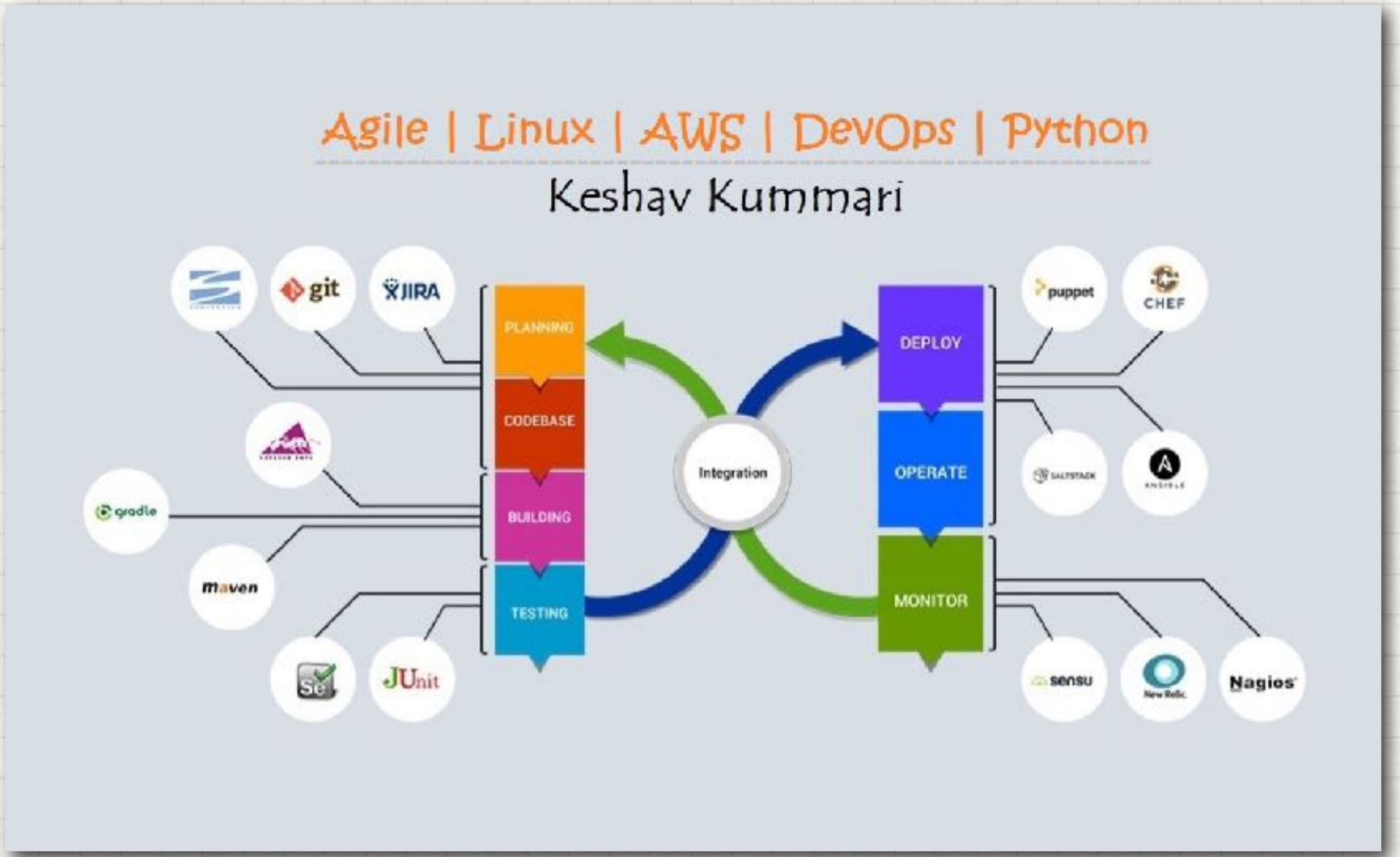
DEVOPS

KESHAV KUMMARI



INTRODUCTION

WHAT IS DEVOPS?

- DevOps is a new Philosophy that can help organisations innovate faster and be more productive and responsive to business needs.
- It promotes collaboration between developers and operations by automating infrastructure, automating workflows and continuously measuring application performance.

INTRODUCTION

DEVOPS GOALS AND BENEFITS

- Increase rate of software delivery.
- Improves company's time to market potentially from months and weeks to days and hours.
- Provide huge competitive advantage due to shorter release cycles.
- Help them automating the releases and their infrastructure so that they can focus on increasing business value
- Reduce manual processes leading to happier employees and customers.
- Lower failure rates of releases.
- Faster mean time to recovery
- Shortened lead time between fixes.

INTRODUCTION

DEVOPS ADOPTION INTEREST

- Use of Agile Development processes.
- Demand for frequent releases to production.
- Availability of cloud infrastructure and tools
- Increased usage of datacenter automation and configuration management tools.
- Increased focus on test automation and continuous integration methods
- A critical mass of publicly available best practices in the industry.

INTRODUCTION

DEVOPS TOOL CHAIN

- DevOps is a set of tool chain that will help organisations achieve their goals.
- The tools fit into several categories that are:
- Code : SCM, Workflow, Development, Review, and Merge.
- Build : Continuous integration and builds.
- Test : Continuous testing that provide feedback
- Package : Packaging code and release to Artifact repository
- Release : Release,Promotion and change management
- Configure : Automated infrastructure and configuration management
- Monitor : Application performance and log monitoring

INTRODUCTION

DEVOPS COURSE GOALS

- In this course we will cover the tool chain that will cover the code, build, test, package, part of release and part of application monitoring.

- The course will enforce the fundamentals around DevOps and help you understand in depth of how these tools fit together will help you transform your organisation and teams and also help you set expectations across the business and technology teams.

INTRODUCTION

DEVOPS AT END OF COURSE

- At the end of the course you will be able to understand the benefits of DevOps model and be able to setup and use the tools that will facilitate in source control management, continuous integration, testing, release management, efficient deployment workflows and application monitoring.

- We will be using some of the best open source tools available in the industry.

- In addition to learning the tools you will also have a complete DevOps environment setup on your computer that you can use for further learning and provide you options to explore further.

INTRODUCTION

DEVOPS ASSUMPTIONS

- Basic understanding of the SDLC lifecycle.
- Basic understanding of the source code management
- Ability to Download, Install & Configure tools as part of the Course
- Basic understanding of Java Programming language and build tools like Maven
- Ability to hands on development in Java using Spring Boot.
- Please note that though the focus here is using Java Programming the tool chain can be applied to any technology.

REQUIRED TOOLS AND SOFTWARE DOWNLOADS

COURSE PREREQUISITES

- Operating System Admin concepts :
- Windows / Unix / Linux or MacOs
- Admin rights on Desktop or Laptop
- Internet Access
- JDK 1.8.X version

DEVOPS

ACRONYMS

- SDLC : Software Development Lifecycle
- SCM : Software configuration management
- ELK : Elasticsearch, Logstash, Kibana
- GitFlow : Git Workflow
- SSH : Secure Shell Host
- Git : Version Control System
- CI : Continuous integration
- Repository : Place where Artifacts are stored

DEVOPS

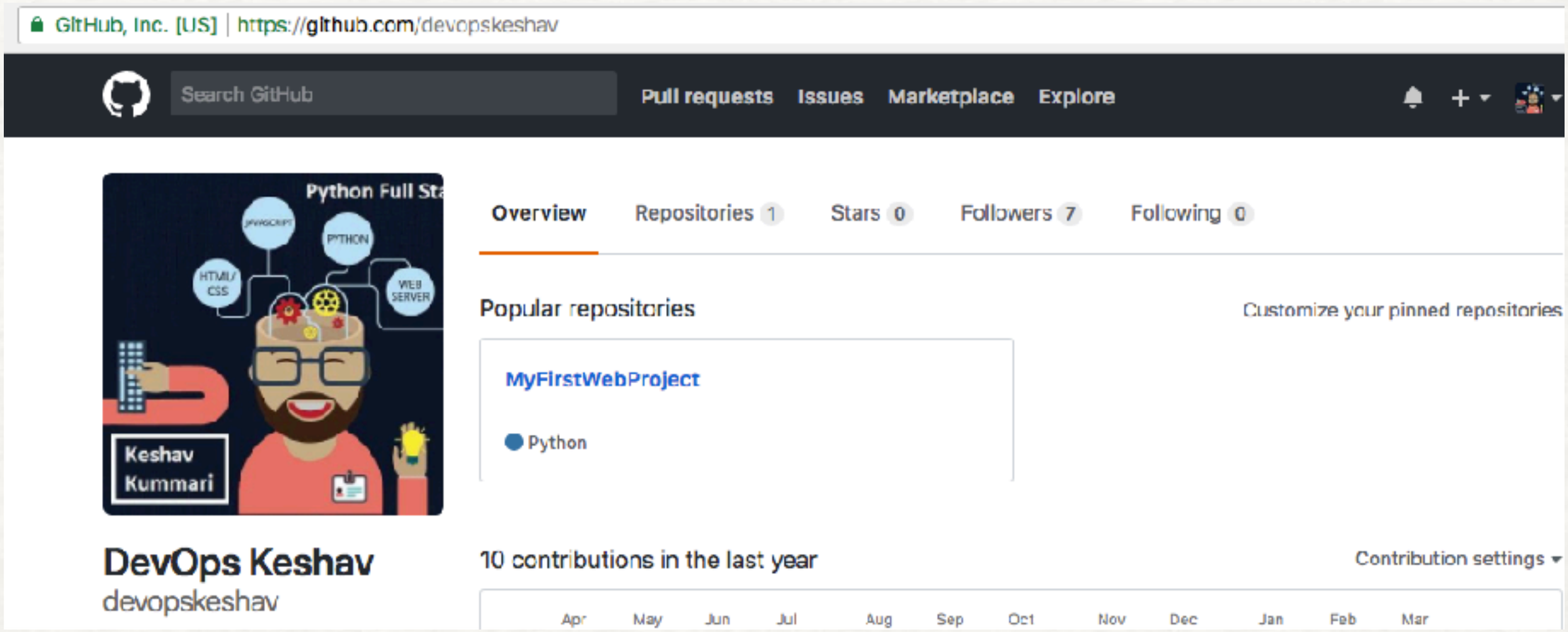
REQUIRED TOOLS

- **GitHub Account**
- https://github.com/join
- **Install Git**
- https://git-scm.com/downloads
- **Install Atlassian Source Tree**
- https://www.sourcetreeapp.com/
- **Install Gitflow for executing via command line**
- https://github.com/nvie/gitflow/wiki/installation

GITHUB

CODE REPOSITORY AND VERSION CONTROL

- Login to GitHub

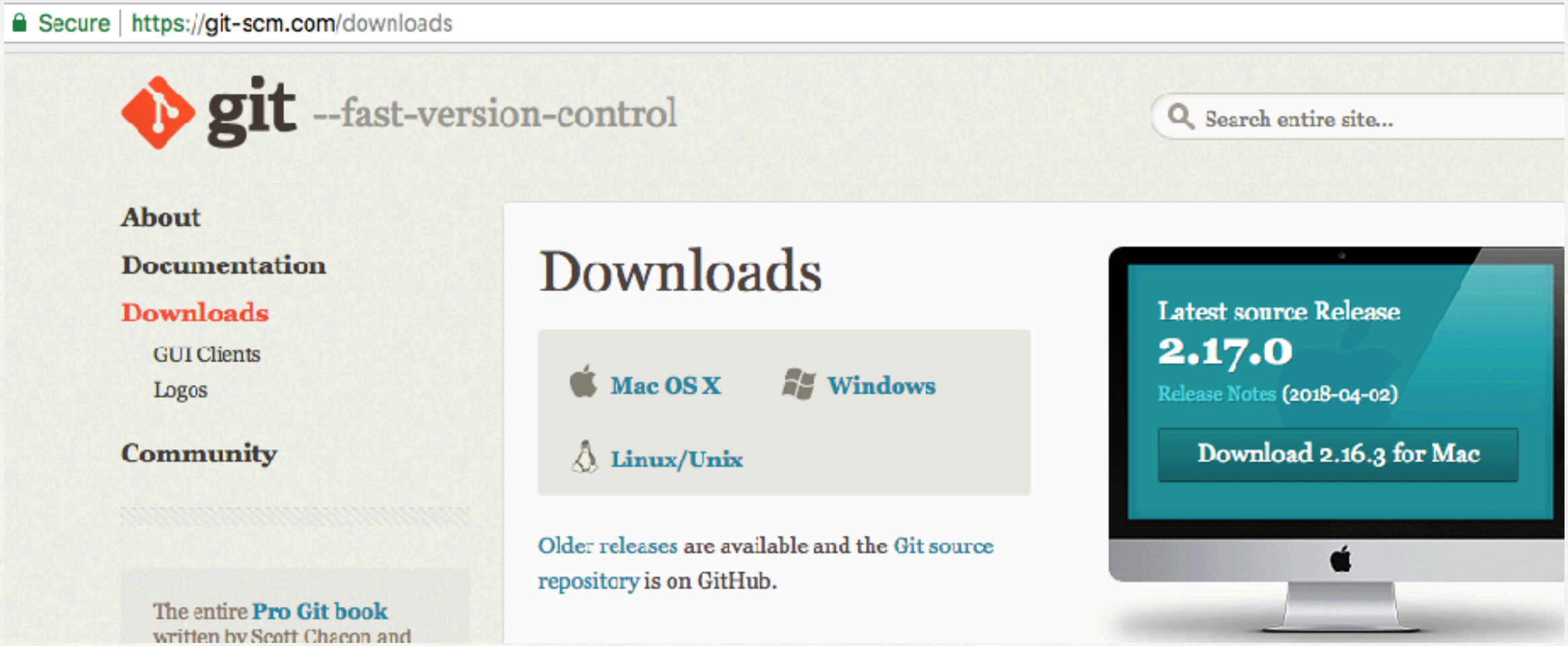


https://github.com/join

DOWNLOAD , INSTALL & CONFIGURE

GIT BASH SOFTWARE

- Download & Install

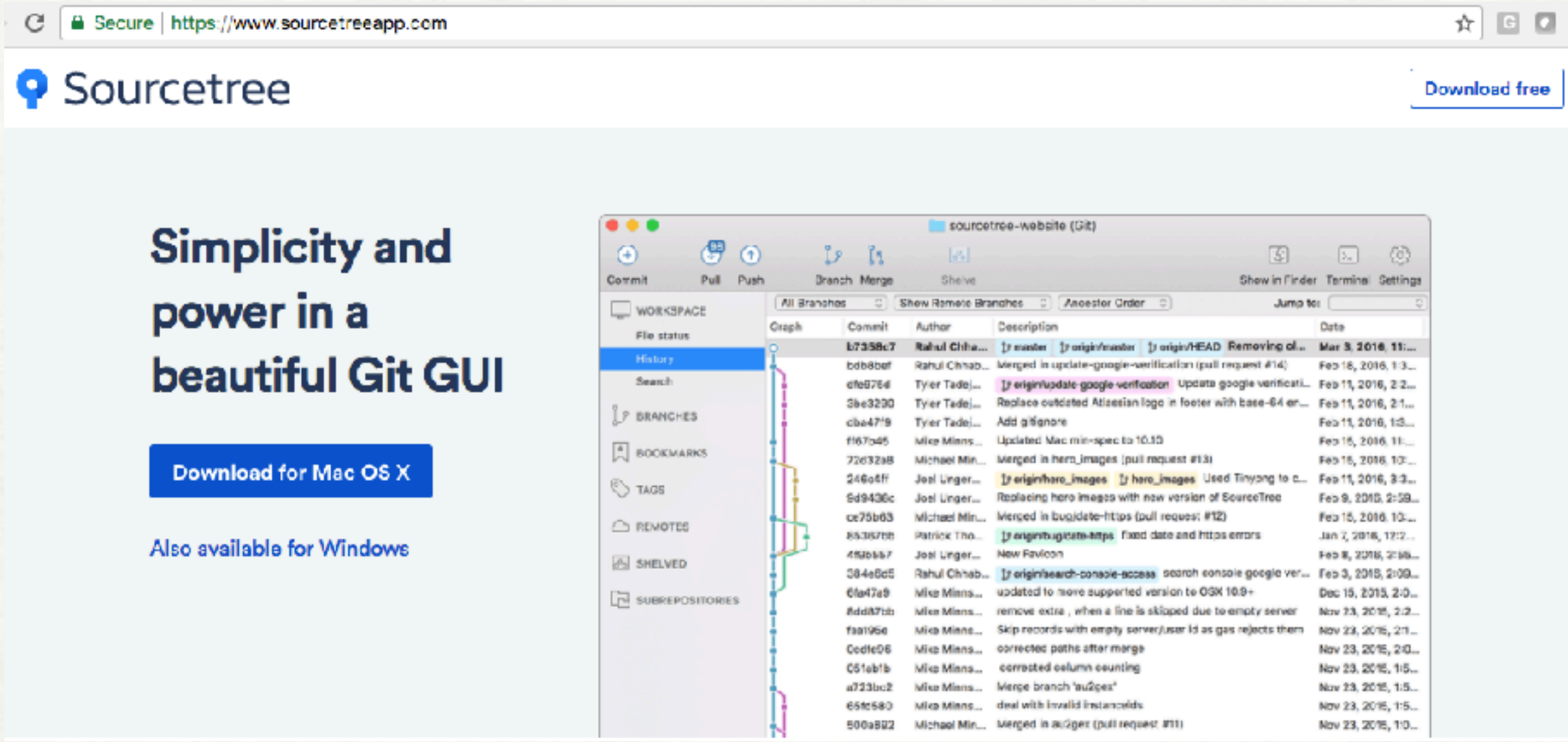


https://git-scm.com/downloads

DOWNLOAD , INSTALL & CONFIGURE

ATLASSIAN SOURCE TREE

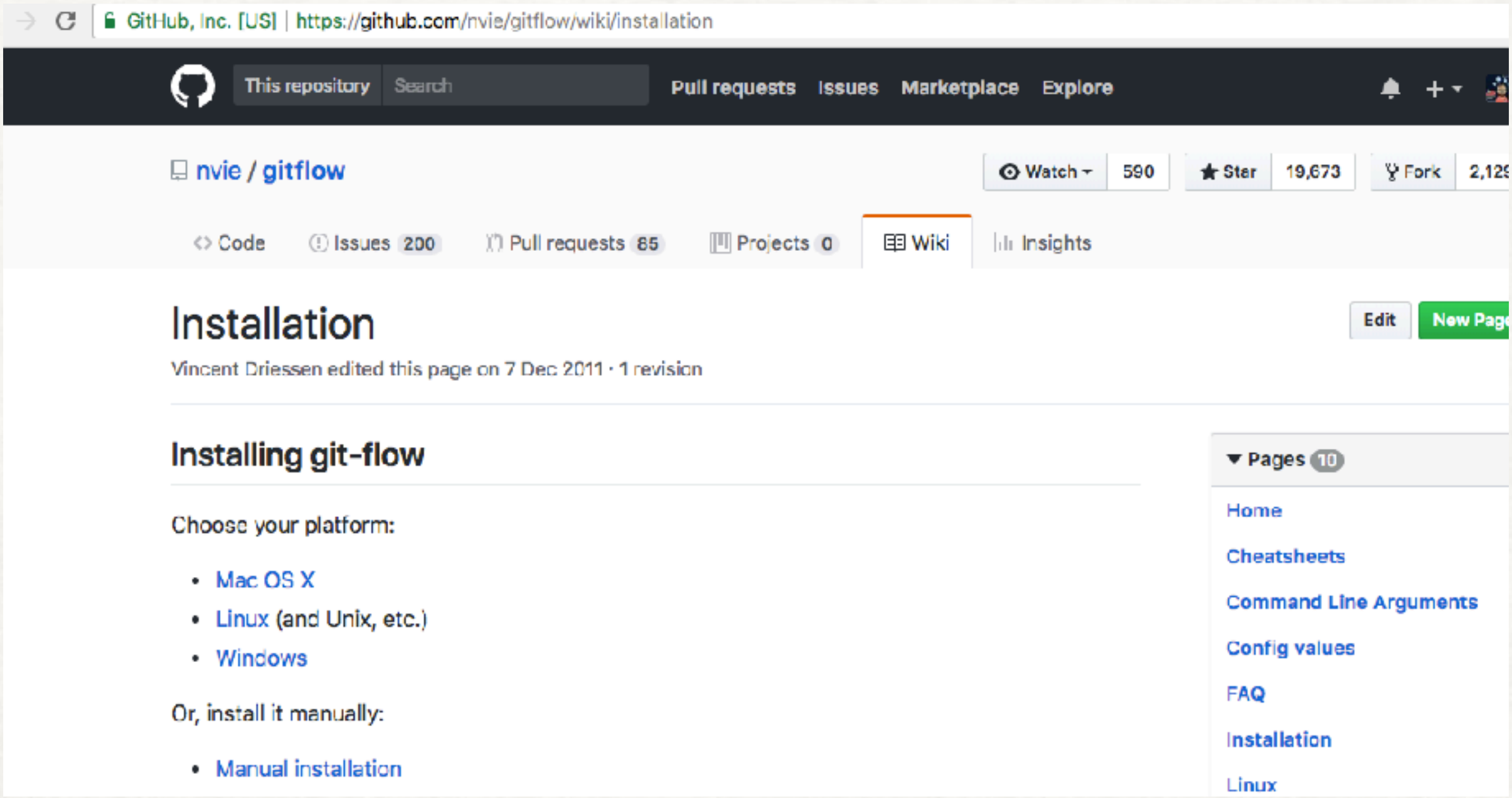
- Download and Install



https://www.sourcetreeapp.com/

DOWNLOAD , INSTALL & CONFIGURE

GITFLOW



https://github.com/nvie/gitflow/wiki/installation

DOWNLOAD OF TOOLS

CI/CD TOOLS

- Download and Install IDE STS : https://spring.io/tools/sts/all
- Download and Install Text Editor ATOM : https://atom.io/
- Download and Install Maven : http://maven.apache.org/
- Download and Install Tomcat : https://tomcat.apache.org/download-80.cgi
- Download and Install Artifactory : https://jfrog.com/open-source/
- Download and Install Jenkins : https://jenkins.io/download/
- Download and Install ElasticSearch : https://www.elastic.co/downloads/elasticsearch
- Download and Install Logstash : https://www.elastic.co/downloads/logstash
- Download and Install Kibana : https://www.elastic.co/downloads/kibana

INSTALL OF TOOLS

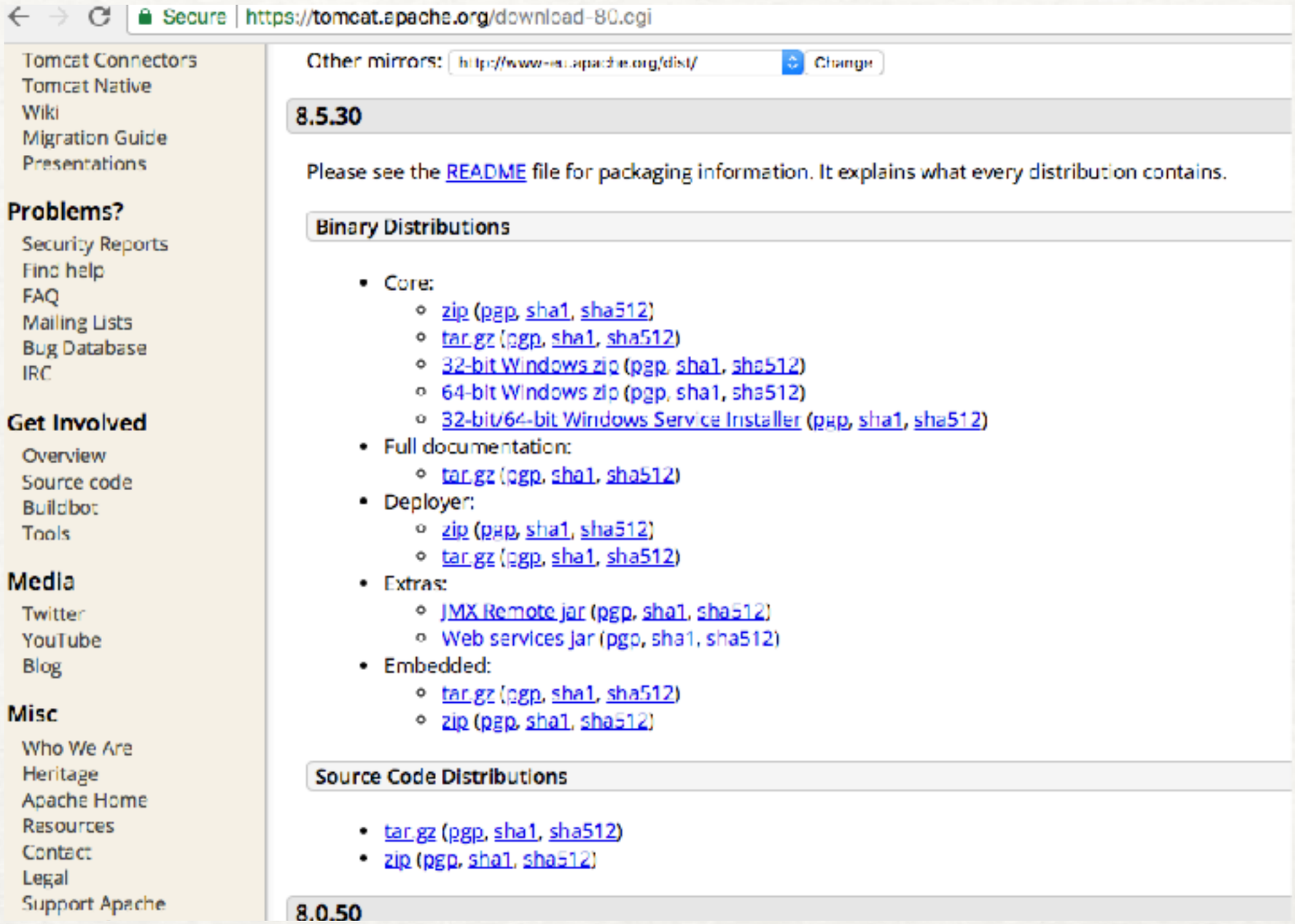
CI/CD PIPELINE

1. Install Tomcat
    - Download, Install & Configure
    - Start the tomcat
    - Validate the setup
    - Port - 8080
2. Install Artifactory
    - Download, Install & Configure
    - Start the artifactory
    - Validate the setup
    - Port - 8081
3. Install Maven
    - Download, Install & Configure
    - Setup the Maven Home
    - Validate the setup
4. Install Jenkins
    - Download war, Deploy & Configure
    - Validate the setup
5. Install ELK
    - Download, Install & Configure
        - ElasticSerach
        - Logstatsh
        - Kibana
    - Validate the setup

TOMCAT

DOWNLOAD, INSTALL & CONFIGURE

- Download Tomcat 8.5.30 tar.gz file



https://tomcat.apache.org/download-80.cgi

TOMCAT

ADDING ROLE NAME, PASSWORD, & PORT

```
sh-3.2# pwd
/devtools
sh-3.2# ls -lrt apache-tomcat-8.5.30.tar.gz
-rw-r--r--@ 1 keshavkummari  staff  9541892 Apr 10 23:12 apache-tomcat-8.5.30.tar.gz
sh-3.2#
sh-3.2# # tar xvzf apache-tomcat-8.5.30.tar.gz
sh-3.2# pwd
/devtools
sh-3.2# ls -ld tomcat8/
drwxr-xr-x  13 root  wheel  442 Apr 10 23:19 tomcat8/
sh-3.2#
```

```
/devtools/tomcat8/conf
sh-3.2# ls
Catalina                    context.xml                 logging.properties          tomcat-users.xml_20180410
catalina.policy             jaspic-providers.xml        server.xml                  tomcat-users.xsd
catalina.properties         jaspic-providers.xsd        tomcat-users.xml            web.xml
sh-3.2# tail tomcat-users.xml
-->
  <role rolename="tomcat"/>
  <role rolename="manager-gui"/>
  <role rolename="manager-script"/>
  <role rolename="admin-gui"/>
  <user username="tomcat" password="tomcat" roles="tomcat"/>
  <user username="manager" password="tomcat" roles="tomcat,manager-gui"/>
  <user username="jenkins" password="jenkins" roles="manager-script"/>
  <user username="keshav" password="tomcat" roles="admin-gui"/>
</tomcat-users>
sh-3.2#
sh-3.2# grep 8181 server.xml
    <Connector port="8181" protocol="HTTP/1.1"
               port="8181" protocol="HTTP/1.1"
```

GO TO TOMCAT-USERS.XML FILE & ADD BELOW ROLE NAME ,USERNAME & PASSWORD

- FileName : tomcat-users.xml file

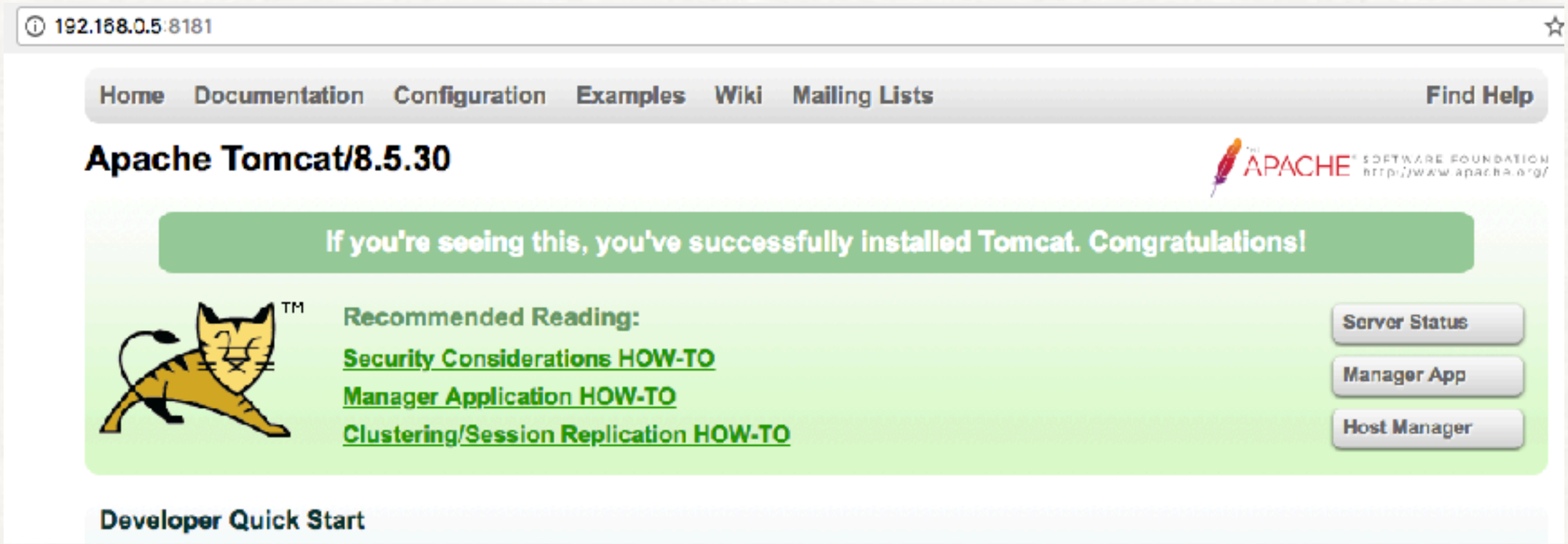
```
$ pwd
/Users/keshavkummari/devtools/tomcat8/conf
$ ls -lrt
total 464
-rw-------@ 1 root  wheel  169322 Apr  4 01:37 web.xml
-rw-------@ 1 root  wheel    2633 Apr  4 01:37 tomcat-users.xsd
-rw-------@ 1 root  wheel    2164 Apr  4 01:37 tomcat-users.xml_20180410
-rw-------@ 1 root  wheel    3622 Apr  4 01:37 logging.properties
-rw-------@ 1 root  wheel    2313 Apr  4 01:37 jaspic-providers.xsd
-rw-------@ 1 root  wheel    1149 Apr  4 01:37 jaspic-providers.xml
-rw-------@ 1 root  wheel    1338 Apr  4 01:37 context.xml
-rw-------@ 1 root  wheel    7376 Apr  4 01:37 catalina.properties
-rw-------@ 1 root  wheel   13824 Apr  4 01:37 catalina.policy
drwxr-x---  3 root  wheel     102 Apr 10 23:22 Catalina
-rw-------@ 1 root  wheel    7511 Apr 11 15:48 server.xml
-rw-------@ 1 root  wheel    2288 May  1 11:06 tomcat-users.xml_20180501
-rw-------@ 1 root  wheel    2033 May  1 11:12 tomcat-users.xml
$
$ tail tomcat-users.xml
  when reading this file. If you wish to configure these users for use with the
  examples web application, do not forget to remove the <!.. ..> that surrounds
  them. You will also need to set the passwords to something appropriate.
-->
<!--
-->
   <role rolename="admin-gui"/>
   <role rolename="manager-gui"/>
   <user username="admin" password="tomcat" roles="admin-gui,manager-gui"/>
</tomcat-users>
$
```

Then, Stop the tomcat & Start & Check in the Browser

TOMCAT

CHECK ON BROWSER

- User Name : admin
- Password : tomcat



Click on Manager App or Host Manager & provide the Username & Password

ARTIFACTORY

DOWNLOAD, UNTAR & START THE JFROG

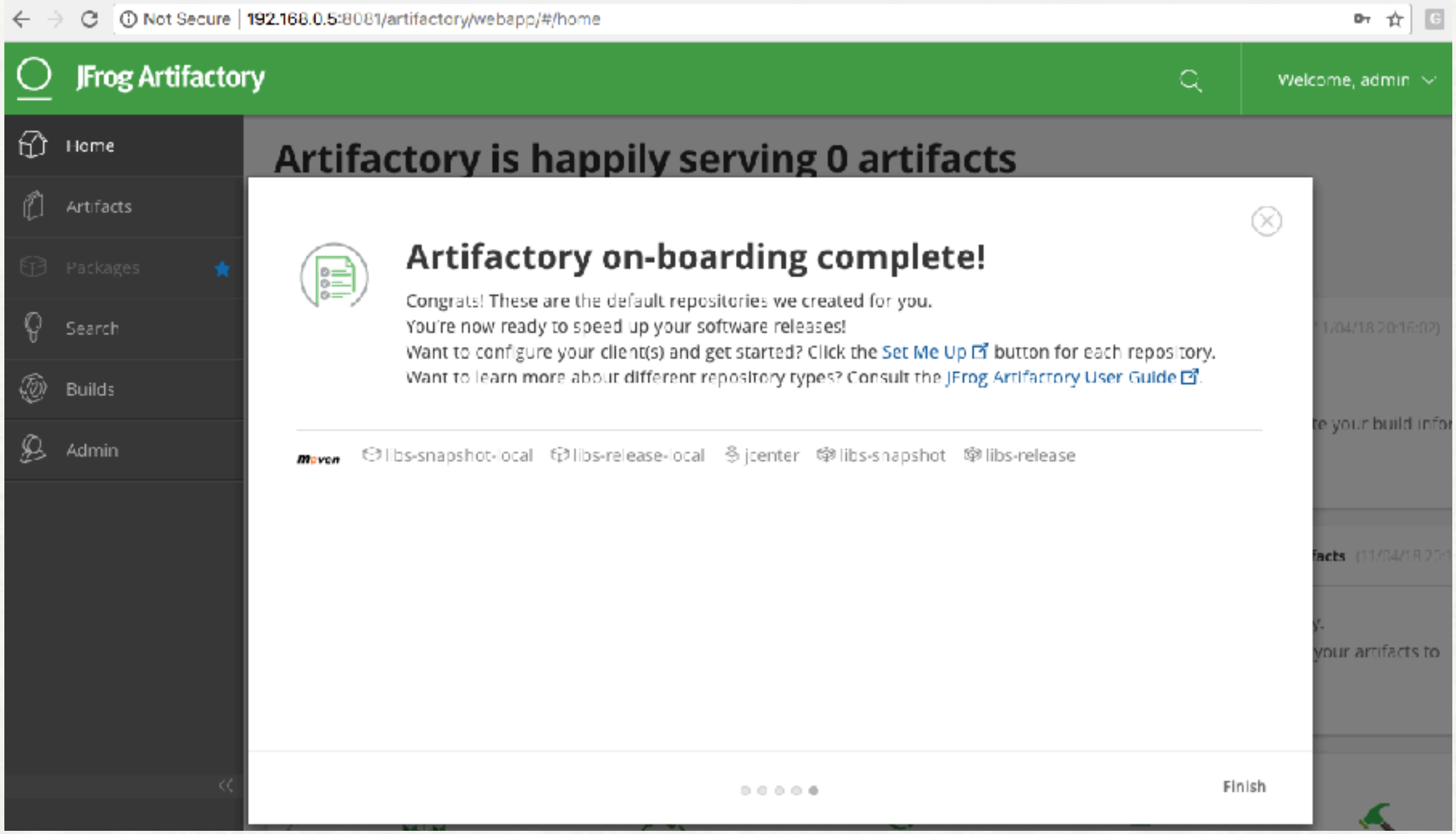

```
sh-3.2# pwd
/devtools
sh-3.2# ls -lrt jfrog-artifactory-oss-5.10.1.zip
-rw-r--r--@ 1 keshavkumari  staff  96686758 Apr 10 23:43 jfrog-artifactory-oss-5.10.1.zip
sh-3.2# unzip jfrog-artifactory-oss-5.10.1.zip
sh-3.2#
sh-3.2# ls -ld artifactory/
drwxr-xr-x@ 17 root  wheel  578 Apr 11 15:22 artifactory/
sh-3.2# cd artifactory/bin/
sh-3.2# pwd
/devtools/artifactory/bin
sh-3.2# # ./artifactory.sh
sh-3.2#
```

JFROG ARTIFACTORY

PORT - 8081

JFROG ARTIFACTORY

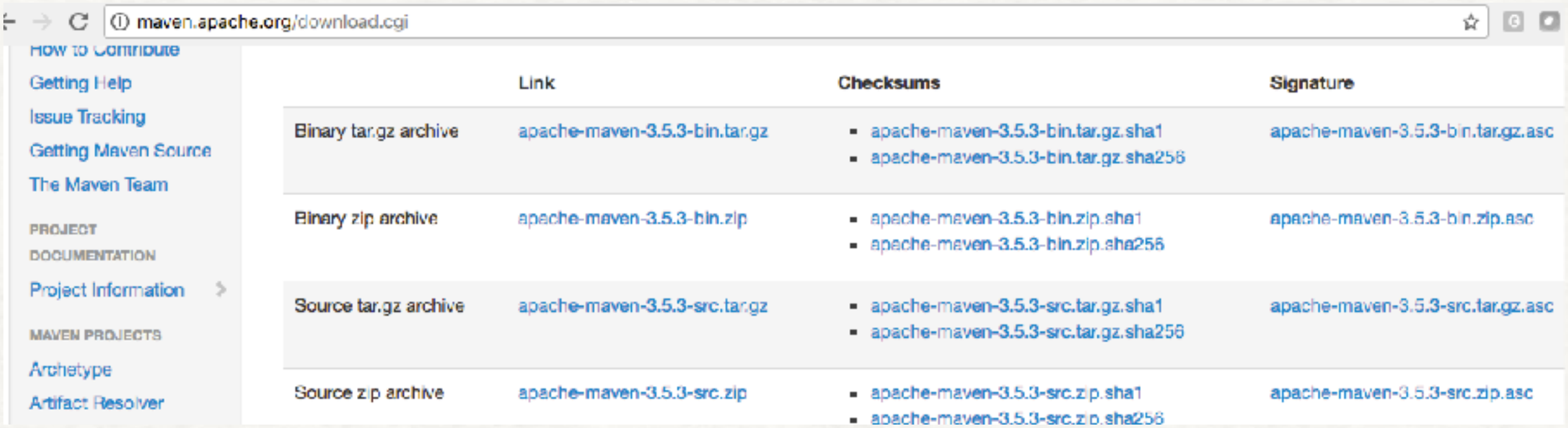
WHILE SETTING UP JFROG ADD MAVEN PLUGIN



Add Maven and continue

MAVEN

DOWNLOAD, INSTALL & CONFIGURE




```
sh-3.2# pwd
/devtools
sh-3.2# ls -lrt apache-maven-3.5.3-bin.tar.gz
-rw-r--r--@ 1 keshavkummari  staff  8799579 Apr 11 09:38 apache-maven-3.5.3-bin.tar.gz
sh-3.2# # tar -xvzf apache-maven-3.5.3-bin.tar.gz
sh-3.2#
sh-3.2# ls -ld maven/
drwxr-xr-x  9 root  wheel  306 Apr 11 09:39 maven/
sh-3.2#
```

MAVEN

BEFORE MODIFY THE .BASH_PROFILE FILE

- Go to user home dir and check the .bash_profile file

```
sh-3.2# pwd
/Users/keshavkummari
sh-3.2# ls -lrt .bash_profile
-rw-r--r--  1 keshavkummari  staff  260 Apr  2  2017 .bash_profile
sh-3.2#
sh-3.2# wc .bash_profile
       8      25     260 .bash_profile
sh-3.2# cat .bash_profile

# added by Anaconda3 4.3.1 installer
export PATH="/Users/keshavkummari/anaconda/bin:$PATH"

# Setting PATH for Python 3.6
# The original version is saved in .bash_profile.pysave
PATH="/Library/Frameworks/Python.framework/Versions/3.6/bin:${PATH}"
export PATH
sh-3.2#
```

MAVEN

SET JAVA HOME PATH IN .BASH_PROFILE FILE

- Set the java home path and cross check

```
sh-3.2# ls -lrt /usr/libexec/java_home
lrwxr-xr-x  1 root  wheel  79 Dec  1 01:28 /usr/libexec/java_home -> /System/Library/Frameworks/JavaVM.framework/Versions/Current/Commands/java_home
sh-3.2# vi .bash_profile
sh-3.2#
sh-3.2# source .bash_profile
sh-3.2#
sh-3.2# cat .bash_profile

# added by Anaconda3 4.3.1 installer
export PATH="/Users/keshavkumari/anaconda/bin:$PATH"

# Setting PATH for Python 3.6
# The original version is saved in .bash_profile.pysave
PATH="/Library/Frameworks/Python.framework/Versions/3.6/bin:${PATH}"
export PATH

# set java
export JAVA_HOME=$(/usr/libexec/java_home)

# maven settings
export M2_HOME=/devtools/maven
export M2=$M2_HOME/bin/
export PATH=$M2:$PATH

sh-3.2# mvn -version
Apache Maven 3.5.3 (3383c37e1f9e9b3bc3df5050c29c8aff9f295297; 2018-02-25T01:19:05+05:30)
Maven home: /devtools/maven
Java version: 1.8.0_161, vendor: Oracle Corporation
Java home: /Library/Java/JavaVirtualMachines/jdk1.8.0_161.jdk/Contents/Home/jre
Default locale: en_US, platform encoding: UTF-8
OS name: "mac os x", version: "10.13.3", arch: "x86_64", family: "mac"
sh-3.2#
```

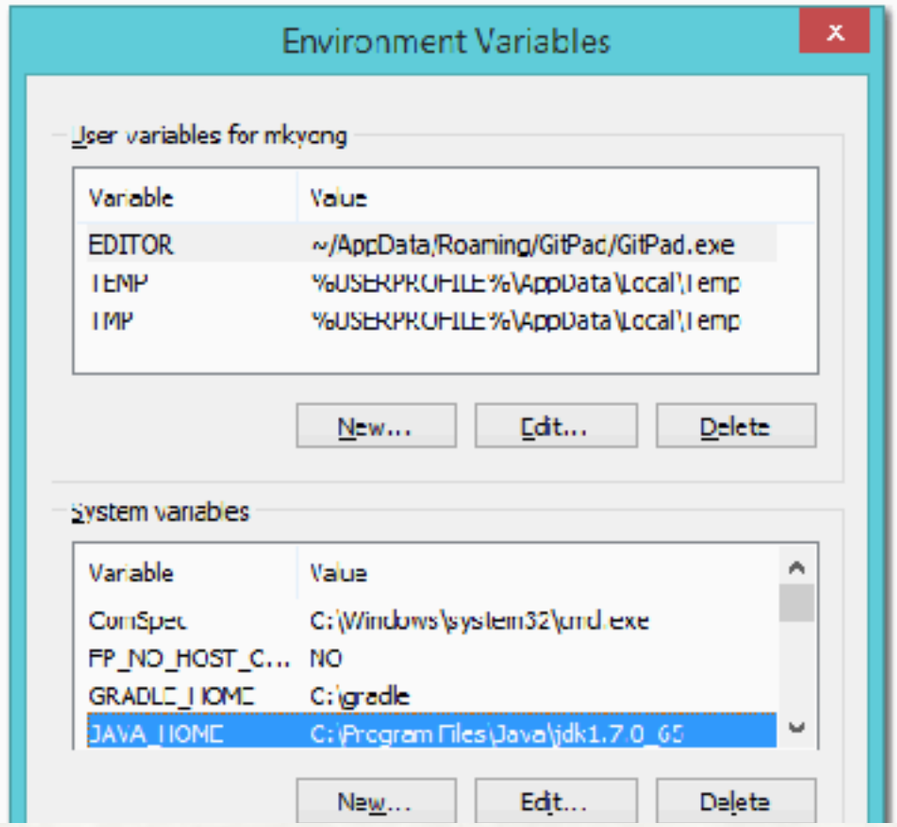
And execute source .bash_profile

HOW TO INSTALL MAVEN ON WINDOWS

- To install Apache Maven on Windows, you just need to download the Maven's zip file, and Unzip it to the directory you wish to install, and configure the Windows environment variables.
- Tools Used :
- JDK 1.7
- Maven 3.2.2
- Windows 8

1. JDK and JAVA_HOME

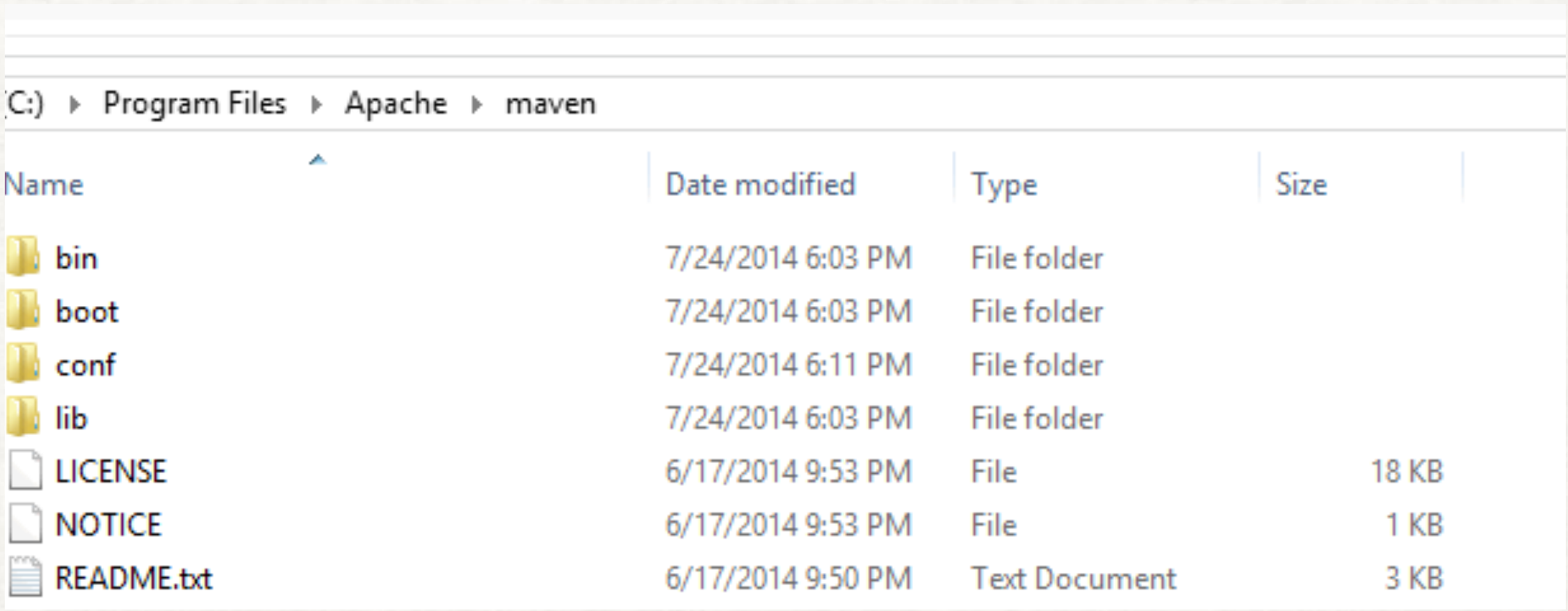
Make sure JDK is installed, and "**JAVA_HOME**" variable is added as Windows environment variable.



DOWNLOAD APACHE MAVEN

- Visit Maven official website, download the Maven zip file, for example : apache-maven-3.2.2-bin.zip. Unzip it to the folder you want to install Maven.

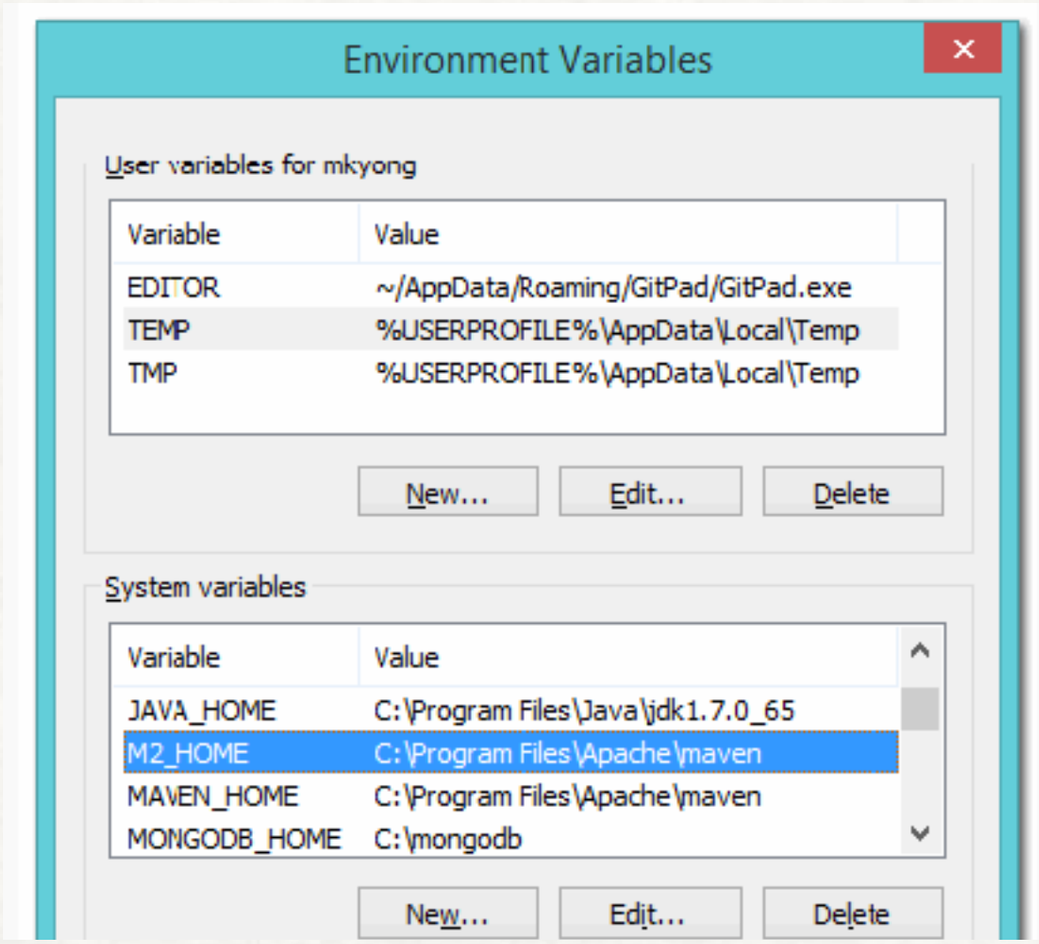
- Assume you unzip to this folder – C:\Program Files\Apache\maven

- 

ADD M2_HOME AND MAVEN_HOME

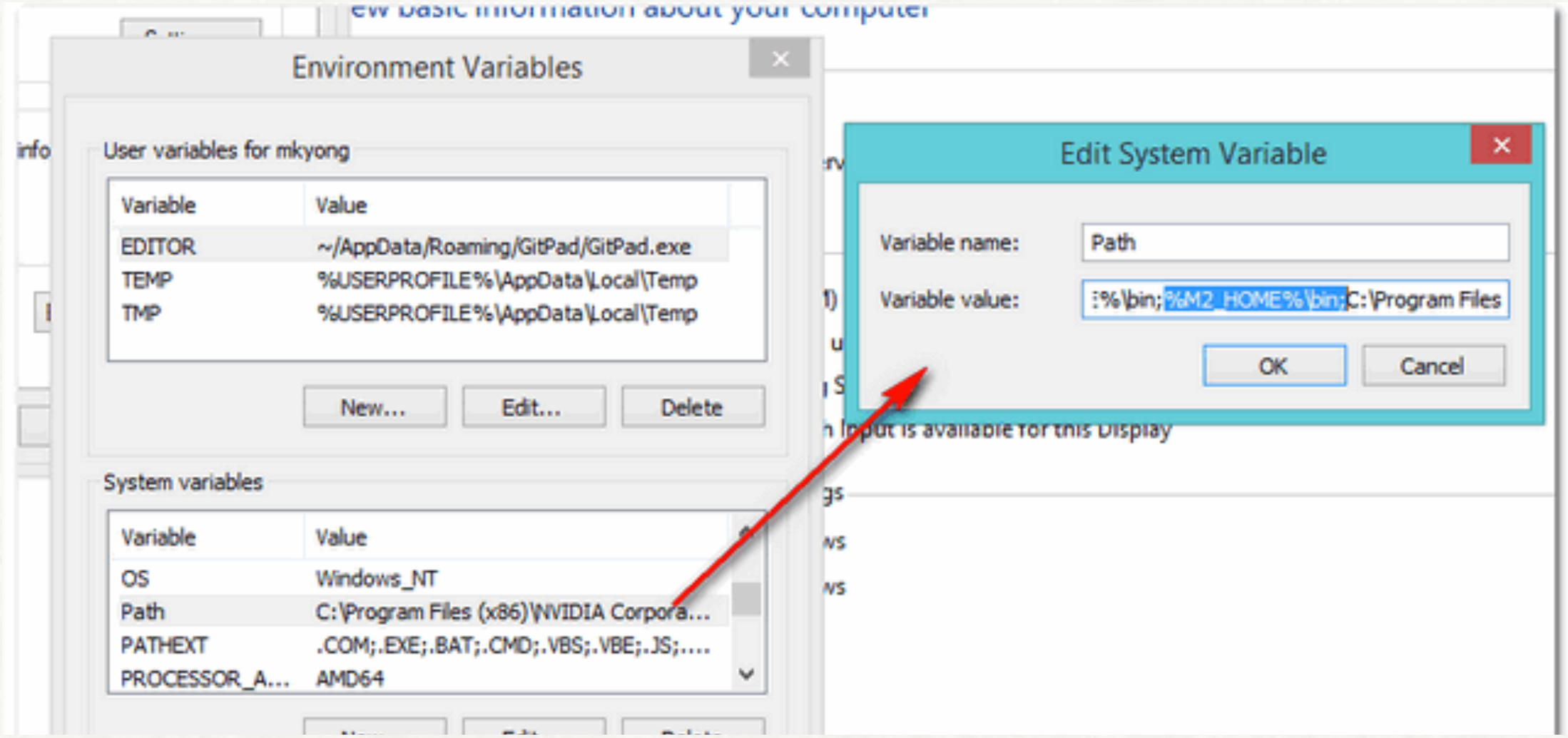
- Add both M2_HOME and MAVEN_HOME variables in the Windows environment, and point it to your Maven folder.

- M2_HOME or MAVEN_HOME : Maven document said add M2_HOME only, but some programs still reference Maven folder with MAVEN_HOME, so, it's safer to add both.

- 

ADD TO PATH

- Update PATH variable, append Maven bin folder – %M2_HOME%\bin, so that you can run the Maven's command everywhere.
-



VERIFICATION

- To verify it, run mvn –version in the command prompt.

C:\Users\kummari>mvn -version

Apache Maven 3.2.2 (45f7c06d68e745d05611f7fd14efb6594181933e; 2014-06-17T21:51:42+08:00)

Maven home: C:\Program Files\Apache\maven

Java version: 1.7.0_65, vendor: Oracle Corporation

Java home: C:\Program Files\Java\jdk1.7.0_65\jre

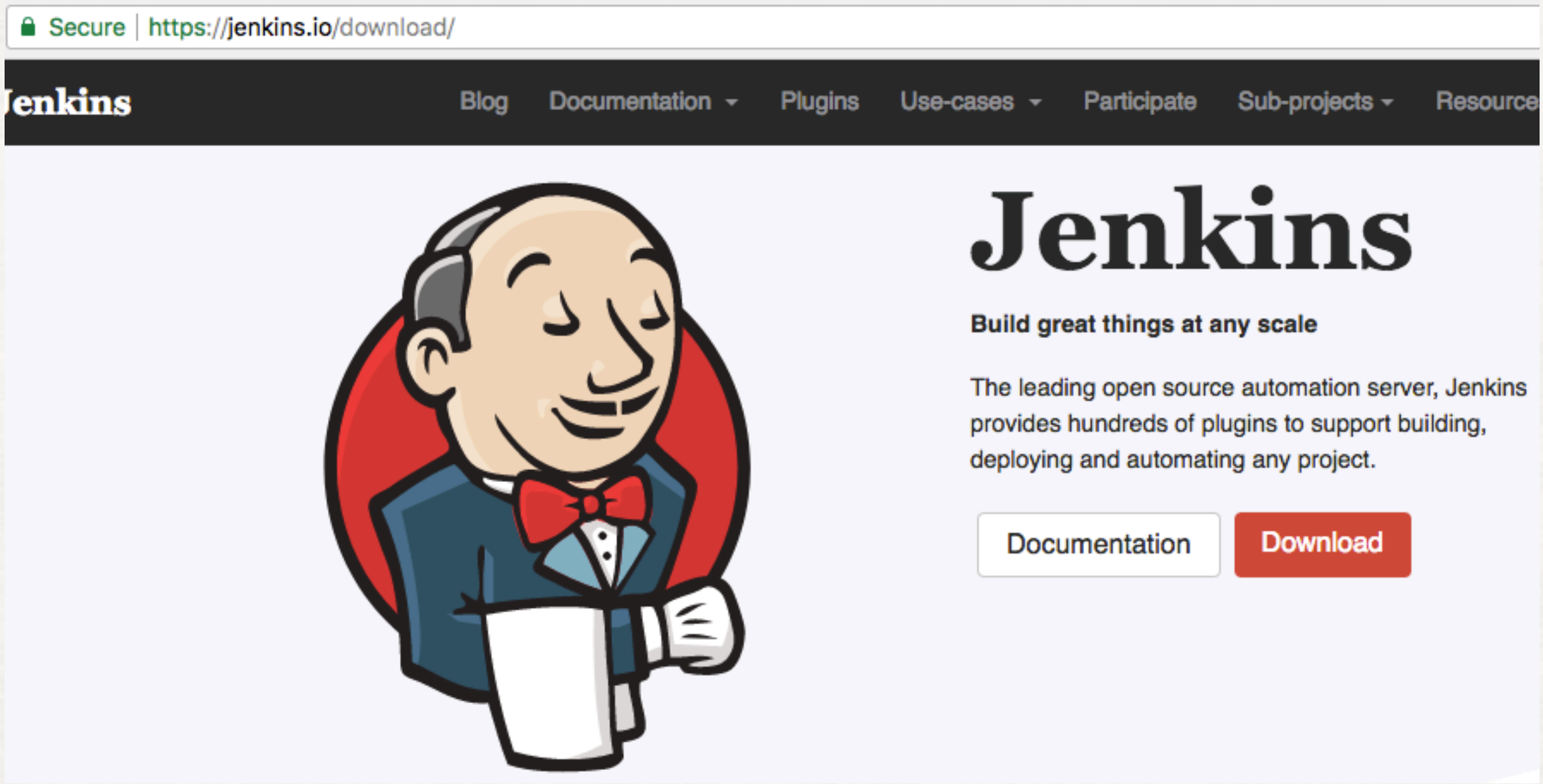
Default locale: en_US, platform encoding: Cp1252

OS name: "windows 8.1", version: "6.3", arch: "amd64", family: "windows"

C:\Users\kummari>

JENKINS

DOWNLOAD, INSTALL & CONFIGURE



https://jenkins.io/download/

JENKINS

CONFIGURE

- Download and install by double clicking the Jenkins file.
- By default Jenkins listen on Port-8080 and even tomcat, hence we need to stop the tomcat and install Jenkins.
- Go to tomcat configuration and modify the tomcat default port to 8181 or 80

```
sh-3.2# grep -H -n 8181 tomcat8/conf/server.xml
tomcat8/conf/server.xml:69:    <Connector port="8181" protocol="HTTP/1.1"
tomcat8/conf/server.xml:75:               port="8181" protocol="HTTP/1.1"
sh-3.2#
```

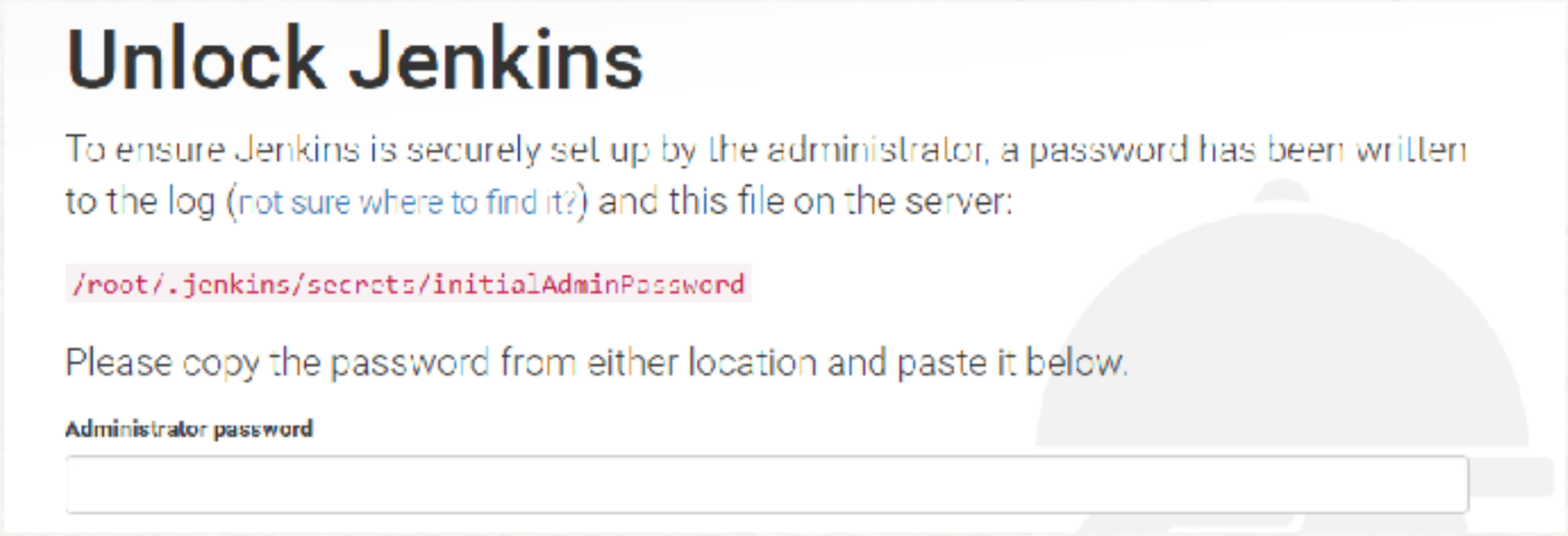
Now, start the tomcat and cross check with new port

```
sh-3.2# pwd
/devtools
sh-3.2# ls -lrt jenkins-2.115.pkg
-rw-r--r--@ 1 keshavkummari  staff  74468938 Apr 11 09:57 jenkins-2.115.pkg
```

Go to Download path and check the jenkins software

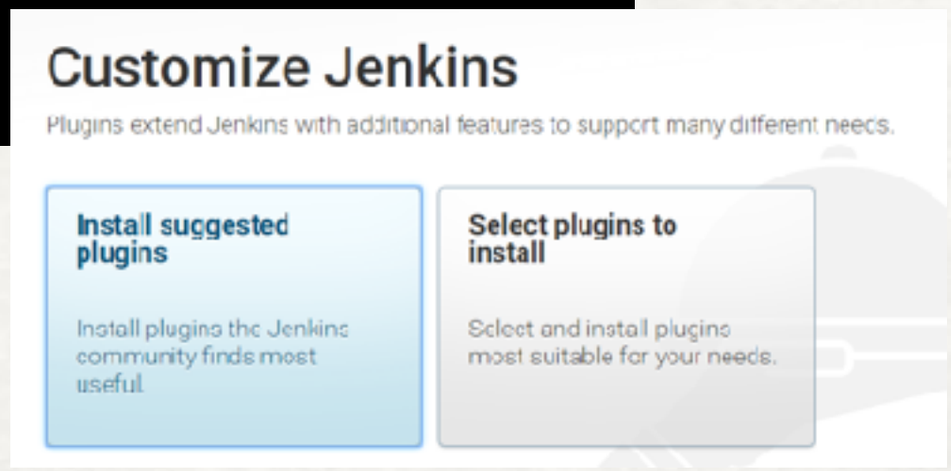
JENKINS

UNLOCK AND INSTALL PLUGINS



Copy the below password and page in the above page

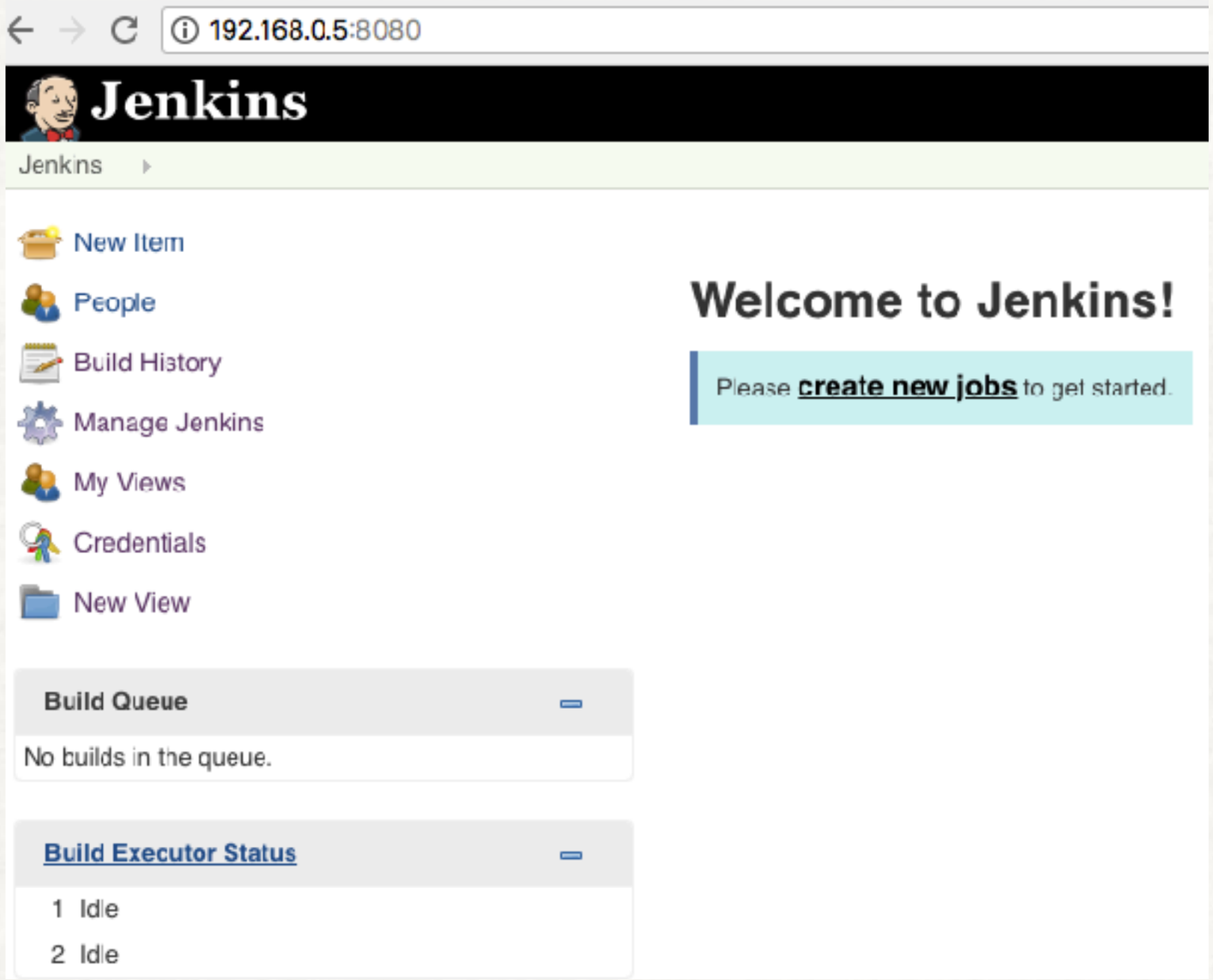
```
[root@Jenkins secrets]#
[root@Jenkins secrets]# cat /root/.jenkins/secrets/initialAdminPassword
9b49e365cd464fa09cd5985d3a0e313d
[root@Jenkins secrets]#
```



JENKINS

JENKINS HOME PAGE

Jenkins



Jenkins Home Page

SECTION-1

WHAT WE HAVE DONE SO FAR

- Tomcat, Artifactory, Jenkins are completed and now Maven

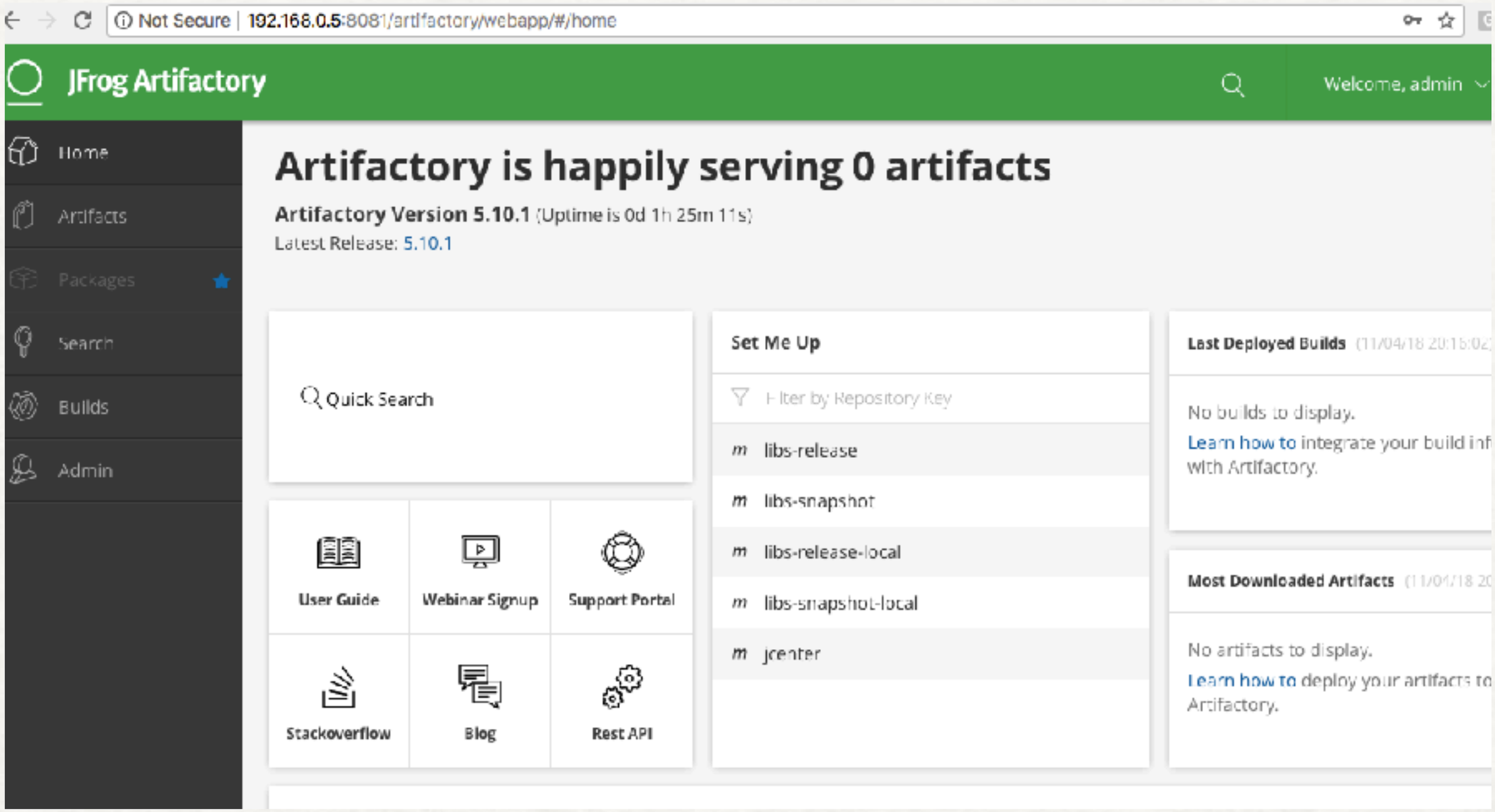
1. Setup Artifactory:
    a. Startup Artifactory
    b. Setup Admin account.
    c. Port: 8081
2. Setup Tomcat:
    a. Startup tomcat.
    b. Update tomcat-users.xml.
    c. Port: 8080
3. Setup Jenkins:
    a. Setup Jenkins.
    b. Port: 8090
4. Setup Maven:
    a. Startup maven home.
    b. Generate maven security.xml and settings-security.xml.

Now, we have to execute step-4

MAVEN SECURITY SETUP

REPOSITORY DETAILS

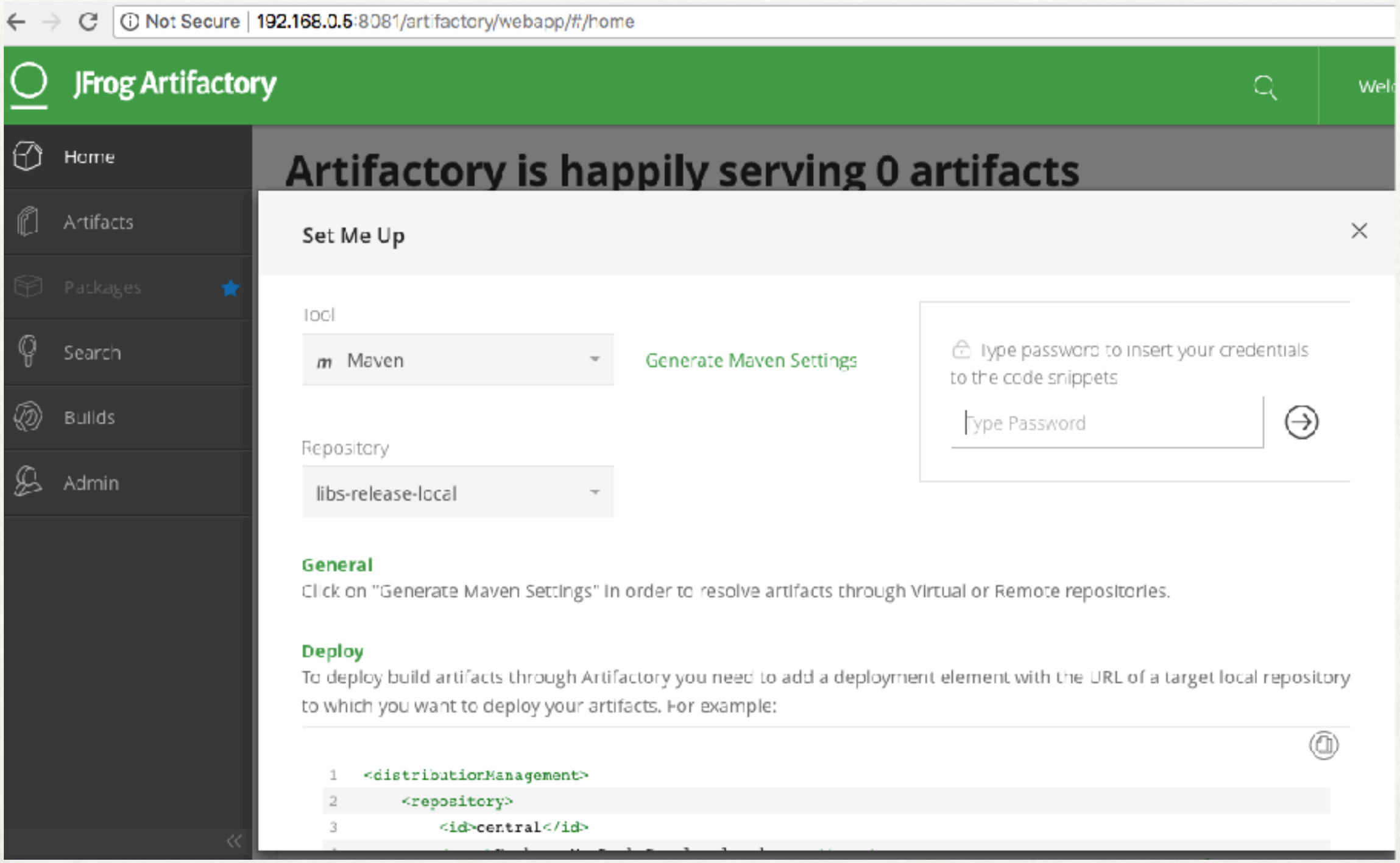
- We can see 5 different repositories



Maven Repositories

GENERATE MAVEN SETTINGS

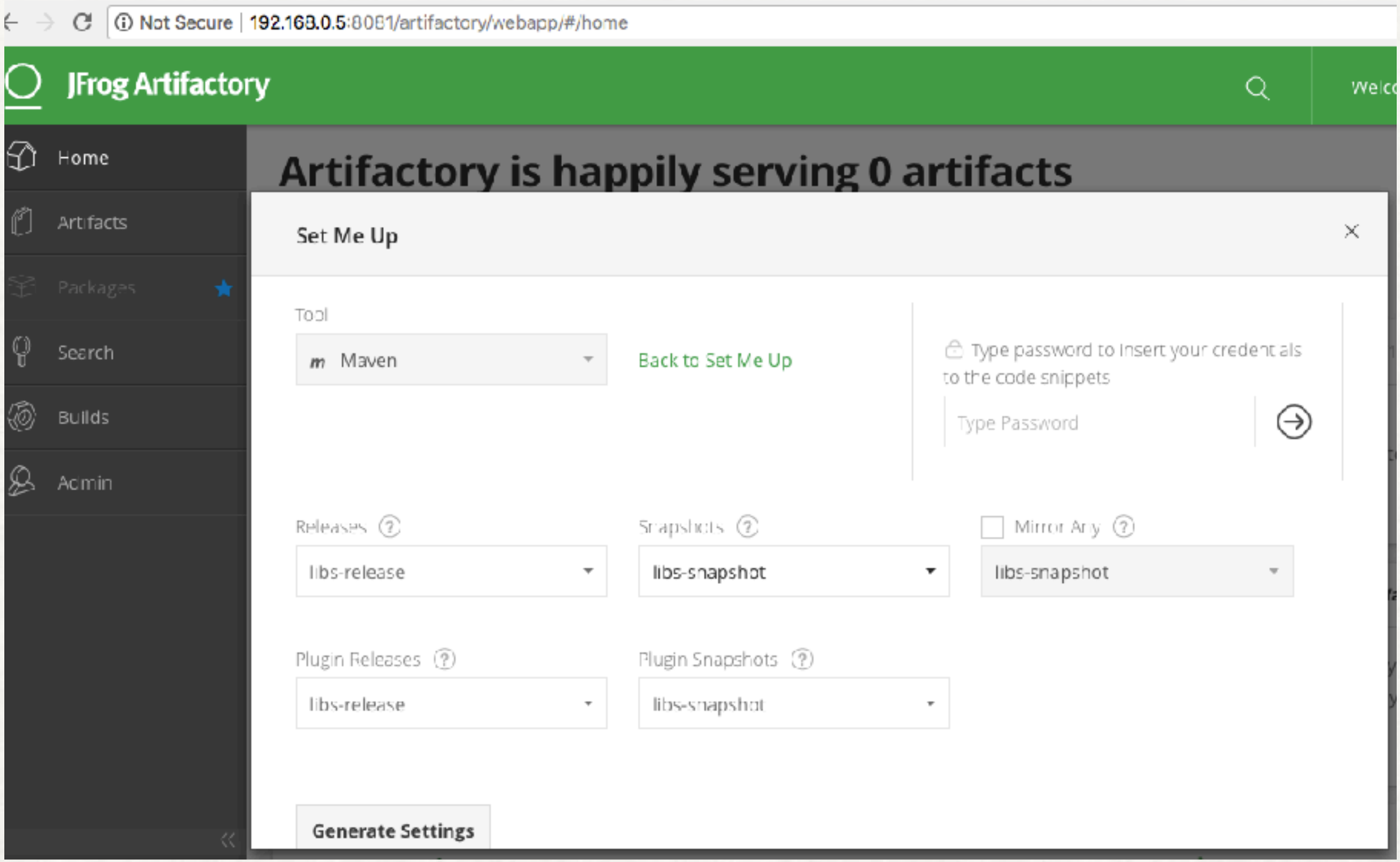
CLICK ON LIBS-RELEASE-LOCAL



Generate Maven Settings

LIBS-RELEASE-LOCAL - GENERATE

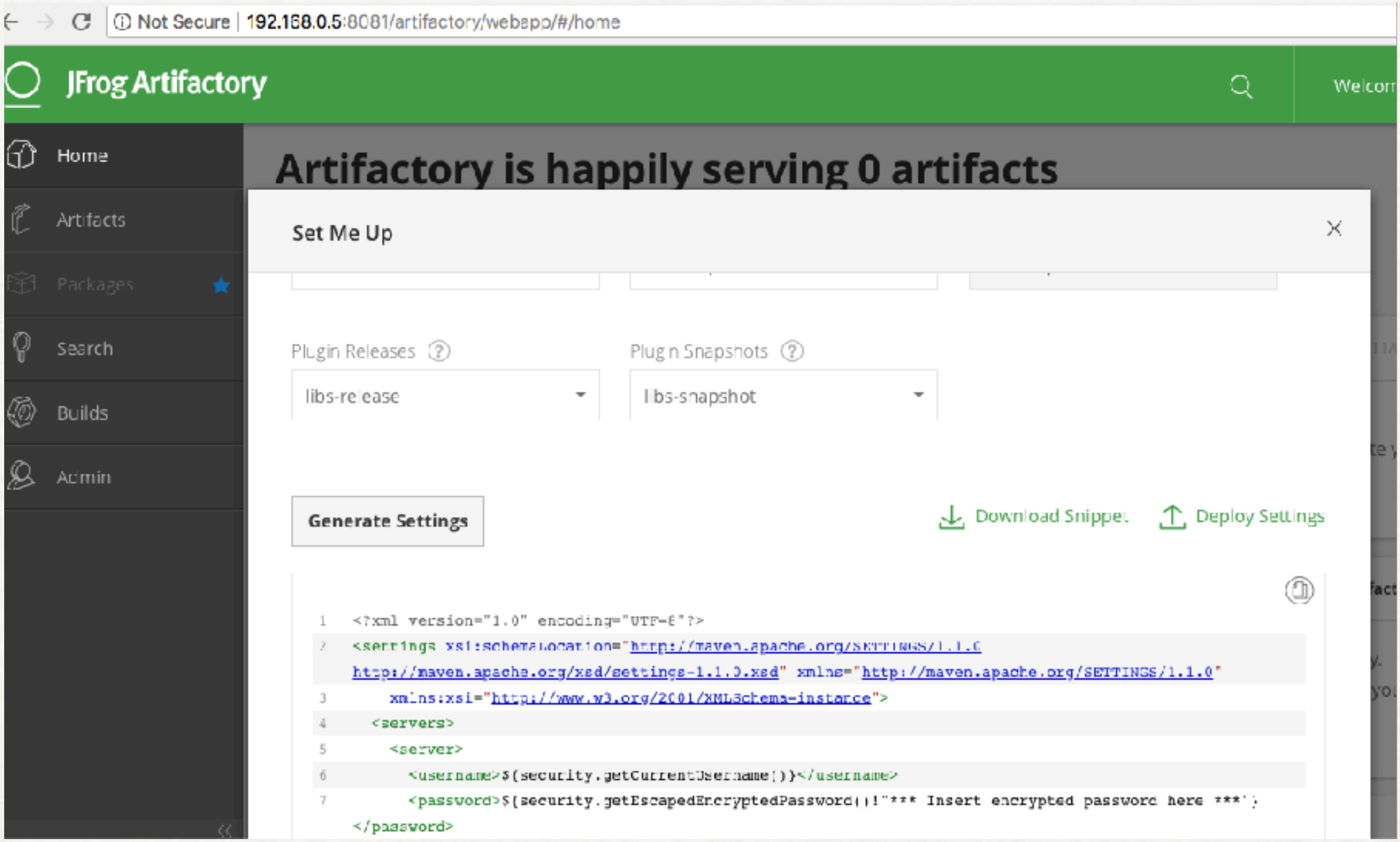
CLICK ON GENERATE SETTINGS



Click on Generate settings and you will see xml configuration file.

DOWNLOAD THE LIBS-RELEASE-LOCAL

CLICK ON DOWNLOAD SNIPPET

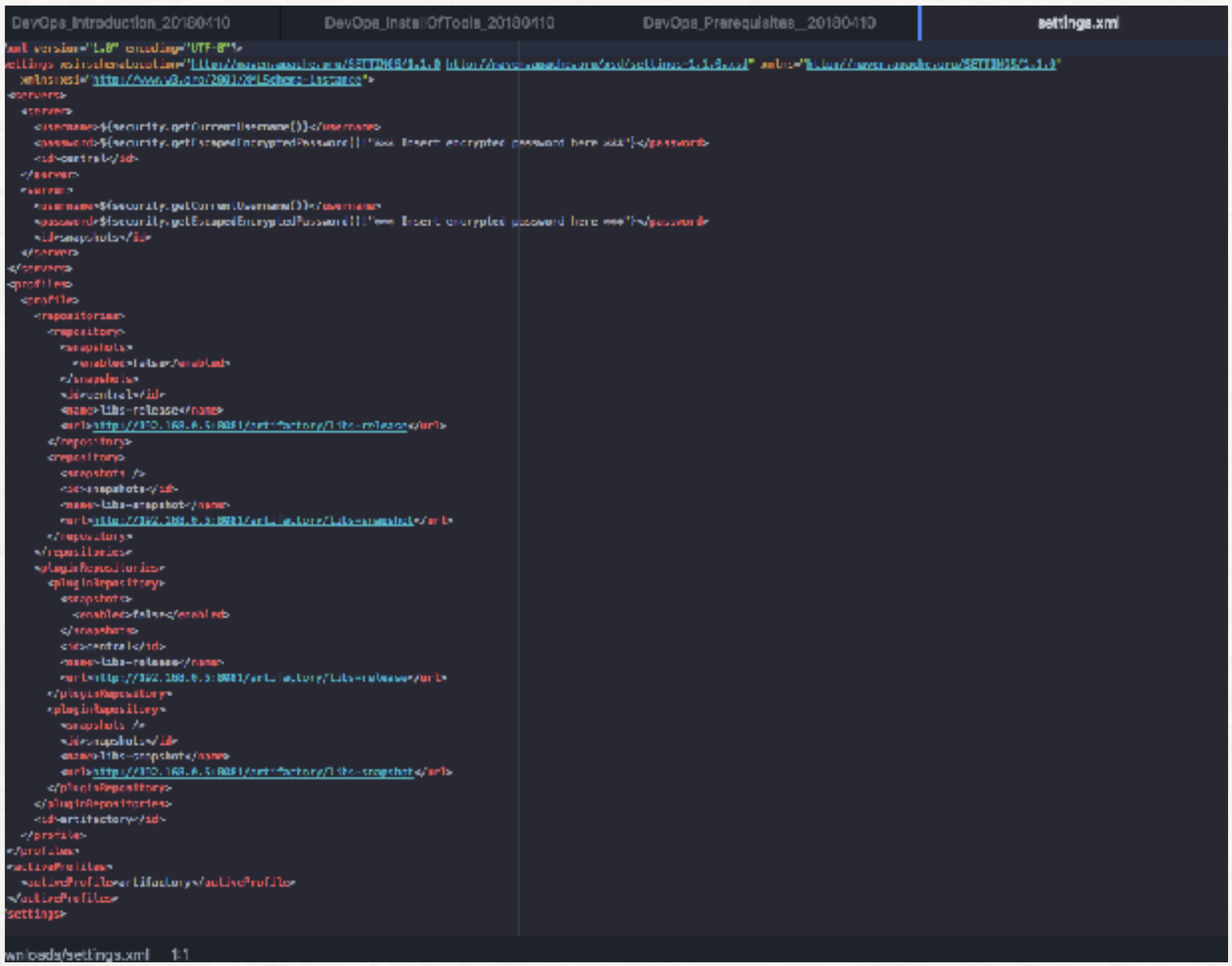


Open the file with ATOM editor

SETTINGS.XML FILE

EDIT THE SETTINGS.XML FILE

- Open with ATOM editor



server.xml file

CREATE A FOLDER I.E. .M2

COPY SETTINGS.XML & SETTINGS-SECURITY.XML FILES IN .M2

```
sh-3.2# mkdir .m2
sh-3.2# pwd
/
sh-3.2# ls -lda .m2/
drwxr-xr-x  2 root  wheel  68 Apr 11 22:11 .m2/
sh-3.2#
sh-3.2# ls -lrta .m2/
total 0
drwxr-xr-x  34 root  wheel  1224 Apr 11 22:11 ..
drwxr-xr-x   2 root  wheel    68 Apr 11 22:11 .
sh-3.2#
```

```
sh-3.2# pwd
/.m2
sh-3.2# ls -lrta
total 16
-rw-r--r--@  1 keshavkummari  staff  1956 Apr 11 20:27 settings.xml
-rw-r--r--@  1 keshavkummari  staff   128 Apr 11 21:50 settings-security.xml
drwxr-xr-x  34 root           wheel  1224 Apr 11 22:11 ..
drwxr-xr-x   4 root           wheel   136 Apr 11 22:14 .
```

Now, we can see both files under .m2 directory

GITHUB

```
$ pwd
/devtools
$ ls -lrt
total 492624
drwxr-xr-x@  3 root           wheel       102 Feb 16 20:34 Sourcetree.app
-rw-r--r--@  1 keshavkummari  staff   9541892 Apr 10 23:12 apache-tomcat-8.5.30.tar.gz
drwxr-xr-x  13 root           wheel       442 Apr 10 23:19 tomcat8
-rw-r--r--@  1 keshavkummari  staff  96686768 Apr 10 23:43 jfrog-artifactory-oss-5.10.1.zip
-rw-r--r--@  1 keshavkummari  staff   8799579 Apr 11 09:38 apache-maven-3.5.3-bin.tar.gz
drwxr-xr-x   9 root           wheel       306 Apr 11 09:39 maven
-rw-r--r--@  1 keshavkummari  staff  74468938 Apr 11 09:57 jenkins-2.115.pkg
-rw-r--r--@  1 keshavkummari  staff  62711230 Apr 11 21:53 Sourcetree_2.7.1d.zip
-rw-r--r--   1 root           wheel       683 Apr 13 08:58 mvn-password
drwxr-xr-x@ 17 root           wheel       578 Apr 15 14:40 artifactory-oss-5.10.1
$
$ mkdir github
$
$ cd github/
$
$ ls -lrt
$
$ mkdir devops
$
$ ls -lrt
total 0
drwxr-xr-x  2 root  wheel  68 Apr 23 22:06 devops
$
$ echo "# devops" >> README.md
$ ls -lrt
total 8
drwxr-xr-x  2 root  wheel  68 Apr 23 22:06 devops
-rw-r--r--  1 root  wheel   9 Apr 23 22:06 README.md
$
```

Git Repo

CLONE

```
Initial commit

Untracked files:
        README.md

nothing added to commit but untracked files present
$ git remote add origin https://github.com/devopskeshav/devops.git
$ git push -u origin master
error: src refspec master does not match any.
error: failed to push some refs to 'https://github.com/devopskeshav/devops.git'
$
$ git remote add origin git@github.com:devopskeshav/devops.git
fatal: remote origin already exists.
$
$ git push -u origin master
error: src refspec master does not match any.
error: failed to push some refs to 'https://github.com/devopskeshav/devops.git'
$
$ git config --global user.name "devops.keshav"
$
$ git config --global user.email "devops.keshav@gmail.com"
$
```

Check now

INTRODUCTION