jenkins, My Views, and Credentials. The footer indicates the page was generated on Jan 9, 2017, at 12:14:01 PM IST, using Jenkins ver. 2.32.1.



Jenkins

- Click on **Yes**, and wait for few seconds while jenkins is restarting

The screenshot shows the Jenkins web interface at `localhost:8080/install/`. The header includes the Jenkins logo, a search bar, and the user `gaurav kaushal` with a `log out` link. Below the header, there's a navigation menu on the left with links like `New Item`, `People`, `Build History`, `Manage Jenkins`, `My Views`, and `Credentials`. The main content area displays **Installation Complete** with a blue sphere icon. Below this, a message states: "Installation is successfully completed. Do you want to stop this Jenkins and start a newly installed Windows service?". A red circle highlights a `Yes` button, and a red arrow points to it from the right. On the left side, there are two expandable sections: `Build Queue` (showing "No builds in the queue.") and `Build Executor Status` (showing two idle executors).

The screenshot shows the Jenkins web interface at `localhost:8080/install/restart`. The header is similar to the previous screen, but the user is `gaurav kaushal` and the `log out` link is present. The main content area displays **Please wait while Jenkins is restarting..** with a large blue sphere icon. Below this, a message states: "You should be taken automatically to the new Jenkins in a few seconds. If for some reason the service fails to start, please check the Windows event log for errors and consult the wiki page located at the [official wiki](#)." On the left side, there are two expandable sections: `Build Queue` (showing "No builds in the queue.") and `Build Executor Status` (showing two idle executors).



- Now enter your credentials to login to Jenkins

- On Click on login button with correct credentials, Dashboard screen will shown:



Step 4: Jenkins and Tomcat Setup

I) Download Tomcat :

- Go to official website of tomcat <http://tomcat.apache.org/download-80.cgi>

The screenshot shows the Apache Tomcat 8.5.9 download page. The page has a sidebar with navigation links and a main content area. The main content area has sections for 'Tomcat 8 Software Downloads', 'Quick Navigation', 'Release Integrity', 'Mirrors', and 'Binary Distributions'. The 'Binary Distributions' section lists download options for Core, 32-bit Windows, and 64-bit Windows. A red arrow points to the '32-bit Windows zip (pgp, md5, sha1)' link.

- Go to the 'Binary Distributions' section. Download the Windows zip file according to your system.
- Unzip the contents of the downloaded zip file at your desired location.

II) Setting up Jenkins and Tomcat

- Copy the *Jenkins.war* file which was downloaded in **Step 2(I)** and copy it to the *webapps* folder in the *tomcat* folder(*Tomcat installation location*).
- Now open the command prompt. From the command prompt, browse to the directory where the tomcat folder is located. Browse to the bin directory in this folder and **run** the *start.bat* file. e.g.

```
E:\Apps\tomcat8\bin>startup.bat
```



Jenkins

- Once the processing is complete without major errors, the following line will come in the output of the command prompt.

INFO: Server startup in 1302 ms

- Open the browser and go to the link – **<http://localhost:8080/jenkins>**. Jenkins will be up and running on tomcat.



Step 5: Jenkins – Maven Setup

I) Download Maven :

- Go to the official website of Apache Maven project
<https://maven.apache.org/download.cgi>

The screenshot shows the Apache Maven Project download page for version 3.3.9. The page includes a sidebar with navigation links, a main content area with system requirements, and a table of download links. A red arrow points to the 'Binary zip archive' link, and the 'Files' section header is circled.

Downloading Apache Maven 3.3.9

Apache Maven 3.3.9 is the latest release and recommended version for all users.

The currently selected download mirror is <http://redrockdigimark.com/apachemirror/>. If you encounter a problem with this mirror, please select another mirror. If all mirrors are failing, there are backup mirrors (at the end of the mirrors list) that should be available. You may also consult the [complete list of mirrors](#).

Other mirrors:

System Requirements

Requirement	Details
Java Development Kit (JDK)	Maven 3.3 requires JDK 1.7 or above to execute - it still allows you to build against 1.3 and other JDK versions by Using Toolchains
Memory	No minimum requirement
Disk	Approximately 10MB is required for the Maven installation itself. In addition to that, additional disk space will be used for your local Maven repository. The size of your local repository will vary depending on usage but expect at least 500MB.
Operating System	No minimum requirement. Start up scripts are included as shell scripts and Windows batch files.

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	apache-maven-3.3.9-bin.tar.gz.asc
Binary zip archive	apache-maven-3.3.9-bin.zip	apache-maven-3.3.9-bin.zip.md5	apache-maven-3.3.9-bin.zip.asc
Source tar.gz archive	apache-maven-3.3.9-src.tar.gz	apache-maven-3.3.9-src.tar.gz.md5	apache-maven-3.3.9-src.tar.gz.asc
Source zip archive	apache-maven-3.3.9-src.zip	apache-maven-3.3.9-src.zip.md5	apache-maven-3.3.9-src.zip.asc

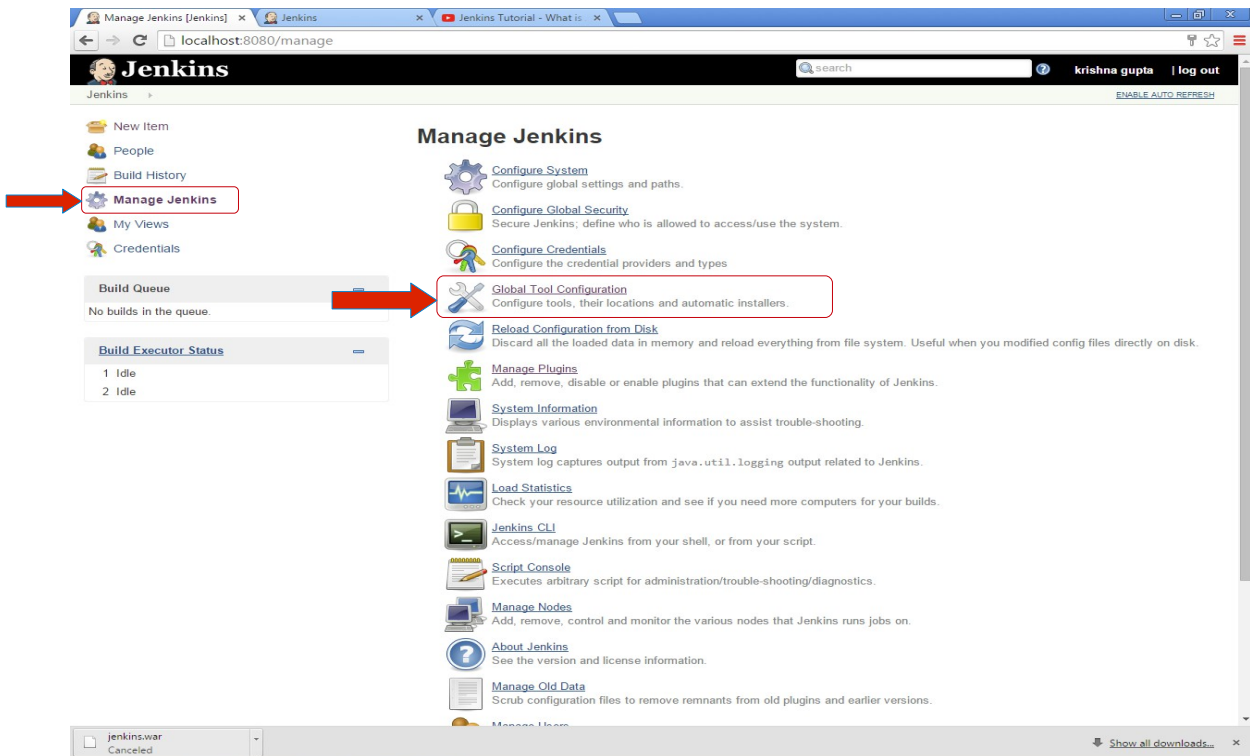
- [Release Notes](#)
- [Reference Documentation](#)
- [Apache Maven Website As Documentation Archive](#)

- While browsing to the site, go to the Files section and download the link to the **Binary.zip file**.
- Once the file is downloaded, extract the files to the relevant application folder. For this purpose, the maven files will be placed in E:\Apps\apache-maven-3.3.3.



II) Setting up Jenkins and Maven

- In the Jenkins dashboard (Home screen), click Manage Jenkins from the left-hand side menu.



- Then, click on '**Global Tool Configuration**' from the right hand side.
- In the Configure system screen, scroll down till you see the Maven section and then click on the '**Add Maven**' button.
- Uncheck the '**Install automatically**' option.
- Add any name for the setting and the location of the MAVEN_HOME.
- Then, click on the '**Save**' button at the end of the screen.

Maven

Maven installations

Maven
Name
LOCALMAVEN
MAVEN_HOME
D:\jenkins\apache-maven-3.3.9-bin\apache-maven-3.3.9
<input type="checkbox"/> Install automatically
<input type="button" value="Delete Maven"/>
<input type="button" value="Add Maven"/>


List of Maven installations on this system



Jenkins

- You can now create a job with the '**Maven project**' option. In the Jenkins dashboard, by clicking the **New Item option**.

← → ↻ localhost:8080/view/All/newJob ☆ ⋮


 **Jenkins** ? krishna gupta | log out

Jenkins > All >


Enter an item name

demo


» 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 even used for something other than software build.

**Maven project**


Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.

**Pipeline**


Orchestrates long-running activities that can span multiple build slaves. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.

**External Job**


This type of job allows you to record the execution of a process run outside Jenkins, even on a remote machine. This is designed so that you can use Jenkins as a dashboard of your existing automation system.

**Multi-configuration project**


Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.

**Folder**

Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folder creates a separate namespace, so you can have multiple things of the same name as long as they are in different folders.

**GitHub Organization**

Scans a GitHub organization (or user account) for all repositories matching some defined markers.

**Multibranch Pipeline**

Creates a set of Pipeline projects according to detected branches in one SCM repository.

if OK

It to create a new item from other existing, you can use this option:



Configure Jenkins :

■ Configuration of JDK location :

- In the Jenkins dashboard (Home screen), click Manage Jenkins from the left-hand side menu.
- Then, click on '**Global Tool Configuration**' from the right hand side.
- In the Configure system screen, scroll down till you see the JDK section and then click on the '**Add JDK**' button.
- Uncheck the '**Install automatically**' option.
- Add jdk name for the setting and the location of the JAVA_HOME.
- Then, click on the '**Save**' button at the end of the screen.

The screenshot shows the Jenkins web interface at localhost:8080/configureTools/. The page title is 'Global Tool Configuration'. Under the 'Maven Configuration' section, there are dropdowns for 'Default settings provider' and 'Default global settings provider', both set to 'Use default maven settings'. The 'JDK' section is highlighted with a red rounded rectangle. It contains a table with one entry for 'jdk1.8.0_111'. The 'Name' field is 'jdk1.8.0_111' and the 'JAVA_HOME' field is 'C:\Program Files\Java\jdk1.8.0_111'. The 'Install automatically' checkbox is unchecked. There is a 'Delete JDK' button and an 'Add JDK' button at the bottom of the section. A link 'Back to Dashboard' is in the top left, and 'Manage Jenkins' is below it. The top right shows a search bar, the user 'krishna gupta', and a 'log out' link.

■ Configuration the GIT location :

- In the Jenkins dashboard (Home screen), click Manage Jenkins from the left-hand side menu.
- Then, click on '**Global Tool Configuration**' from the right hand side.
- In the Configure system screen, scroll down till you see the JDK section and then click on the '**Add JDK**' button.
- Uncheck the '**Install automatically**' option.
- Add jdk name for the setting and the location of the JAVA_HOME.
- Then, click on the '**Save**' button at the end of the screen.



Jenkins

Git

Git installations

Git

Name

Default

Path to Git executable

C:\Users\tcs\jenkins

?

☐ Install automatically

?

Add Git

Delete Git

In Addition you can also do configuration of :

- **Secure Jenkins**
- **Generate ssh key for Jenkins user**



Jenkins

Jenkins management

- Plug-in management
- Restart your Jenkins

Jenkins Plugins:

Jenkins has over 1000+ plugins, that are classified as:

- Software configuration management

Version Control Systems

1.Accurev	2.Bazaar	3.BitKeeper	4.ClearCase	5.Darcs	6.Dimensions	7.Git
8.Harvest	9.MKS	10.Integrity	11.PVCS	12.StarTeam	13.Subversion	14.Team
15.Foundation Server	16.Visual SourceSafe etc...					

- Builders(Build and Test)

Build Tools

1.Ant	2.Maven
3.MSBuild	4.Cmake
5.Gradle	6.Grails
7.Scons	8.Groovy etc...

Test Frameworks

1.Junit	2.Nunit
3.MSTest	4.Selenium
5.Fitnesse	
etc...	

- Virtual Machine Controllers

1.Amazon EC2	2.VMWare	3.VirtualBox	4.Xen	5.Libvirt
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- Notifiers

1.Twitter	2.Campfire	3.Google Calendar	4.IM	5.IRC
6.Lava Lamp	7.Sounds	8.Speak	etc...	

- Static Analyzers

1.Checkstyle	2.CodeScanner	3.DRY	4.Crap4j	5.Findbugs
6.PMD	7.Fortify	8.Sonar	9.FXCop	etc...

- Authorization

1.Active Directory	2.LDAP	etc...
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