DAP4.0 – DevOps PoC-1

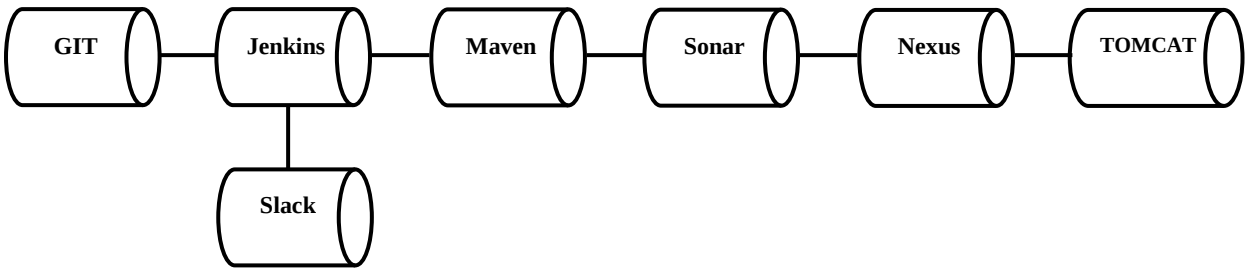
Employee Id:	353882
Employee Name:	Srinivas Inampudi
Program:	DAP4.0 – DevOps
Mentor Name:	Anindya Bhattacharya
Use Case:	CI/CD Pipeline leveraging the tool stack which is in the curriculum

Table of Contents

DAP4.0 – DevOps PoC-1 2
1. CI-CD Pipeline Diagram 2
2. Create GCP Account 2
3. Create GIT HUB Account 2
4. TOMCAT Installation 3
5. Nexus Installation 5
   Create VM and Install Nexus 5
6. Sonar Qube Installation 9
   Create VM and Install Sonar Qube 9
7. Jenkins and Maven Installation 12
   Create VM and Install Jenkins 12
8. Jenkins Integration with other Tools 17
   Install Plug-ins that are required for CI-CD pipeline implementation 17
   Github integration with Jenkins 19
   Sonar Qube integration with Jenkins 20
   Slack integration with Jenkins 20
   Nexus integration with Jenkins 23
9. CI-CD Pipeline Job in Jenkins 23
   Continuous_Integration_Job 23
   Continuous_Deployment_Job 27
   Create Pipeline View 29
10. Validation Screen Shots 30

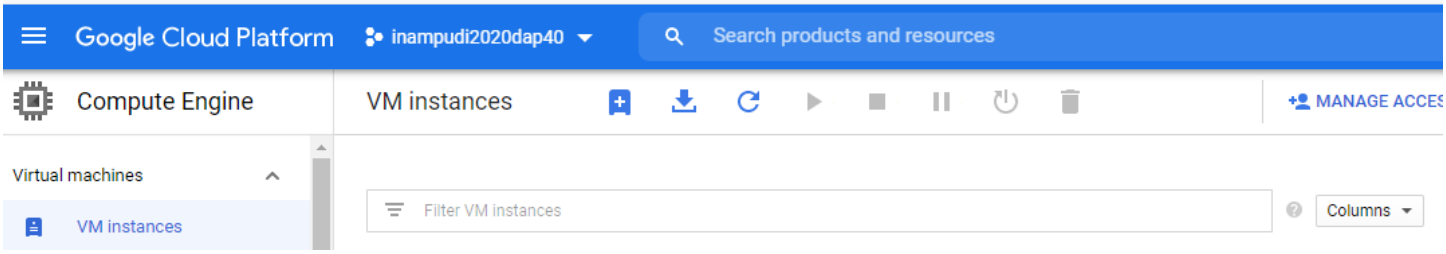
DAP4.0 – DevOps PoC-1

1. CI-CD Pipeline Diagram



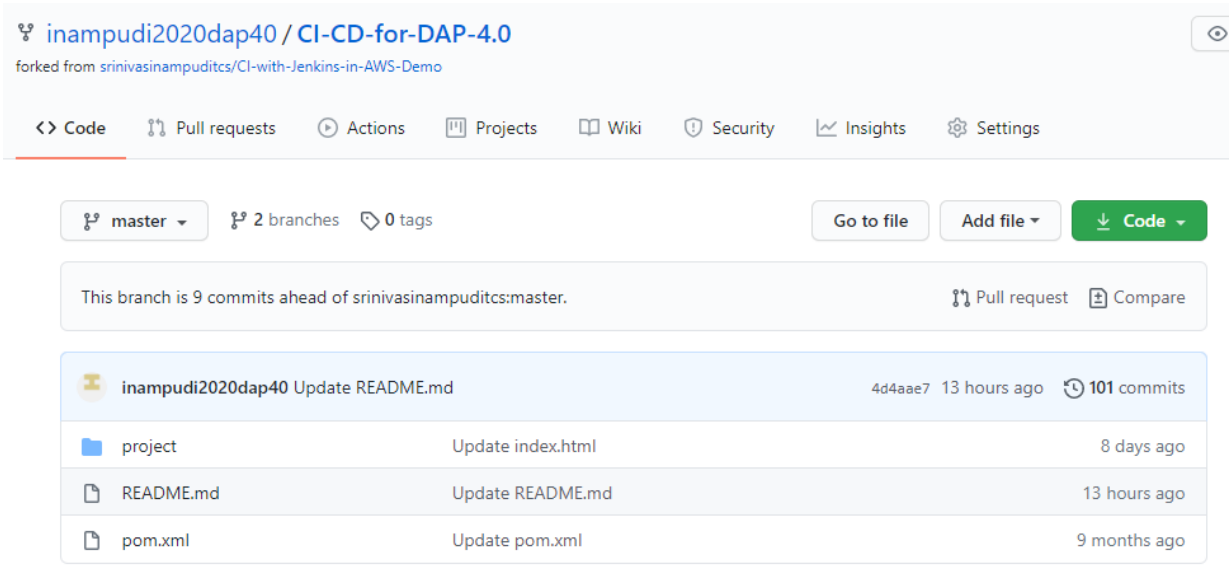
2. Create GCP Account

Created a GCP account and created a Project: inampudi2020dap40



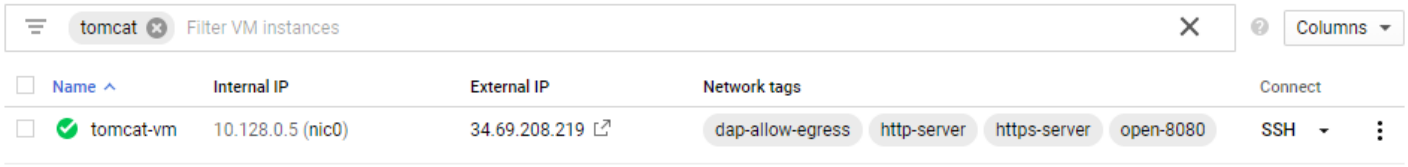
3. Create GIT HUB Account

Created a new GIT Hub account – **inampudi2020dap40** and forked a project to a new repository **CI-CD-for-DAP-4.0**



4. TOMCAT Installation

Created a VM for TOMCAT and install TOMCAT



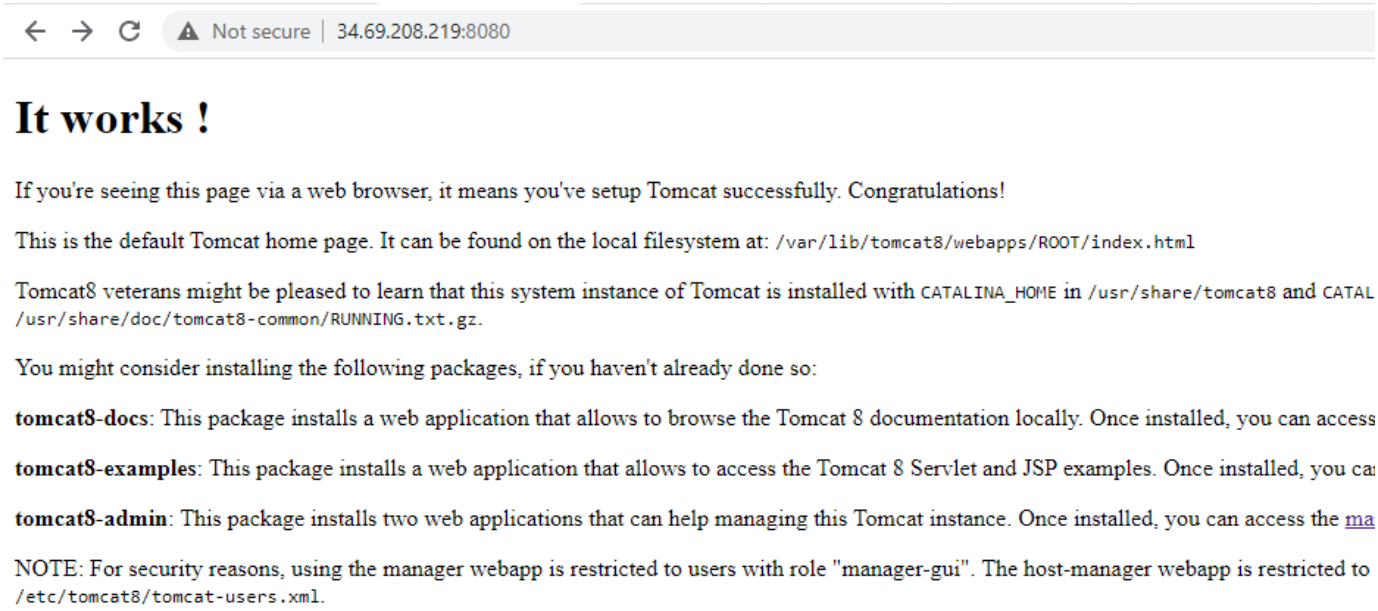

```
inampudi_2020_dap4_0@tomcat-vm:~$ sudo apt-get install tomcat8
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no
  grub-pc-bin motd-news-config
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  authbind libcommons-collections3-java libcommons-dbcp-java li
Suggested packages:
  libcommons-collections3-java-doc libcommons-dbcp-java-doc lib
  tomcat8-admin tomcat8-docs tomcat8-examples tomcat8-user
```

```
inampudi_2020_dap4_0@tomcat-vm:~$ sudo apt-get install tomcat8-docs tomcat8-examples tomcat8-admin
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  grub-pc-bin motd-news-config
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  libjakarta-taglibs-standard-java libjaxp1.3-java libjstl1.1-java libxalan2-java libxerces2-java li
  libxml-commons-resolver1.1-java
```

Start TOMCAT service

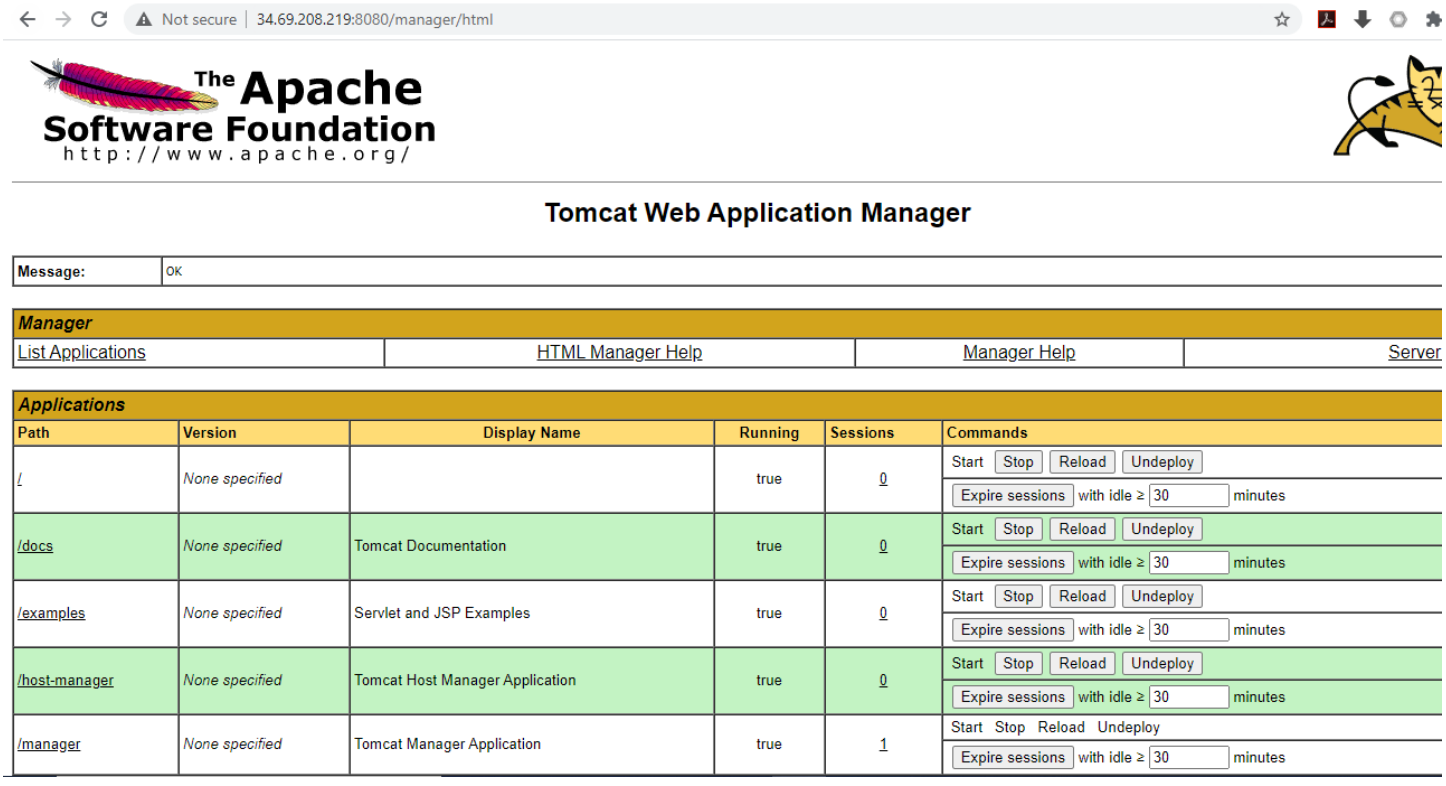
```
inampudi_2020_dap4_0@tomcat-vm:~$ sudo systemctl start tomcat8
inampudi_2020_dap4_0@tomcat-vm:~$ ps -ef | grep tomcat8
tomcat8    9814     1  1 06:01 ?        00:00:08 /usr/lib/jvm/java-8-openjdk-amd64/bin/java -Djava.util.logging.config.file=/var/lib/tomcat8/co
nf/logging.properties -Djava.util.logging.manager=org.apache.juli.ClassLoaderLogManager -Djava.awt.headless=true -Xmx128m -XX:+UseConcMarkSwee
pGC -Djava.endorsed.dirs=/usr/share/tomcat8/endorsed -classpath /usr/share/tomcat8/bin/bootstrap.jar:/usr/share/tomcat8/bin/tomcat-juli.jar -D
catalina.base=/var/lib/tomcat8 -Dcatalina.home=/usr/share/tomcat8 -Djava.io.tmpdir=/tmp/tomcat8-tomcat8-tmp org.apache.catalina.startup.Bootst
rap start
```

Access TOMCAT by http://34.69.208.219:8080/



Add admin user and password

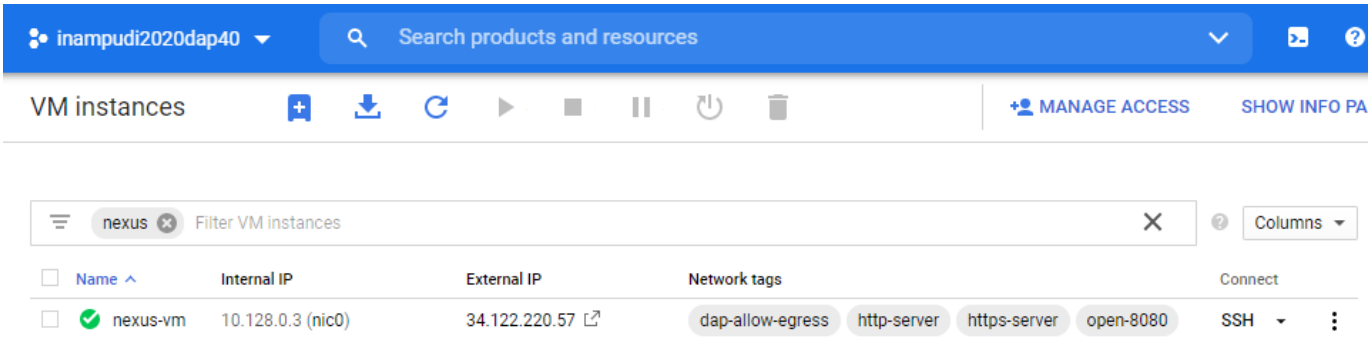
```
inampudi_2020_dap4_0@tomcat-vm:~$
inampudi_2020_dap4_0@tomcat-vm:~$ sudo vi /var/lib/tomcat8/conf/tomcat-users.xml
inampudi_2020_dap4_0@tomcat-vm:~$
inampudi_2020_dap4_0@tomcat-vm:~$ sudo grep inampudi /var/lib/tomcat8/conf/tomcat-users.xml
  <user username="inampudi2020dap40" password="inampudi2020dap40" roles="admin,manager,admin-script,manager-gui,manager-script,manager-jmx,man
ager-status,admin-gui"/>
inampudi_2020_dap4_0@tomcat-vm:~$
inampudi_2020_dap4_0@tomcat-vm:~$ sudo systemctl restart tomcat8
inampudi_2020_dap4_0@tomcat-vm:~$
```



5. Nexus Installation

Create VM and Install Nexus

i. Create a VM with Ubuntu



ii. **sudo apt-get update**

```
inampudi_2020_dap4_0@nexus-vm:~$ sudo apt-get update
Hit:1 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial InRelease
Get:2 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-updates InRelease [109 kB]
Get:3 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-backports InRelease [107 kB]
Get:4 http://security.ubuntu.com/ubuntu xenial-security InRelease [109 kB]
Get:5 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial/universe amd64 Packages [7,532 kB]
Get:6 http://archive.canonical.com/ubuntu xenial InRelease [11.5 kB]
Get:7 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial/universe Translation-en [4,354 kB]
Get:8 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial/multiverse amd64 Packages [144 kB]
Get:9 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial/multiverse Translation-en [106 kB]
Get:10 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-updates/main amd64 Packages [1,861 kB]
Get:11 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-updates/main Translation-en [451 kB]
Get:12 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-updates/restricted amd64 Packages [10.2 kB]
Get:13 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-updates/universe amd64 Packages [1,178 kB]
Get:14 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-updates/universe Translation-en [344 kB]
Get:15 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-updates/multiverse amd64 Packages [23.0 kB]
Get:16 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-updates/multiverse Translation-en [8,632 B]
Get:17 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-backports/main amd64 Packages [9,812 B]
Get:18 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-backports/main Translation-en [4,456 B]
Get:19 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-backports/universe amd64 Packages [11.3 kB]
Get:20 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-backports/universe Translation-en [4,476 B]
Get:21 http://security.ubuntu.com/ubuntu xenial-security/main amd64 Packages [1,458 kB]
Get:22 http://security.ubuntu.com/ubuntu xenial-security/main Translation-en [347 kB]
Get:23 http://security.ubuntu.com/ubuntu xenial-security/restricted amd64 Packages [9,824 B]
Get:24 http://security.ubuntu.com/ubuntu xenial-security/universe amd64 Packages [755 kB]
Get:25 http://security.ubuntu.com/ubuntu xenial-security/universe Translation-en [213 kB]
Get:26 http://security.ubuntu.com/ubuntu xenial-security/multiverse amd64 Packages [8,228 B]
Get:27 http://security.ubuntu.com/ubuntu xenial-security/multiverse Translation-en [2,888 B]
Get:28 http://archive.canonical.com/ubuntu xenial/partner amd64 Packages [3,124 B]
Get:29 http://archive.canonical.com/ubuntu xenial/partner Translation-en [1,672 B]
Fetched 19.2 MB in 3s (5,250 kB/s)
Reading package lists... Done
```

iii. Install JRE - **sudo apt-get install openjdk-8-jre**

```
inampudi_2020_dap4_0@nexus-vm:~$ sudo apt-get install openjdk-8-jre
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  grub-pc-bin motd-news-config
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  ca-certificates-java fontconfig fontconfig-config fonts-dejavu-core fonts-dejavu
  libasound2-data libasyncns0 libatk1.0-0 libatk1.0-data libavahi-client3 libavahi
  libdatrie1 libdrm-amdgpu1 libdrm-intel1 libdrm-nouveau2 libdrm-radeon1 libflac8
  libgif7 libgl1-mesa-dri libgl1-mesa-glx libglapi-mesa libgraphite2-3 libgtk2.0-0
  libjpeg-turbo8 libjpeg8 liblcms2-2 libllvm6.0 libnspr4 libnss3 libnss3-nssdb lib
  libpciaccess0 libpcsclite1 libpixman-1-0 libpulse0 libsensors4 libsndfile1 libth
  libvorbisenc2 libx11-xcb1 libxcb-dri2-0 libxcb-dri3-0 libxcb-glx0 libxcb-present
  libxcursor1 libxdamage1 libxfixes3 libxi6 libxinerama1 libxrandr2 libxrender1 li
  x11-common
Suggested packages:
```

```
Setting up openjdk-8-jre:amd64 (8u265-b01-0ubuntu2~16.04) ...
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/jre/bin/po
Processing triggers for libc-bin (2.23-0ubuntu11.2) ...
Processing triggers for ureadahead (0.100.0-19.1) ...
Processing triggers for systemd (229-4ubuntu21.29) ...
Processing triggers for ca-certificates (20190110~16.04.1) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...

done.
done.
inampudi_2020_dap4_0@nexus-vm:~$
```

iv. Install JDK - **sudo apt-get install -y openjdk-8-jdk**

```
inampudi_2020_dap4_0@nexus-vm:~$ sudo apt-get install -y openjdk-8-jdk
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  grub-pc-bin motd-news-config
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  libice-dev libice6 libpthread-stubs0-dev libsm-dev libsm6 libx11-dev libx11-doc li
  openjdk-8-jdk-headless x11proto-core-dev x11proto-input-dev x11proto-kb-dev xorg-s
Suggested packages:
  libice-doc libsm-doc libxcb-doc libxt-doc openjdk-8-demo openjdk-8-source visualvm
The following NEW packages will be installed:
  libice-dev libice6 libpthread-stubs0-dev libsm-dev libsm6 libx11-dev libx11-doc li
  openjdk-8-jdk openjdk-8-jdk-headless x11proto-core-dev x11proto-input-dev x11proto-
0 upgraded, 19 newly installed, 0 to remove and 10 not upgraded.
Need to get 13.2 MB of archives.
After this operation, 60.1 MB of additional disk space will be used.
```

```
Setting up openjdk-8-jdk:amd64 (8u265-b01-0ubuntu2~16.04) ...
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/bin/appletviewe
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/bin/jconsole to
Processing triggers for libc-bin (2.23-0ubuntu11.2) ...
inampudi_2020_dap4_0@nexus-vm:~$
inampudi_2020_dap4_0@nexus-vm:~$
```

v. Validate Java version : **java -version**

```
inampudi_2020_dap4_0@nexus-vm:~$ java -version
openjdk version "1.8.0_265"
OpenJDK Runtime Environment (build 1.8.0_265-8u265-b01-0ubuntu2~16.04-b01)
OpenJDK 64-Bit Server VM (build 25.265-b01, mixed mode)
inampudi_2020_dap4_0@nexus-vm:~$
```

vi. Download and extract nexus : wget https://download.sonatype.com/nexus/3/latest-unix.tar.gz

```
inampudi_2020_dap4_0@nexus-vm:~$ pwd
/home/inampudi_2020_dap4_0
inampudi_2020_dap4_0@nexus-vm:~$ wget https://download.sonatype.com/nexus/3/latest-unix.tar.gz
--2020-10-07 17:58:53--  https://download.sonatype.com/nexus/3/latest-unix.tar.gz
Resolving download.sonatype.com (download.sonatype.com)... 52.8.211.60, 52.9.82.11
Connecting to download.sonatype.com (download.sonatype.com)|52.8.211.60|:443... connected.
HTTP request sent, awaiting response... 302 Moved Temporarily
Location: https://sonatype-download.global.ssl.fastly.net/repository/downloads-prod-group/3/nexus-3.28.0-01-unix.tar.gz [following]
--2020-10-07 17:58:53--  https://sonatype-download.global.ssl.fastly.net/repository/downloads-prod-group/3/nexus-3.28.0-01-unix.tar.gz
Resolving sonatype-download.global.ssl.fastly.net (sonatype-download.global.ssl.fastly.net)... 151.101.1.194, 151.101.65.194, 151.101.129.194,
 ...
Connecting to sonatype-download.global.ssl.fastly.net (sonatype-download.global.ssl.fastly.net)|151.101.1.194|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 166492158 (159M) [application/x-gzip]
Saving to: 'latest-unix.tar.gz'

latest-unix.tar.gz                  100%[=================================================================>] 158.78M   124MB/s    in 1.3s

2020-10-07 17:58:58 (124 MB/s) - 'latest-unix.tar.gz' saved [166492158/166492158]

inampudi_2020_dap4_0@nexus-vm:~$ ls
latest-unix.tar.gz
```

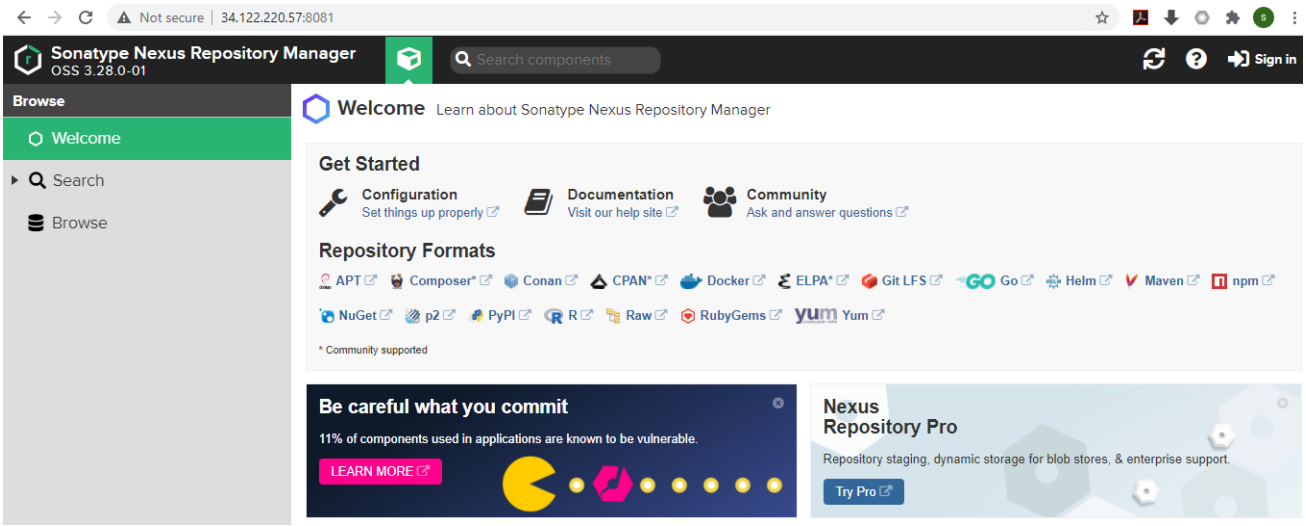
```
inampudi_2020_dap4_0@nexus-vm:~$ tar xvzf latest-unix.tar.gz
nexus-3.28.0-01/.install4j/9d17dc87.1prop
nexus-3.28.0-01/.install4j/MessagesDefault
nexus-3.28.0-01/.install4j/build.uuid
nexus-3.28.0-01/.install4j/i4j_extf_0_17is1ik.utf8
nexus-3.28.0-01/.install4j/i4j_extf_10_17is1ik_10358jn.png
nexus-3.28.0-01/.install4j/i4j_extf_11_17is1ik_1gne9sv.png
nexus-3.28.0-01/.install4j/i4j_extf_12_17is1ik_sc8j43.png
nexus-3.28.0-01/.install4j/i4j_extf_13_17is1ik_10nxrsm.png
nexus-3.28.0-01/.install4j/i4j_extf_14_17is1ik_yd7am4.png
nexus-3.28.0-01/.install4j/i4j_extf_15_17is1ik_vu6hgs.png
```

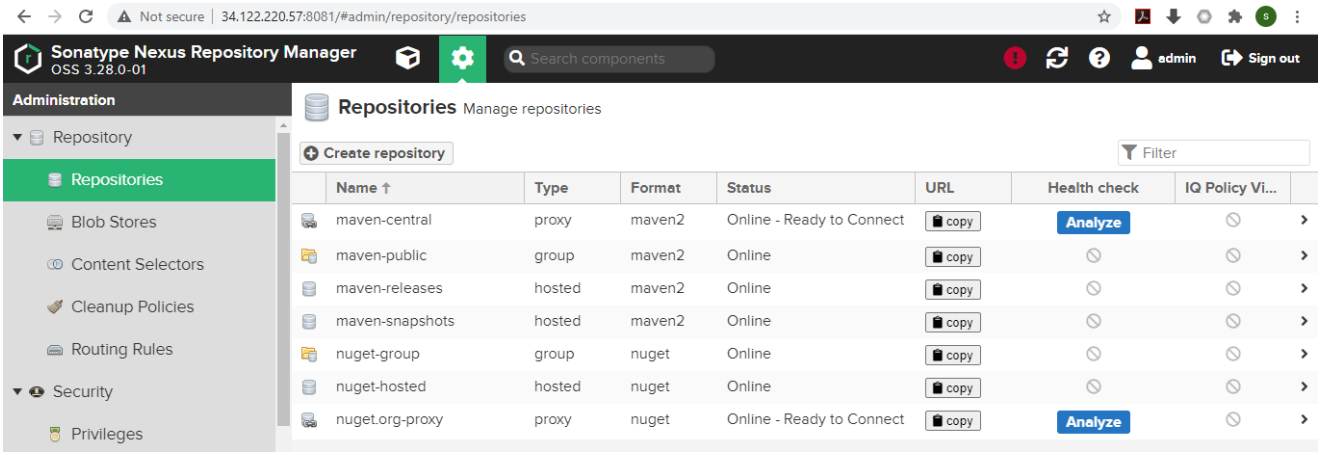
vii. Go to bin directory and Start Nexus - ./nexus run

```
inampudi_2020_dap4_0@nexus-vm:~$ ls
latest-unix.tar.gz  nexus-3.28.0-01  sonatype-work
inampudi_2020_dap4_0@nexus-vm:~$ cd nexus-3.28.0-01/
inampudi_2020_dap4_0@nexus-vm:~/nexus-3.28.0-01$ ls
bin  deploy  etc  lib  NOTICE.txt  OSS-LICENSE.txt  PRO-LICENSE.txt  public  system
inampudi_2020_dap4_0@nexus-vm:~/nexus-3.28.0-01$ cd bib
-bash: cd: bib: No such file or directory
inampudi_2020_dap4_0@nexus-vm:~/nexus-3.28.0-01$ cd bin
inampudi_2020_dap4_0@nexus-vm:~/nexus-3.28.0-01/bin$ ./nexus run
2020-10-07 18:04:22,037+0000 INFO  [FelixStartLevel] *SYSTEM org.sonatype.nexus.pax.
2020-10-07 18:04:22,854+0000 INFO  [FelixStartLevel] *SYSTEM org.sonatype.nexus.feat
ing
2020-10-07 18:04:25,036+0000 WARN  [FelixStartLevel] *SYSTEM uk.org.lidalia.sysoutsl
ework class org.ops4j.pax.logging.slf4j.Slf4jLogger is not known - if it needs acces
need to register it by calling registerLoggingSystemPackage
```

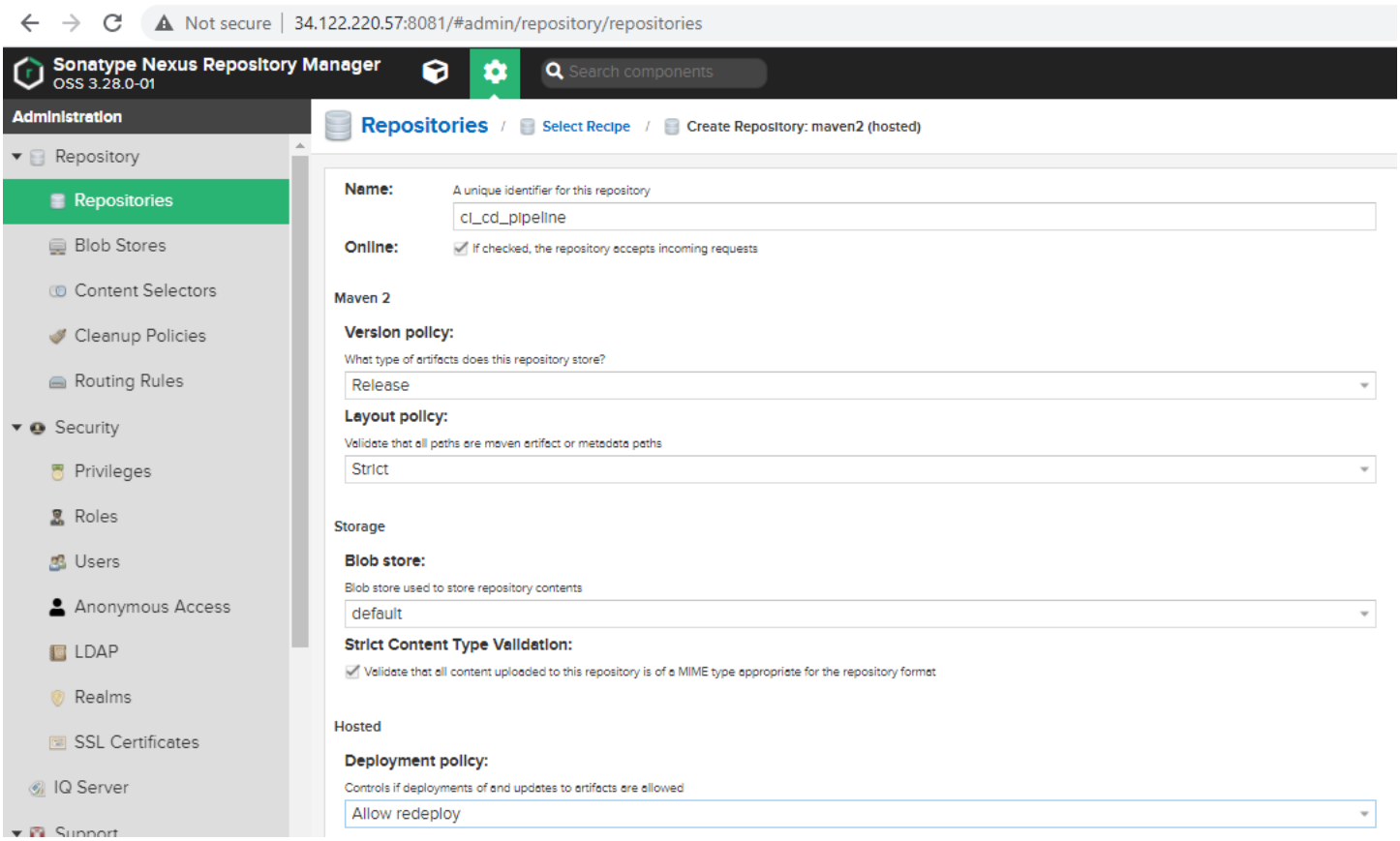
```
-------------------------------------------------

Started Sonatype Nexus OSS 3.28.0-01

-------------------------------------------------
2020-10-07 18:05:22,266+0000 INFO  [FelixStartLevel] *SYSTEM org.sonatype.nexus.quartz
[tasklog.cleanup] : state=WAITING
2020-10-07 18:05:22,355+0000 INFO  [FelixStartLevel] *SYSTEM org.sonatype.nexus.schedu
g.cleanup] scheduled: cron
2020-10-07 18:05:22,385+0000 INFO  [FelixStartLevel] *SYSTEM org.sonatype.nexus.quartz
repository.cleanup] : state=WAITING
2020-10-07 18:05:22,396+0000 INFO  [FelixStartLevel] *SYSTEM org.sonatype.nexus.schedu
ory.cleanup] scheduled: cron
2020-10-07 18:05:22,467+0000 INFO  [FelixStartLevel] *SYSTEM org.sonatype.nexus.quartz
nup' [repository.storage-facet-cleanup] : state=WAITING
2020-10-07 18:05:22,477+0000 INFO  [FelixStartLevel] *SYSTEM org.sonatype.nexus.schedu
epository.storage-facet-cleanup] scheduled: cron
2020-10-07 18:05:22,529+0000 INFO  [FelixStartLevel] *SYSTEM org.sonatype.nexus.quartz
mode
2020-10-07 18:08:22,729+0000 INFO  [qtp744598046-42] *UNKNOWN org.apache.shiro.session
 validation scheduler...
2020-10-07 18:08:22,764+0000 INFO  [qtp744598046-42] *UNKNOWN org.sonatype.nexus.inter
ult configuration: OrientAnonymousConfiguration{enabled=true, userId='anonymous', real
2020-10-07 18:10:00,031+0000 INFO  [quartz-8-thread-1] *SYSTEM org.sonatype.nexus.quar
eanup' [repository.storage-facet-cleanup] state change WAITING -> RUNNING
2020-10-07 18:10:00,072+0000 INFO  [quartz-8-thread-1] *SYSTEM org.sonatype.nexus.quar
eanup' [repository.storage-facet-cleanup] state change RUNNING -> WAITING (OK)
```

viii. Launch Nexus in browser : http://34.122.220.57:8081/



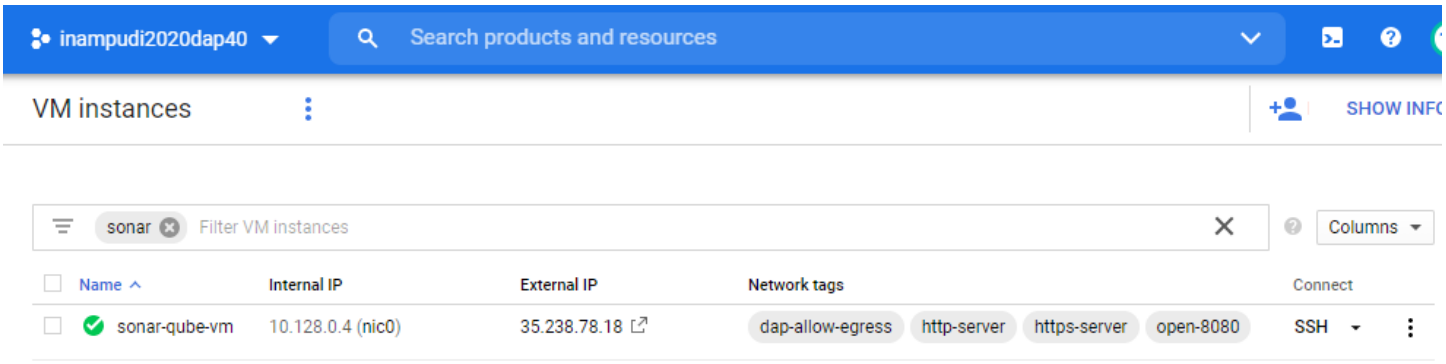


Create a Repository : **ci_cd_pipeline**



6. Sonar Qube Installation

Create VM and Install Sonar Qube



Install JDK

```
inampudi_2020_dap4_0@sonar-qube-vm:~$ sudo apt-get install default-jdk
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  grub-pc-bin motd-news-config
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  ca-certificates-java default-jdk-headless default-jre default-jre-headless font
  fonts-dejavu-extra hicolor-icon-theme java-common libasound2 libasound2-data li
  libavahi-common-data libavahi-common3 libcairo2 libcups2 libdatrie1 libdrm-amdg
```

```
Setting up default-jdk-headless (2:1.8-56ubuntu2) ...
Setting up openjdk-8-jdk:amd64 (8u265-b01-0ubuntu2~16.04) ...
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/bi
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/bi
Setting up default-jdk (2:1.8-56ubuntu2) ...
Processing triggers for libc-bin (2.23-0ubuntu11.2) ...
Processing triggers for ureadahead (0.100.0-19.1) ...
Processing triggers for systemd (229-4ubuntu21.29) ...
Processing triggers for ca-certificates (20190110~16.04.1) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...

done.
done.
inampudi_2020_dap4_0@sonar-qube-vm:~$
```

Install Docker with : wget -qO- https://get.docker.com | sh

```
inampudi_2020_dap4_0@sonar-qube-vm:~$ wget -qO- https://get.docker.com | sh
# Executing docker install script, commit: 26ff363bcf3b3f5a00498ac43694bf1c7d9ce16c
+ sudo -E sh -c apt-get update -qq >/dev/null
+ sudo -E sh -c DEBIAN_FRONTEND=noninteractive apt-get install -y -qq apt-transport-h
+ sudo -E sh -c curl -fsSL "https://download.docker.com/linux/ubuntu/gpg" | apt-key a
+ sudo -E sh -c echo "deb [arch=amd64] https://download.docker.com/linux/ubuntu xenia
+ sudo -E sh -c apt-get update -qq >/dev/null
+ [ -n  ]
+ sudo -E sh -c apt-get install -y -qq --no-install-recommends docker-ce >/dev/null
+ sudo -E sh -c docker version
Client: Docker Engine - Community
 Version:           19.03.13
 API version:       1.40
 Go version:        go1.13.15
 Git commit:        4484c46d9d
 Built:             Wed Sep 16 17:02:59 2020
 OS/Arch:           linux/amd64
 Experimental:      false
```

```
If you would like to use Docker as a non-root user, you should now consider
adding your user to the "docker" group with something like:

  sudo usermod -aG docker inampudi_2020_dap4_0

Remember that you will have to log out and back in for this to take effect!

WARNING: Adding a user to the "docker" group will grant the ability to run
         containers which can be used to obtain root privileges on the
         docker host.
         Refer to https://docs.docker.com/engine/security/security/#docker-daemon-attack-surface
         for more information.
inampudi_2020_dap4_0@sonar-qube-vm:~$
```

```
inampudi_2020_dap4_0@sonar-qube-vm:~$
inampudi_2020_dap4_0@sonar-qube-vm:~$ docker --version
Docker version 19.03.13, build 4484c46d9d
inampudi_2020_dap4_0@sonar-qube-vm:~$
```

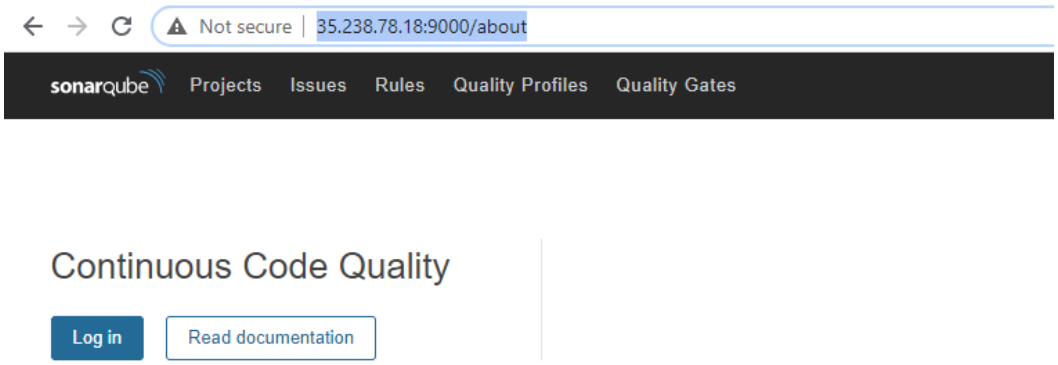
Install Sonarqube through docker

```
inampudi_2020_dap4_0@sonar-qube-vm:~$ sudo docker pull sonarqube
Using default tag: latest
latest: Pulling from library/sonarqube
cbdbe7a5bc2a: Pull complete
ad75d47265c8: Pull complete
43f3acb0c861: Pull complete
bfe61efc35b0: Pull complete
cc57849e5ff2: Pull complete
Digest: sha256:10bb6f658a4a716733b6226a165897237fd031d8b02e6f7eddc639125eb8607e
Status: Downloaded newer image for sonarqube:latest
docker.io/library/sonarqube:latest
```

Run Sonar Qube image to start the service

```
inampudi_2020_dap4_0@sonar-qube-vm:~$ sudo docker run -d --name sonarqube -p 9000:9000 -p 9092:9092 sonarqube
f121377d19405ba078d42aecd831482ace951e7d2e5681188780a8459f94eb3a
inampudi_2020_dap4_0@sonar-qube-vm:~$
inampudi_2020_dap4_0@sonar-qube-vm:~$ sudo docker ps
CONTAINER ID        IMAGE               COMMAND                  CREATED             STATUS              PORTS
          NAMES
f121377d1940        sonarqube           "bin/run.sh bin/sona…"   8 seconds ago       Up 7 seconds        0.0.0.0:9000->9000/tcp, 0.0.0.0:9092-
>9092/tcp   sonarqube
inampudi_2020_dap4_0@sonar-qube-vm:~$
```

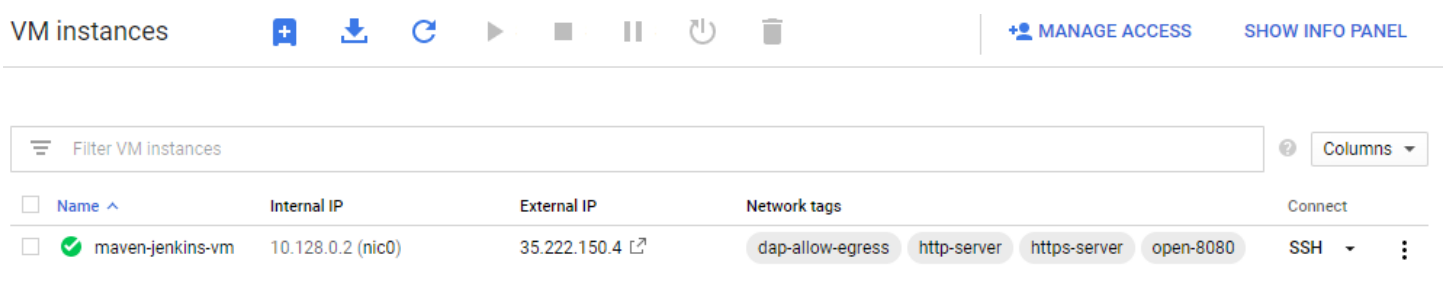
Launch SonarQube from URL : **http://35.238.78.18:9000/**



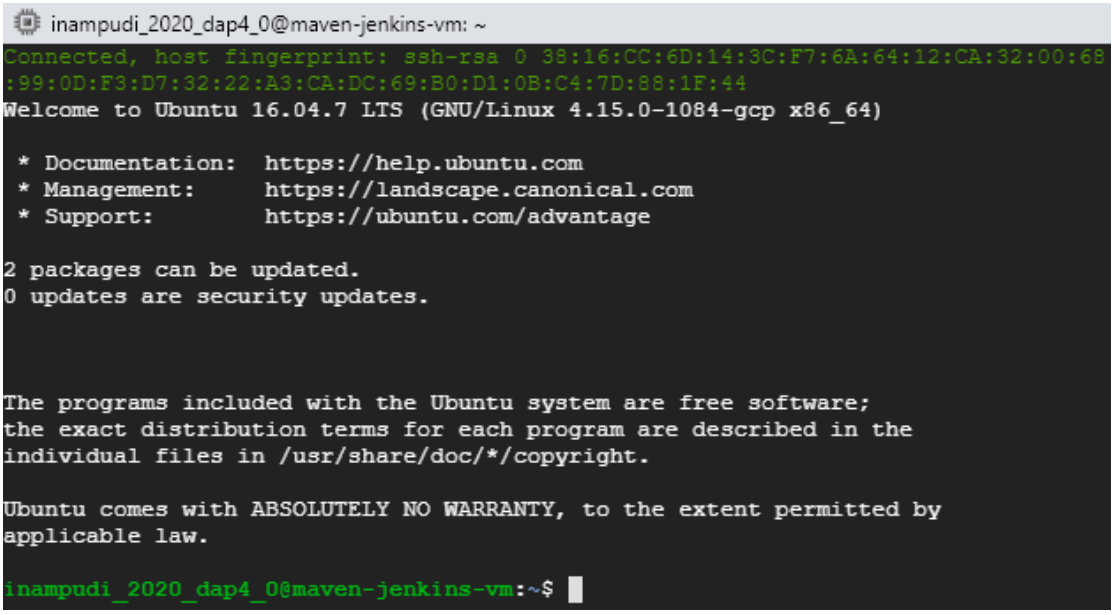
7. Jenkins and Maven Installation

Create VM and Install Jenkins

i. Create a VM with Ubuntu



ii. Connect to VM through SSH



iii. Execute **sudo apt-get update**

```
inampudi_2020_dap4_0@maven-jenkins-vm:~$ sudo apt-get update
Hit:1 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial InRelease
Get:2 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-updates InRelease [109 kB]
Get:3 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-backports InRelease [107 kB]
Hit:4 http://security.ubuntu.com/ubuntu xenial-security InRelease
Get:5 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-updates/main amd64 Packages [1,861 kB]
Hit:6 http://archive.canonical.com/ubuntu xenial InRelease
Fetched 2,077 kB in 0s (2,734 kB/s)
Reading package lists... Done
inampudi_2020_dap4_0@maven-jenkins-vm:~$
```

iv. Install Java : **sudo apt-get install openjdk-8-jdk**

```
inampudi_2020_dap4_0@maven-jenkins-vm:~$ sudo apt-get install openjdk-8-jdk
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  grub-pc-bin motd-news-config
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  ca-certificates-java fontconfig fontconfig-config fonts-dejavu-core fonts-dejavu-extra
  libatk1.0-data libavahi-client3 libavahi-common-data libavahi-common3 libcairo2 libcup
  libfontconfig1 libgdk-pixbuf2.0-0 libgdk-pixbuf2.0-common libgif7 libgl1-mesa-dri libg
  libharfbuzz0b libice-dev libice6 libjbig0 libjpeg-turbo8 libjpeg8 liblcms2-2 libllvm6.
  libpangoft2-1.0-0 libpciaccess0 libpcsclite1 libpixman-1-0 libpthread-stubs0-dev libpu
  libtxc-dxtn-s2tc0 libvorbis0a libvorbisenc2 libx11-dev libx11-doc libx11-xcb1 libxau-d
  libxcb-sync1 libxcb1-dev libxcomposite1 libxcursor1 libxdamage1 libxdmcp-dev libxfixes
  libxxf86vm1 openjdk-8-jdk-headless openjdk-8-jre openjdk-8-jre-headless x11-common x11
```

```
Setting up openjdk-8-jdk:amd64 (8u265-b01-0ubuntu2~16.04) ...
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/bin/appletviewer to provide /usr/bin/appletviewer (appletviewer) in auto mode
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/bin/jconsole to provide /usr/bin/jconsole (jconsole) in auto mode
Processing triggers for libc-bin (2.23-0ubuntu11.2) ...
Processing triggers for ureadahead (0.100.0-19.1) ...
Processing triggers for systemd (229-4ubuntu21.29) ...
Processing triggers for ca-certificates (20190110~16.04.1) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...

done.
done.
inampudi_2020_dap4_0@maven-jenkins-vm:~$
```

v. Install Maven : **sudo apt-get install maven**

```
inampudi_2020_dap4_0@maven-jenkins-vm:~$ sudo apt-get install maven
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  grub-pc-bin motd-news-config
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  ant ant-optional junit junit4 libaopalliance-java libapache-pom-java libasm4-java
  libcglib3-java libclassworlds-java libcommons-cli-java libcommons-codec-java libc
  libcommons-lang-java libcommons-lang3-java libcommons-logging-java libcommons-net
  libdom4j-java libdoxia-core-java libeasymock-java libeclipse-aether-java libgeron
  libhamcrest-java libhttpclient-java libhttpcore-java libjaxen-java libjaxp1.3-jav
  libjsr305-java liblog4j1.2-java libmaven-parent-java libmaven2-core-java libmaven
  libplexus-archiver-java libplexus-bsh-factory-java libplexus-cipher-java libplexu
  libplexus-cli-java libplexus-component-annotations-java libplexus-component-metac
  libplexus-container-default1.5-java libplexus-containers-java libplexus-container
  libplexus-interpolation-java libplexus-io-java libplexus-sec-dispatcher-java libp
  libservlet2.5-java libservlet3.1-java libsisu-inject-java libsisu-plexus-java lib
  libxbean-java libxerces2-java libxml-commons-external-java libxml-commons-resolve
Suggested packages:
```

```
Setting up libplexus-component-metadata-java (1.6-2) ...
Setting up libplexus-containers1.5-java (1.6-2) ...
Setting up libsisu-inject-java (0.3.2-1) ...
Setting up libsisu-plexus-java (0.3.2-1) ...
Setting up libwagon2-java (2.10-3) ...
Setting up libmaven3-core-java (3.3.9-3) ...
Setting up libxom-java (1.2.10-1) ...
Setting up maven (3.3.9-3) ...
update-alternatives: using /usr/share/maven/bin/mvn to provide /usr/bin/mvn (mvn) in auto mode
inampudi_2020_dap4_0@maven-jenkins-vm:~$
```

vi. Install Jenkins : **sudo apt-get install Jenkins**

```
wget -q -O - https://pkg.jenkins.io/debian/jenkins.io.key | sudo apt-key add -
sudo sh -c 'echo deb https://pkg.jenkins.io/debian binary/ > \
    /etc/apt/sources.list.d/jenkins.list'
sudo apt-get update
sudo apt-get install jenkins
```

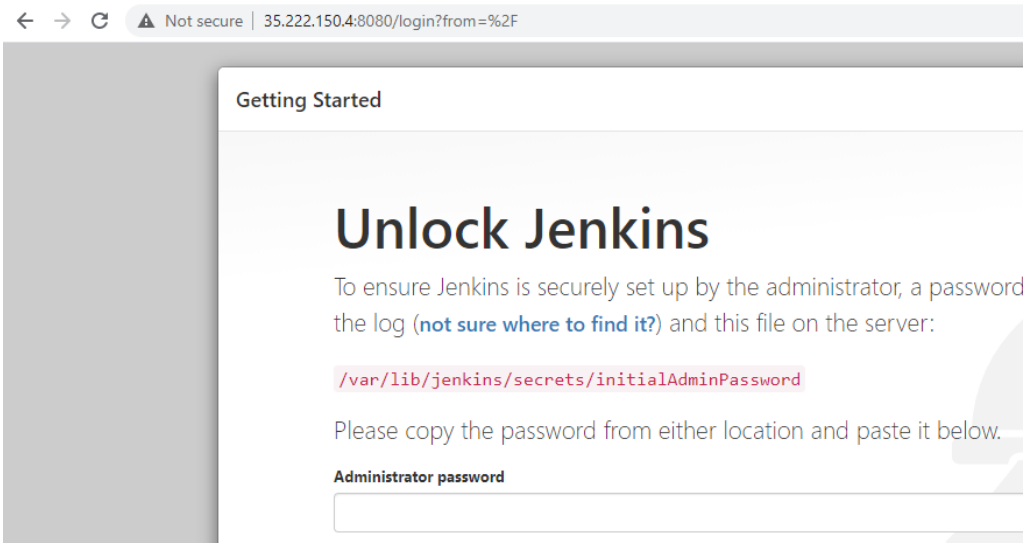
```
inampudi_2020_dap4_0@maven-jenkins-vm:~$ wget -q -O - https://pkg.jenkins.io/debian-stable/jenkins.io.key | sudo apt-key add -
OK
inampudi_2020_dap4_0@maven-jenkins-vm:~$ sudo sh -c 'echo deb https://pkg.jenkins.io/debian-stable binary/ > \
>     /etc/apt/sources.list.d/jenkins.list'
inampudi_2020_dap4_0@maven-jenkins-vm:~$ sudo apt-get update
Hit:1 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial InRelease
Hit:2 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-updates InRelease
Get:3 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial-backports InRelease [107 kB]
Hit:4 http://security.ubuntu.com/ubuntu xenial-security InRelease
Ign:5 https://pkg.jenkins.io/debian-stable binary/ InRelease
Get:6 https://pkg.jenkins.io/debian-stable binary/ Release [2,044 B]
Hit:7 http://archive.canonical.com/ubuntu xenial InRelease
Get:8 https://pkg.jenkins.io/debian-stable binary/ Release.gpg [833 B]
Get:9 https://pkg.jenkins.io/debian-stable binary/ Packages [18.4 kB]
Fetched 128 kB in 0s (243 kB/s)
Reading package lists... Done
```

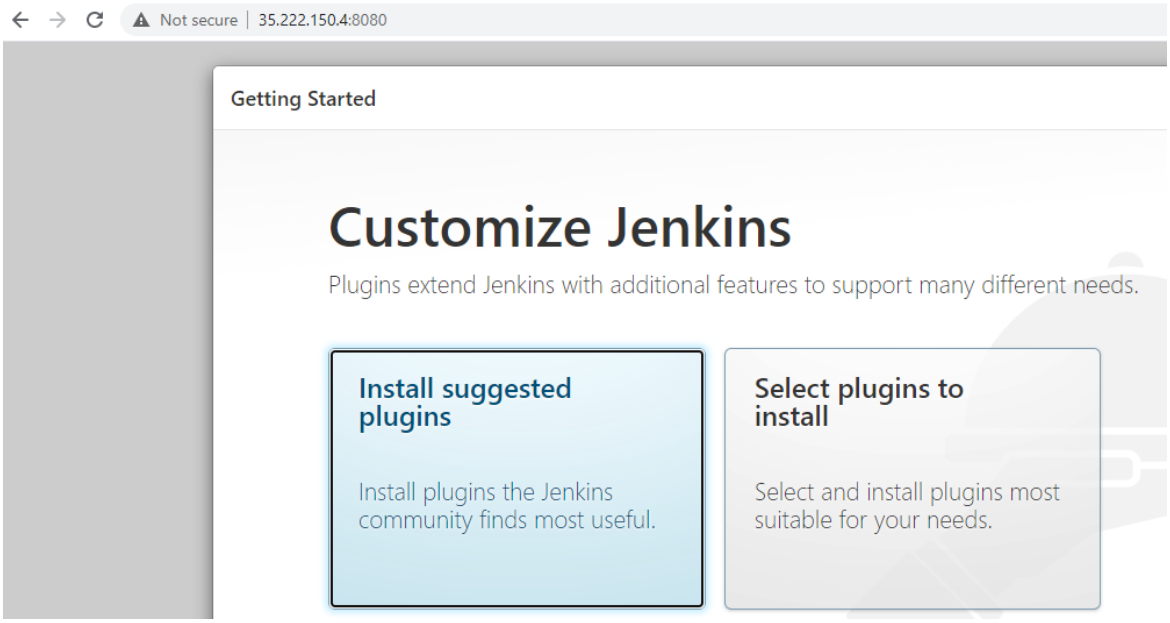
```
inampudi_2020_dap4_0@maven-jenkins-vm:~$ sudo apt-get install jenkins
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  grub-pc-bin motd-news-config
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  daemon
The following NEW packages will be installed:
  daemon jenkins
0 upgraded, 2 newly installed, 0 to remove and 8 not upgraded.
Need to get 66.1 MB of archives.
After this operation, 67.7 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://us-central1.gce.archive.ubuntu.com/ubuntu xenial/universe amd64 daemon amd64 0.6.4-1 [98.2 kB]
Get:2 https://pkg.jenkins.io/debian-stable binary/ jenkins 2.249.1 [66.0 MB]
Fetched 66.1 MB in 3s (21.6 MB/s)
Selecting previously unselected package daemon.
(Reading database ... 76644 files and directories currently installed.)
Preparing to unpack .../daemon_0.6.4-1_amd64.deb ...
Unpacking daemon (0.6.4-1) ...
Selecting previously unselected package jenkins.
Preparing to unpack .../jenkins_2.249.1_all.deb ...
Unpacking jenkins (2.249.1) ...
Processing triggers for man-db (2.7.5-1) ...
Processing triggers for ureadahead (0.100.0-19.1) ...
Processing triggers for systemd (229-4ubuntu21.29) ...
Setting up daemon (0.6.4-1) ...
Setting up jenkins (2.249.1) ...
Processing triggers for ureadahead (0.100.0-19.1) ...
Processing triggers for systemd (229-4ubuntu21.29) ...
inampudi_2020_dap4_0@maven-jenkins-vm:~$
```

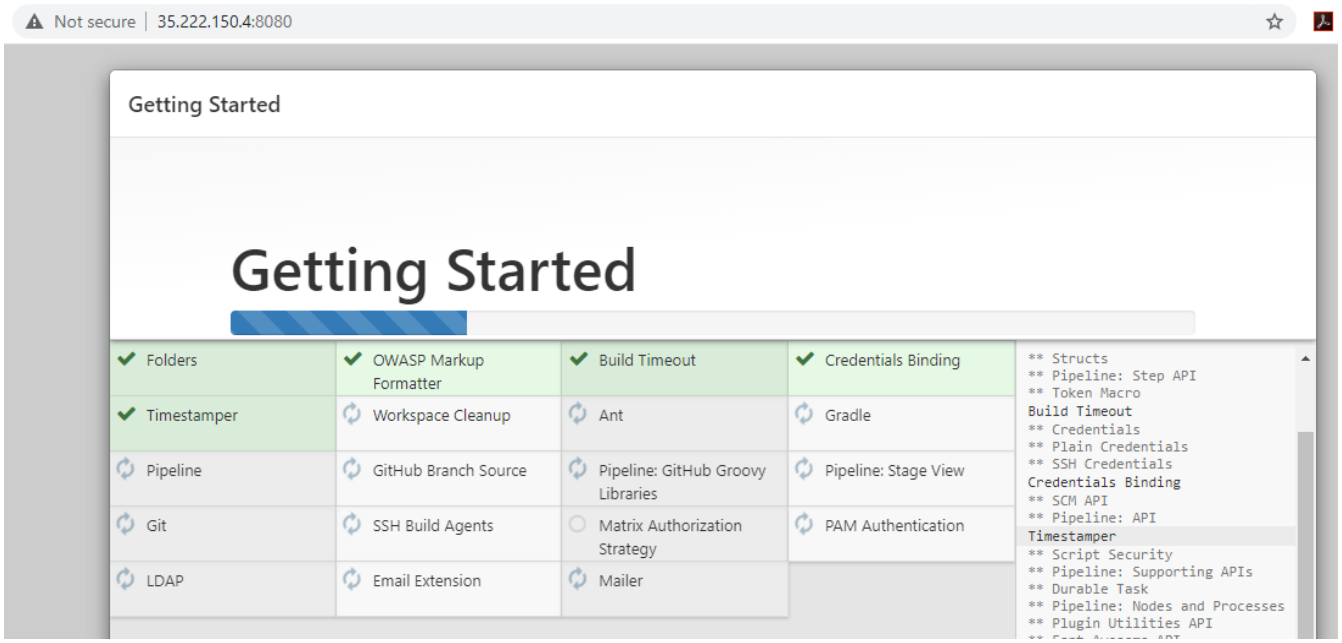
vii. Validate Jenkins Installation : **sudo systemctl status jenkins**

```
inampudi_2020_dap4_0@maven-jenkins-vm:~$ sudo systemctl status jenkins
● jenkins.service - LSB: Start Jenkins at boot time
   Loaded: loaded (/etc/init.d/jenkins; bad; vendor preset: enabled)
   Active: active (exited) since Wed 2020-10-07 13:32:12 UTC; 3min 35s ago
     Docs: man:systemd-sysv-generator(8)

Oct 07 13:32:11 maven-jenkins-vm systemd[1]: Starting LSB: Start Jenkins at boot time...
Oct 07 13:32:11 maven-jenkins-vm jenkins[10892]: Correct java version found
Oct 07 13:32:11 maven-jenkins-vm jenkins[10892]:  * Starting Jenkins Automation Server jenkins
Oct 07 13:32:11 maven-jenkins-vm su[10940]: Successful su for jenkins by root
Oct 07 13:32:11 maven-jenkins-vm su[10940]: + ??? root:jenkins
Oct 07 13:32:11 maven-jenkins-vm su[10940]: pam_unix(su:session): session opened for user jenkins by (uid=0)
Oct 07 13:32:12 maven-jenkins-vm jenkins[10892]:    ...done.
Oct 07 13:32:12 maven-jenkins-vm systemd[1]: Started LSB: Start Jenkins at boot time.
```

viii. Access Jenkins URL : http://35.222.150.4:8080/. Get the password for Admin from below path







Instance Configuration

Jenkins URL: http://35.222.150.4:8080/

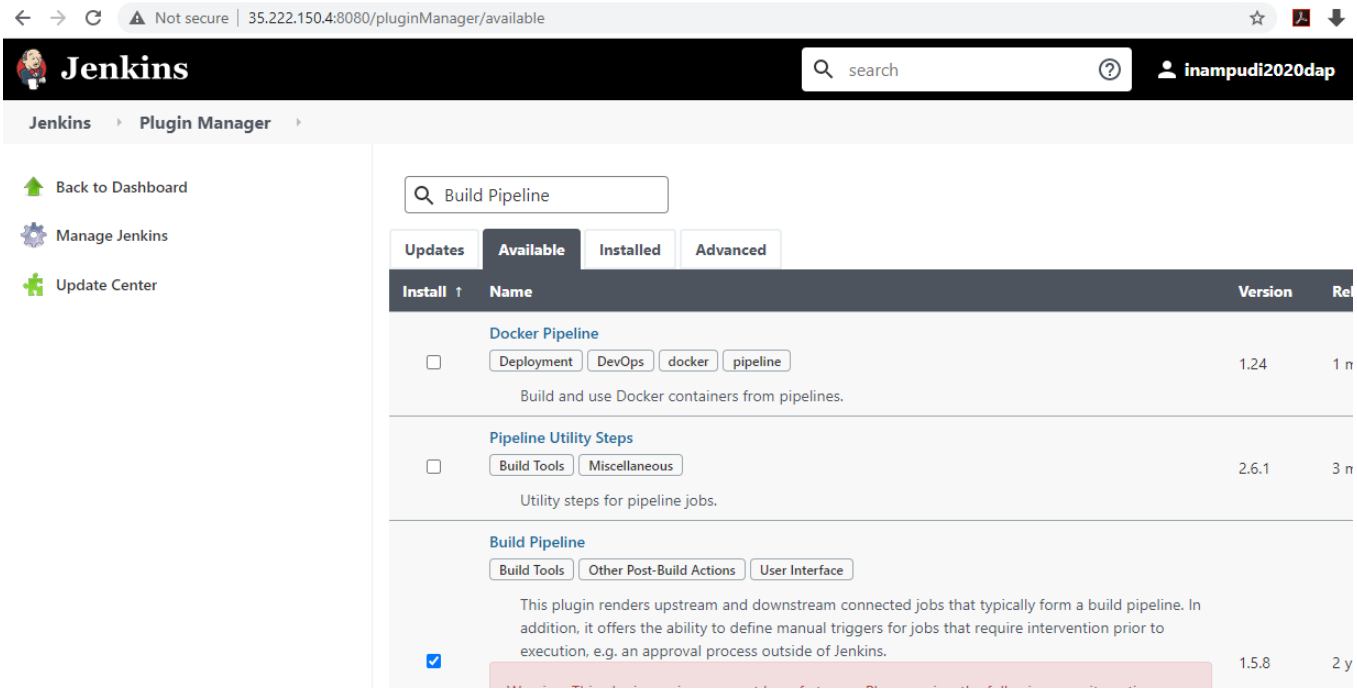
The Jenkins URL is used to provide the root URL for absolute links to various Jenkins resources. That means this value is required for proper operation of many Jenkins features including email notifications, PR status updates, and the `BUILD_URL` environment variable provided to build steps.

The proposed default value shown is **not saved yet** and is generated from the current request, if possible. The best practice is to set this value to the URL that users are expected to use. This will avoid confusion when sharing or viewing links.

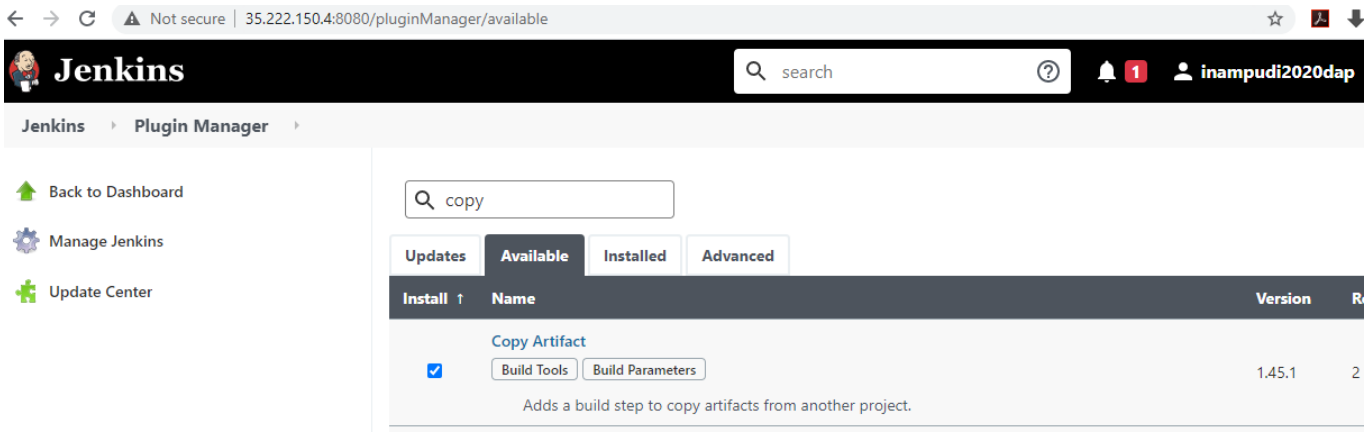
8. Jenkins Integration with other Tools

Install Plug-ins that are required for CI-CD pipeline implementation

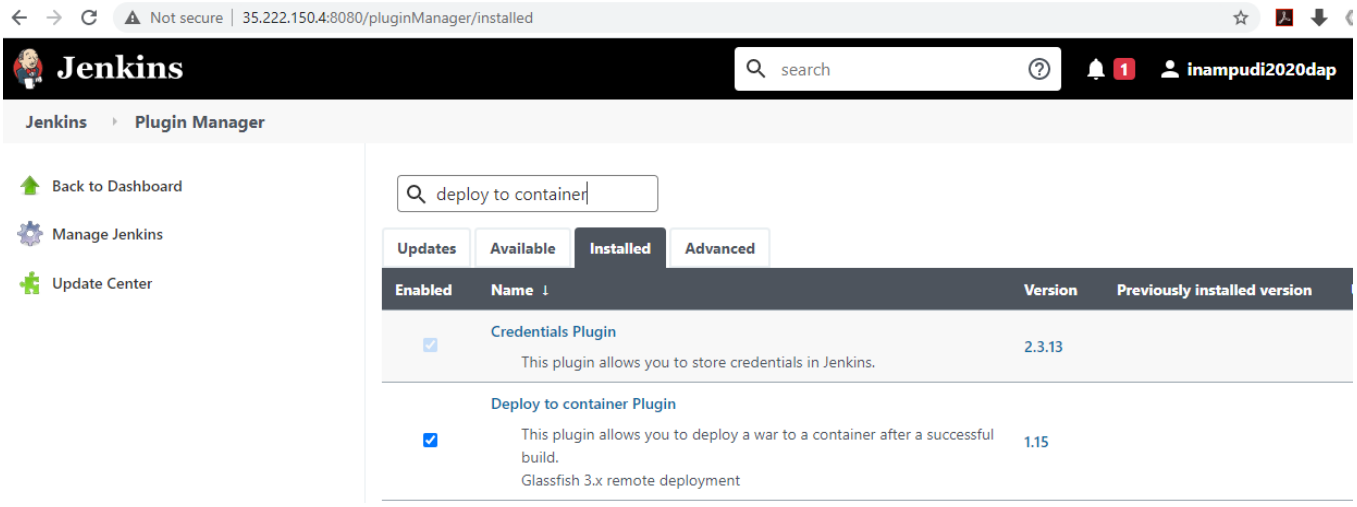
i. Install Build Pipeline Plug-in



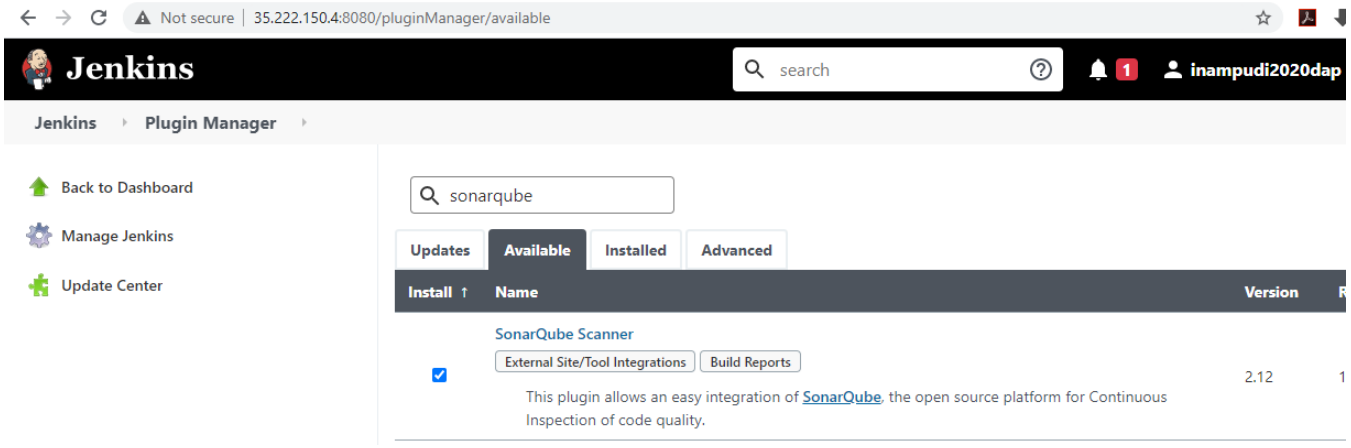
ii. Install Copy Artifact Plug-in



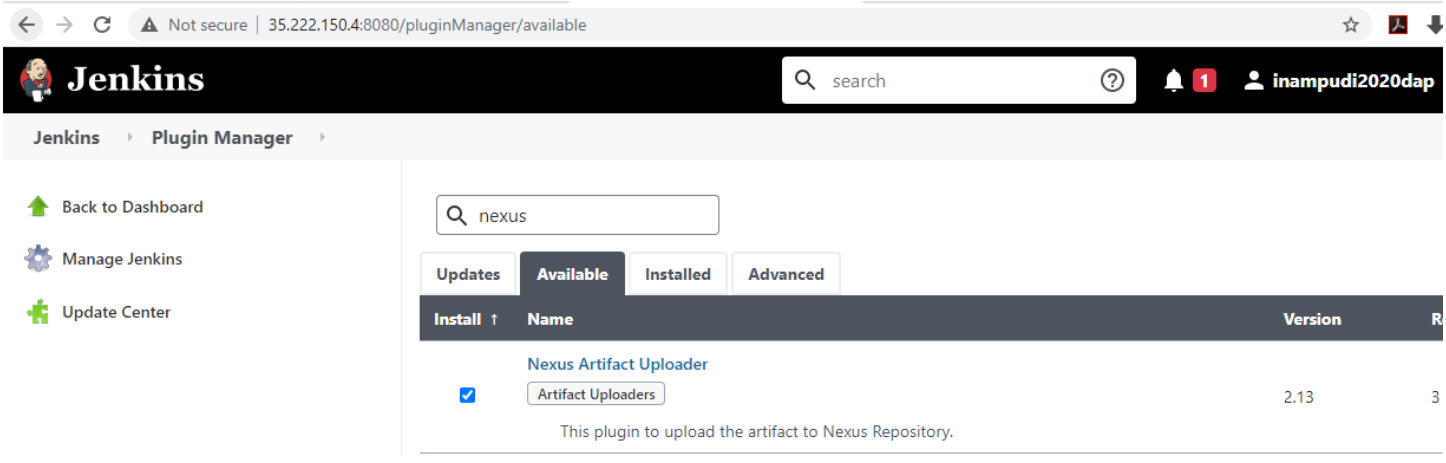
iii. Install Deploy to container Plugin Plug-in



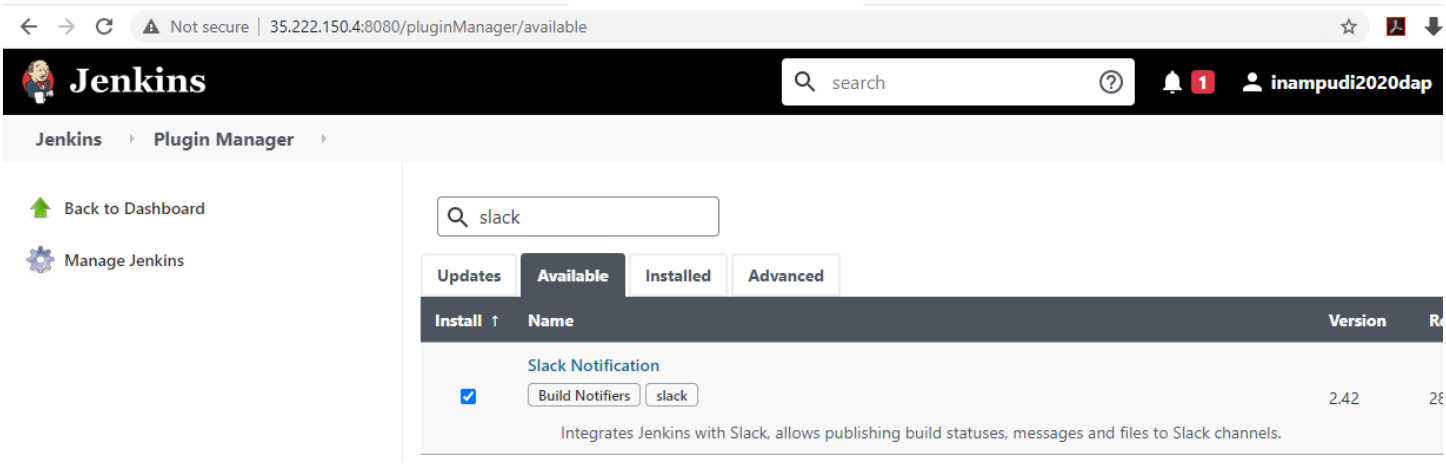
iv. Install SonarQube Scanner Plug-in



v. Install Nexus Artifact Uploader Plug-in

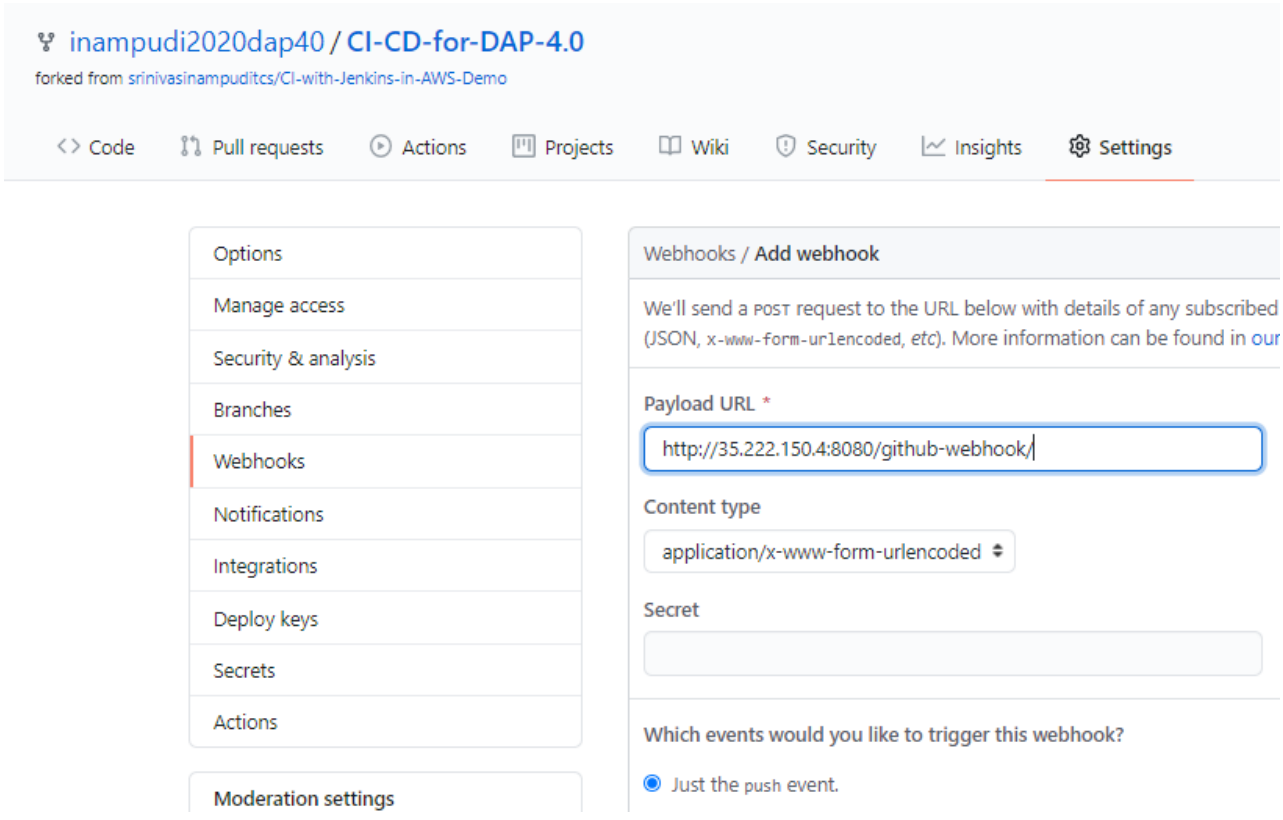


i. Install Slack Notification Plug-in



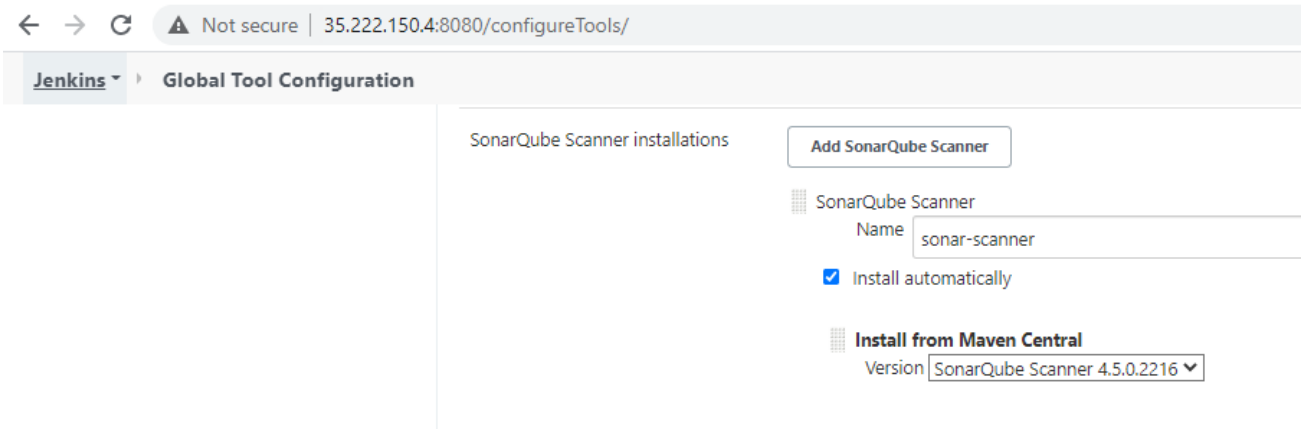
Github integration with Jenkins

Add Jenkins URL webhook Settings

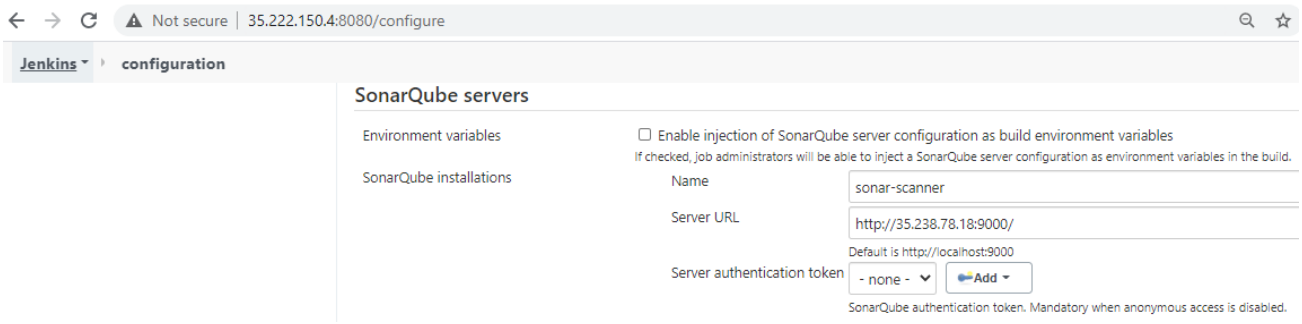


Sonar Qube integration with Jenkins

Add Sonar Installation in Global Tool Configuration in Jenkins

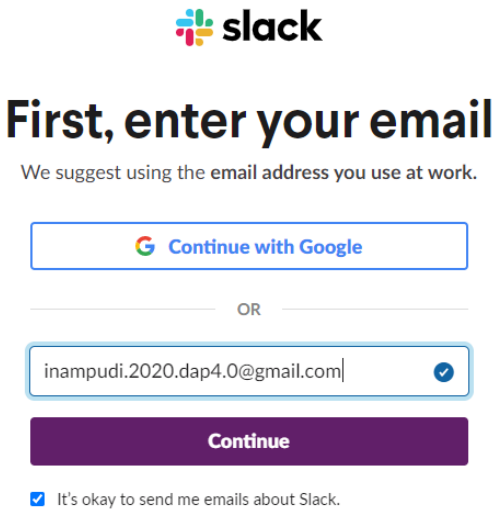


Add SonarQube Servers in Configuration in Jenkins



Slack integration with Jenkins

- Logged into Slack and created
  - workspace – **DAP4.0_DevOps(**dap40devops.slack.com)
  - channel – **ci-cd-pipeline**

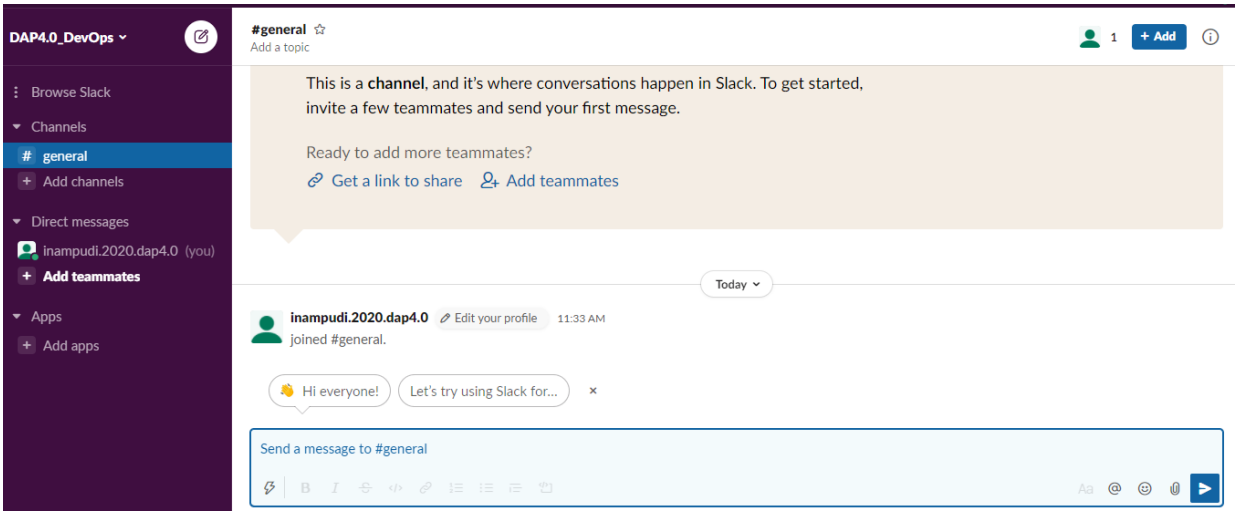


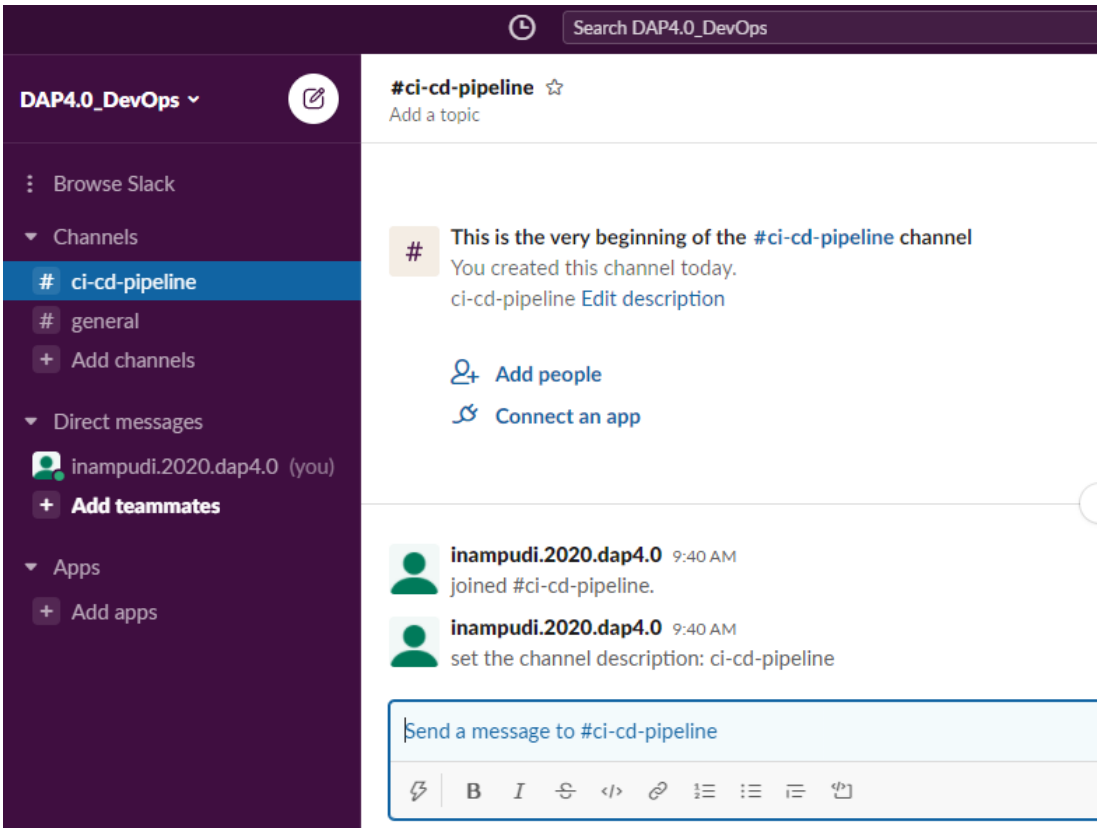
Step 1 of 3

Slack gives your team a place to talk and work together

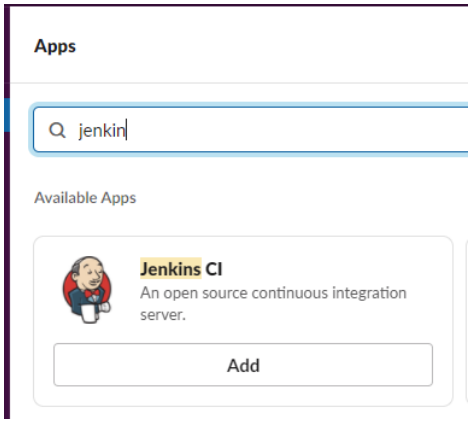
What's the name of your team or company?

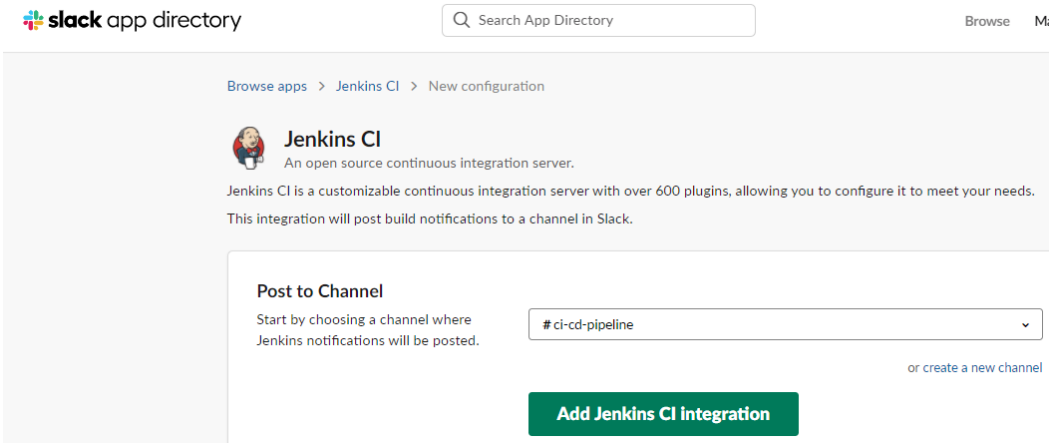
DAP4.0_DevOps 242





Add Jenkins to Slack App Directory





Follow the steps mentioned in Slack and integrate with Jenkins

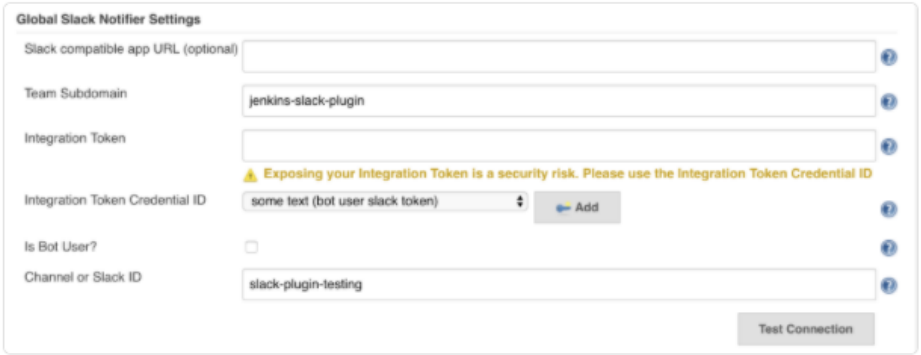
Step 3

After it's installed, click on **Manage Jenkins** again in the left navigation, and then go to **Configure System**. Find the **Global Slack Notifier Settings** section and add the following values:

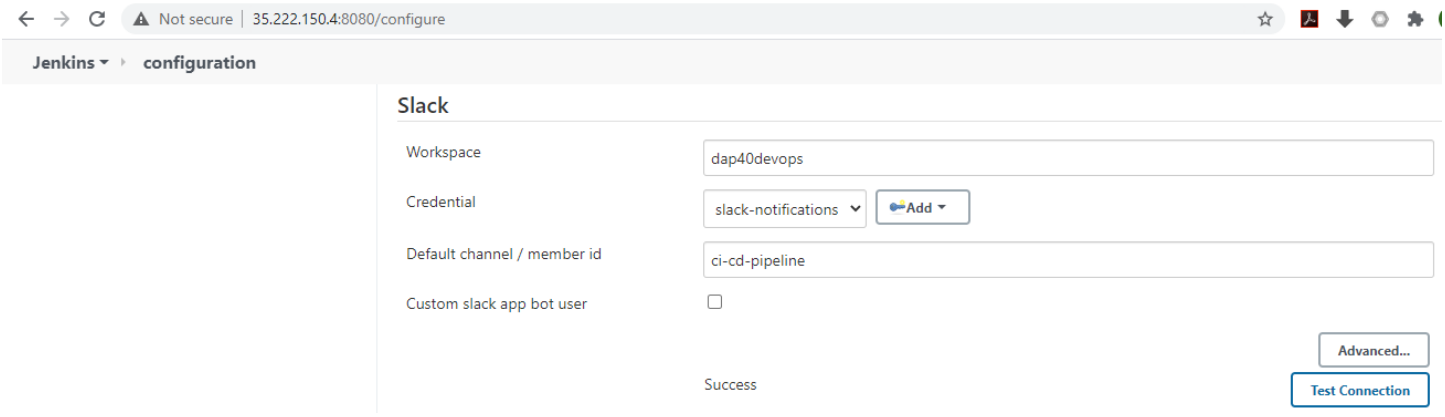
- **Team Subdomain:** dap40devops
- **Integration Token Credential ID:** Create a secret text credential using `JS7GxmLD1IyG8yB7sYO7RKPc` as the value

The other fields are optional. You can click on the question mark icons next to them for more information. Press **Save** when you're done.

Note: Please remember to replace the Integration Token in the screenshot below with your own.

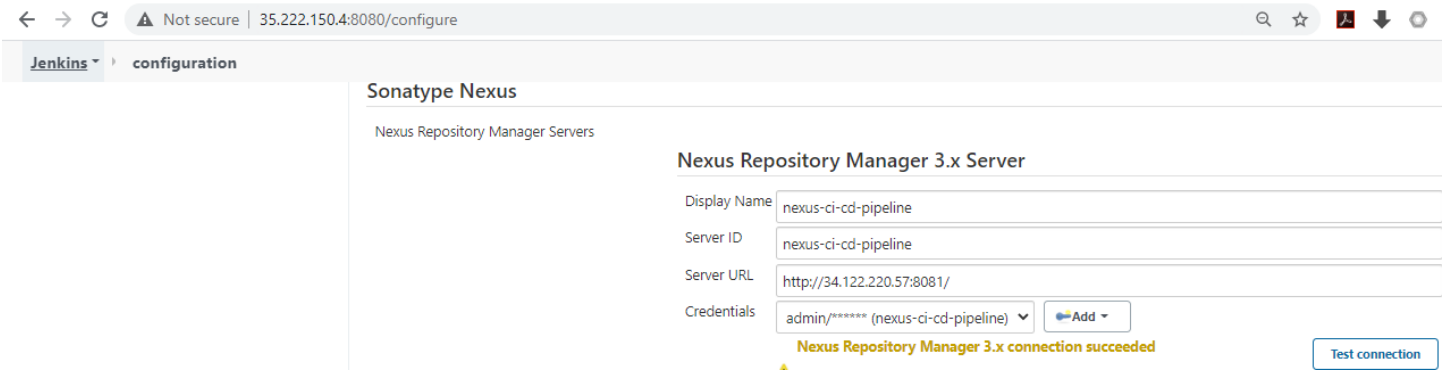


Add Slack details in Jenkins Configuration



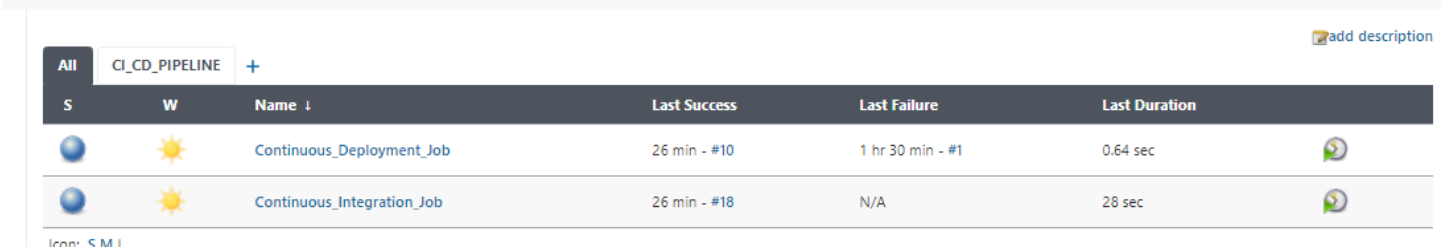
Nexus integration with Jenkins

Add Nexus repository details in Jenkins Configuration

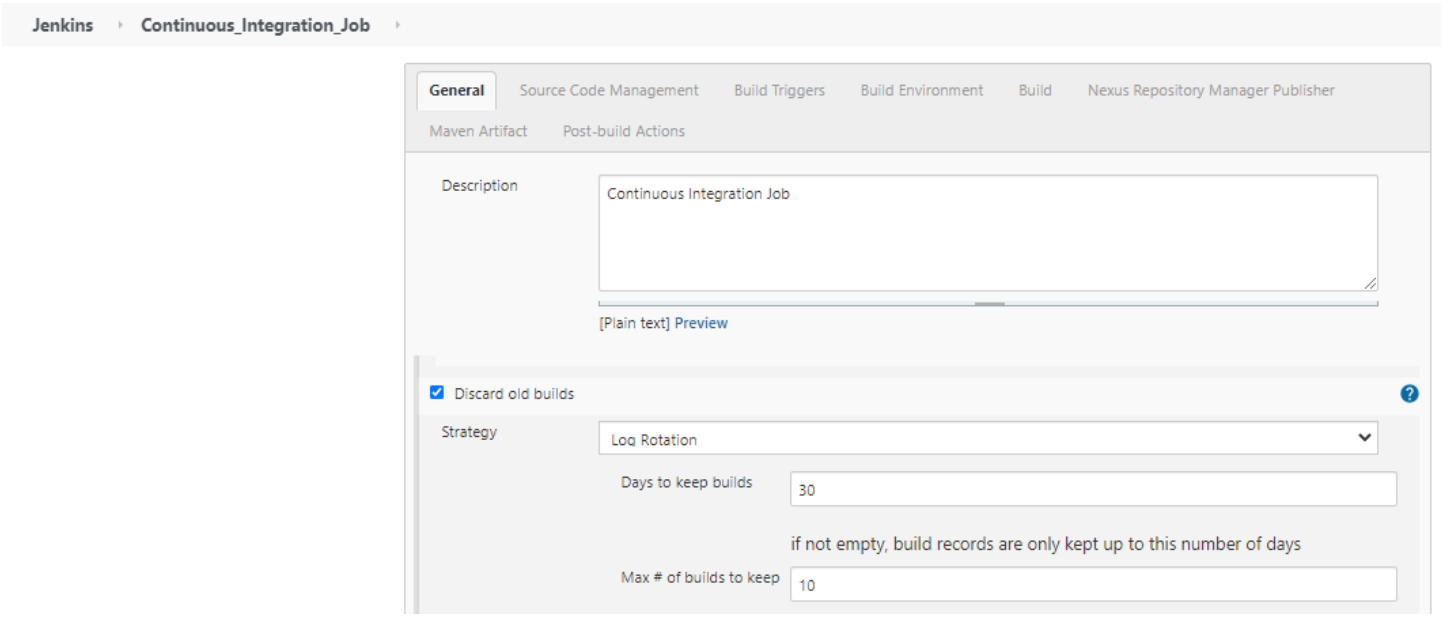


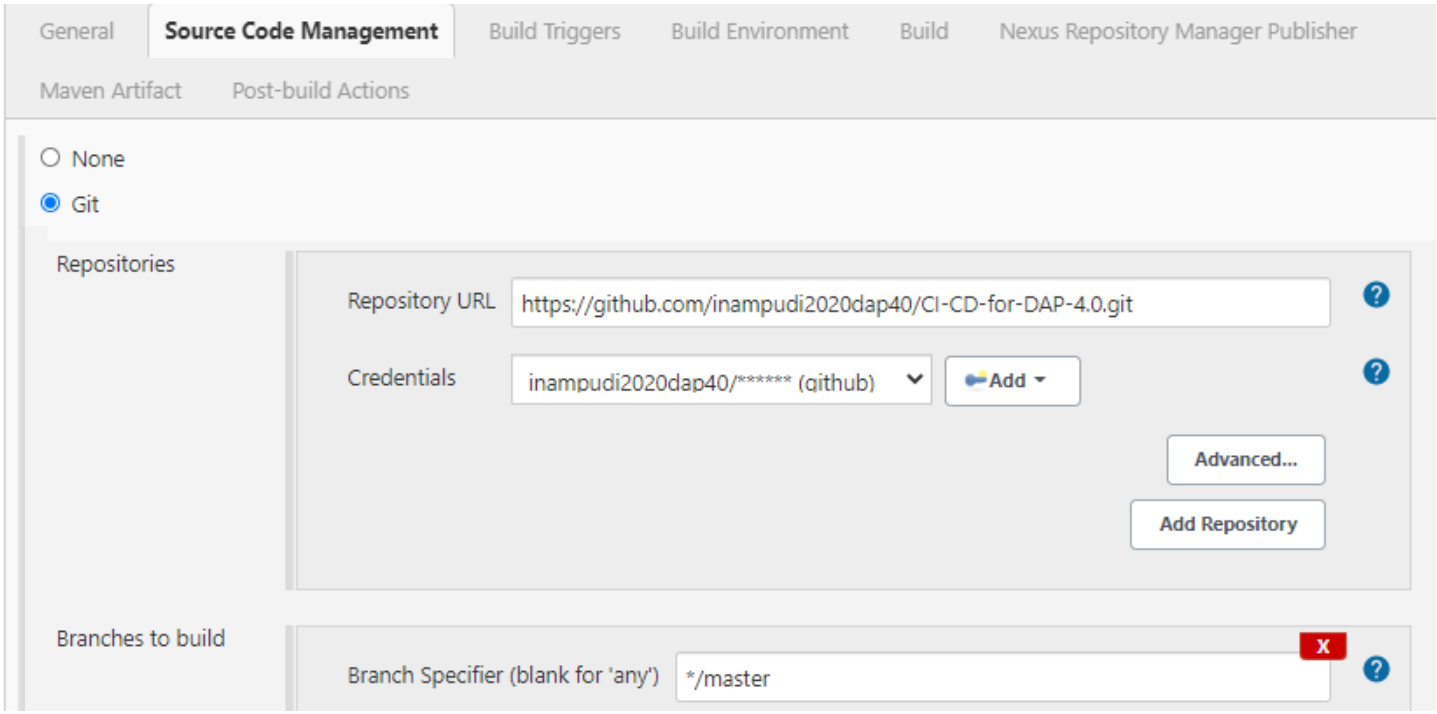
9. CI-CD Pipeline Job in Jenkins

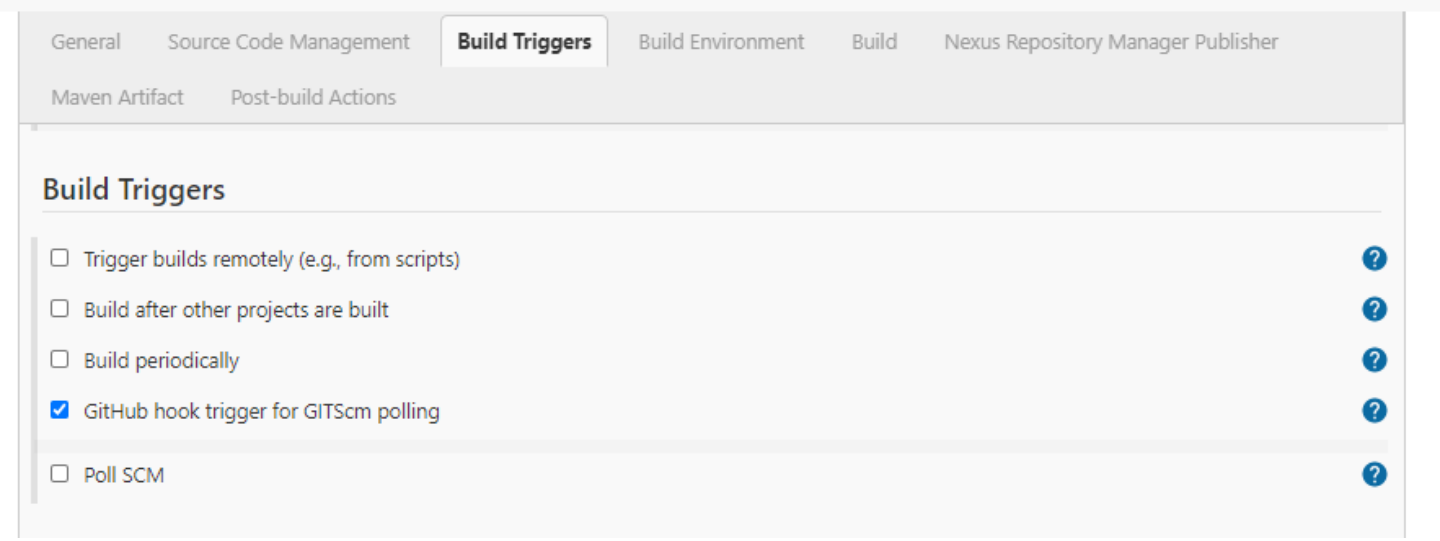
Create Continuous_Integration_Job and Continuous_Deployment_Job

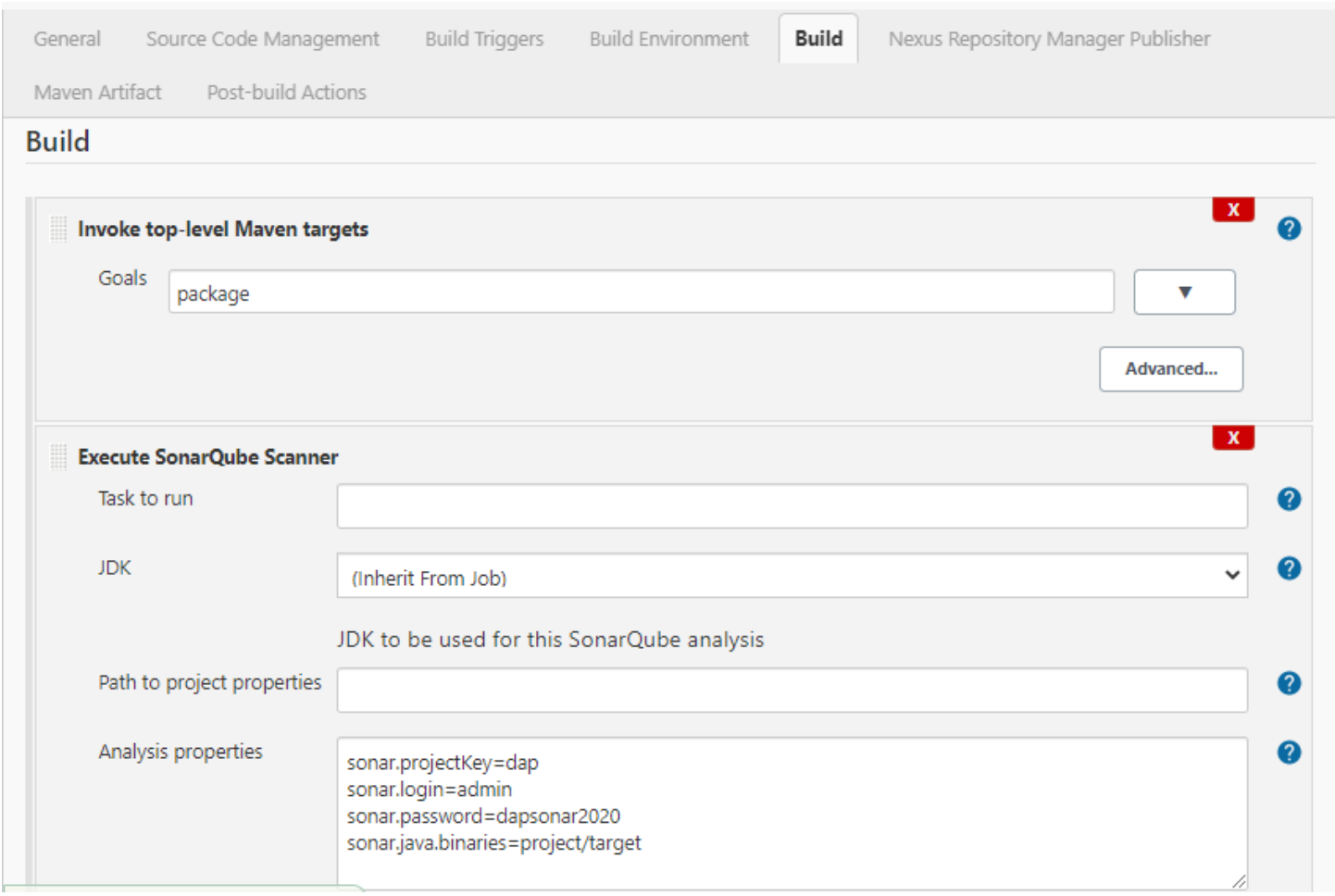


Continuous_Integration_Job

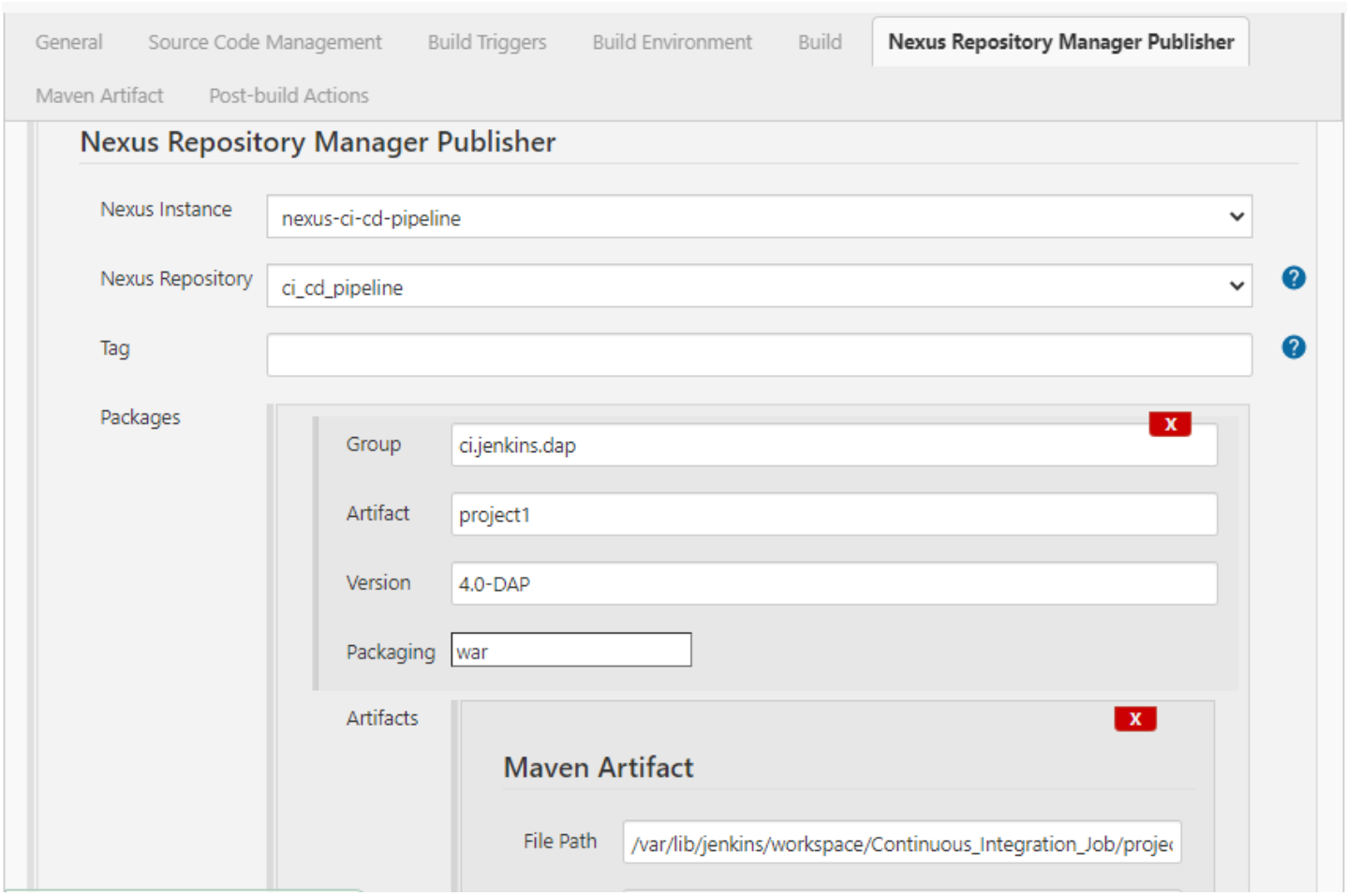

Jenkins
Continuous_Integration_Job
General
Source Code Management
Build Triggers
Build Environment
Build
Nexus Repository Manager Publisher
Maven Artifact
Post-build Actions
Description
Continuous Integration Job
[Plain text] Preview
Discard old builds
Strategy
Log Rotation
Days to keep builds
30
if not empty, build records are only kept up to this number of days
Max # of builds to keep
10

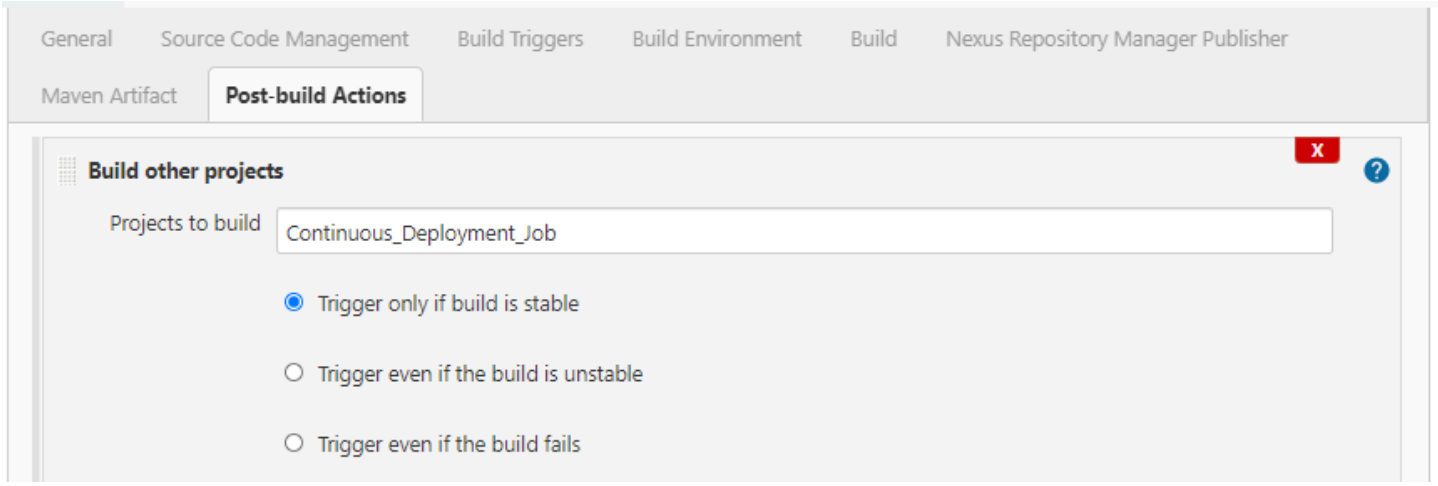

General
Source Code Management
Build Triggers
Build Environment
Build
Nexus Repository Manager Publisher
Maven Artifact
Post-build Actions
None
Git
Repositories
Repository URL
https://github.com/inampudi2020dap40/CI-CD-for-DAP-4.0.git
Credentials
inampudi2020dap40/****** (github)
Add
Advanced...
Add Repository
Branches to build
Branch Specifier (blank for 'any')
*/master
X

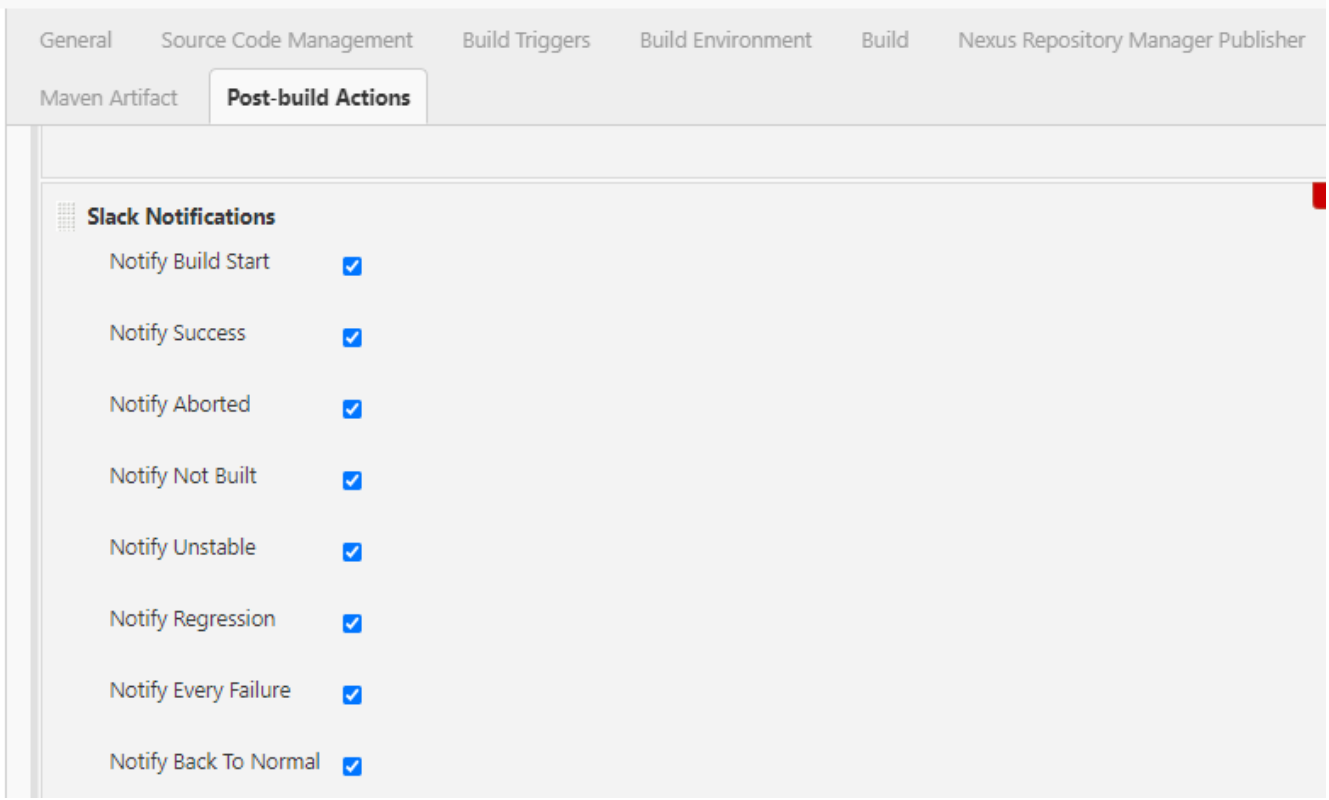

General
Source Code Management
Build Triggers
Build Environment
Build
Nexus Repository Manager Publisher
Maven Artifact
Post-build Actions
Build Triggers
Trigger builds remotely (e.g., from scripts)
Build after other projects are built
Build periodically
GitHub hook trigger for GITScm polling
Poll SCM


General
Source Code Management
Build Triggers
Build Environment
Build
Nexus Repository Manager Publisher
Maven Artifact
Post-build Actions
Build
Invoke top-level Maven targets
Goals
package
Advanced...
Execute SonarQube Scanner
Task to run
JDK
(Inherit From Job)
JDK to be used for this SonarQube analysis
Path to project properties
Analysis properties
sonar.projectKey=dap
sonar.login=admin
sonar.password=dapsonar2020
sonar.java.binaries=project/target

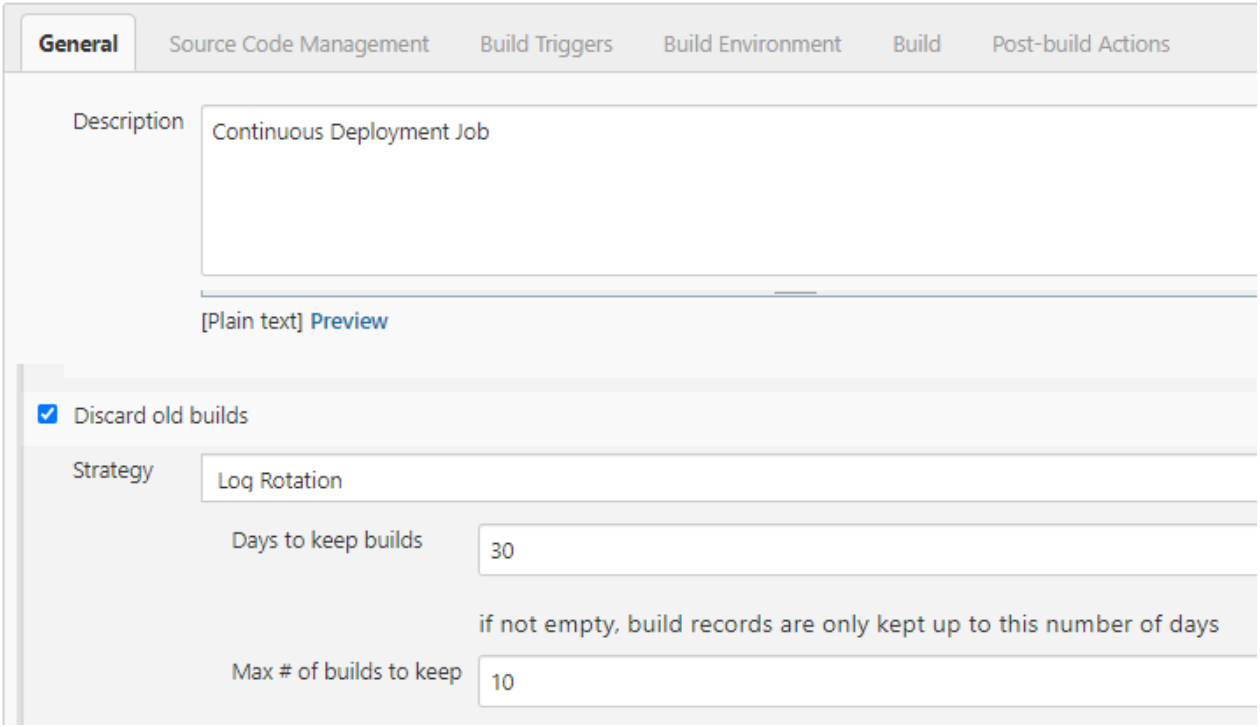
Maven Artifact : /var/lib/jenkins/workspace/Continuous_Integration_Job/project/target/project-4.0-DAP.war

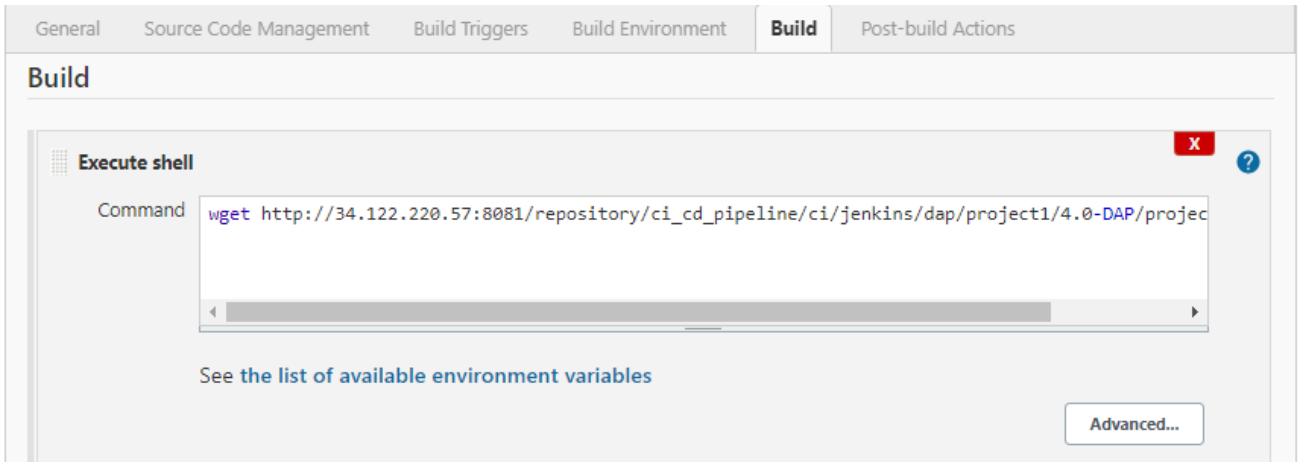


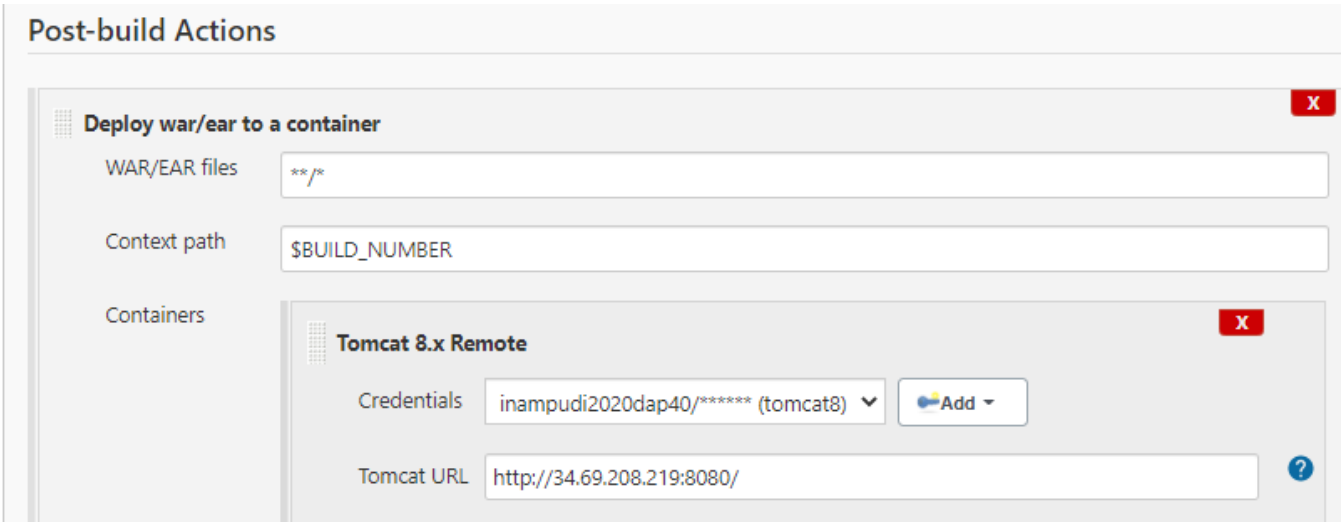


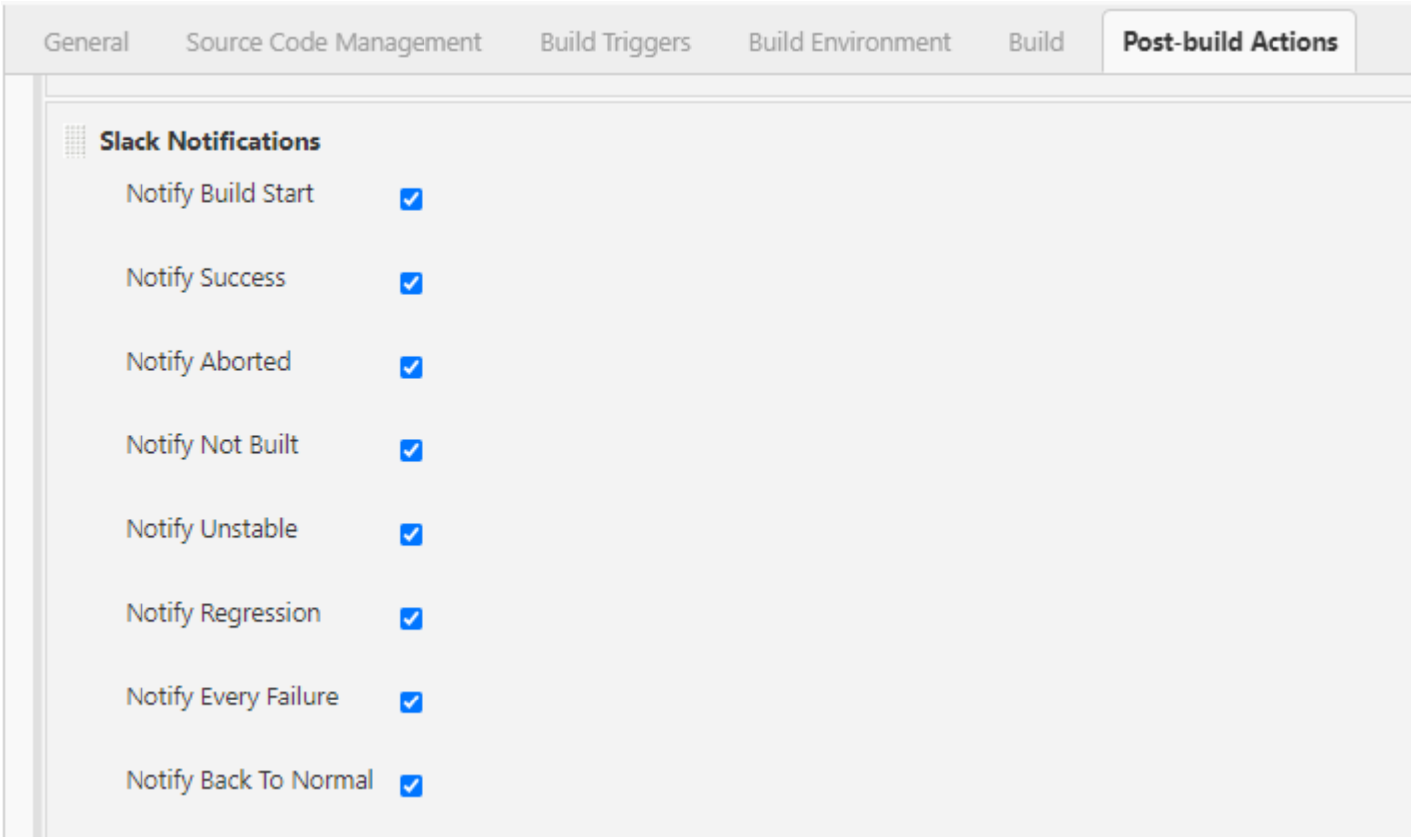


Continuous_Deployment_Job

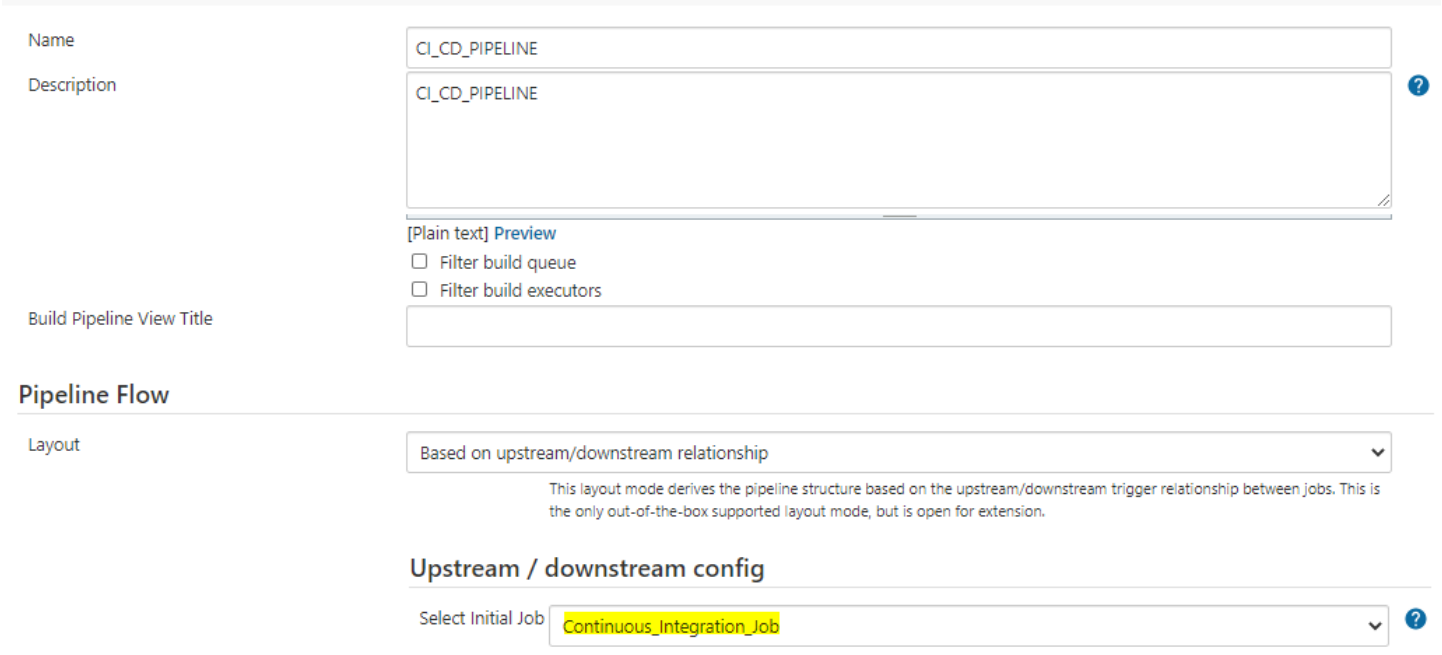



General
Source Code Management
Build Triggers
Build Environment
Build
Post-build Actions
Build
Execute shell
Command
wget http://34.122.220.57:8081/repository/ci_cd_pipeline/ci/jenkins/dap/project1/4.0-DAP/projec
See the list of available environment variables
Advanced...

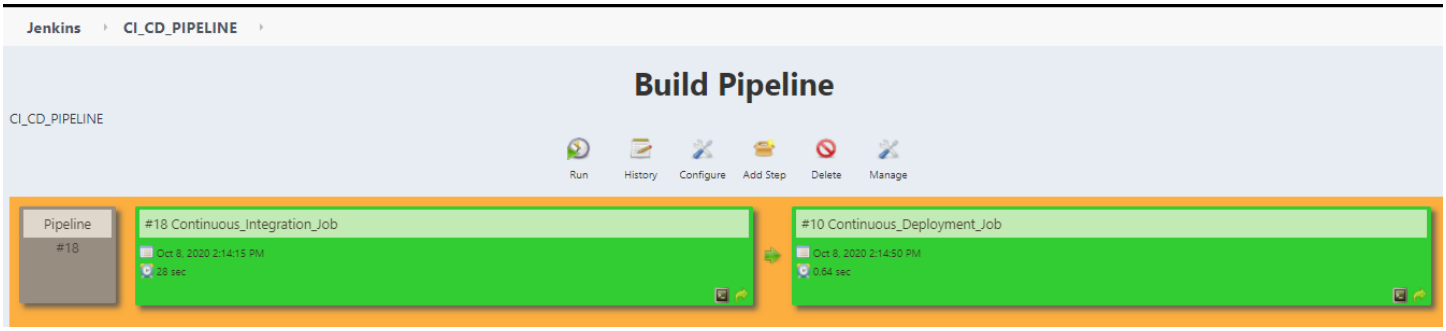

Post-build Actions
Deploy war/ear to a container
WAR/EAR files
**/*
Context path
$BUILD_NUMBER
Containers
Tomcat 8.x Remote
Credentials
inampudi2020dap40/****** (tomcat8)
Add
Tomcat URL
http://34.69.208.219:8080/

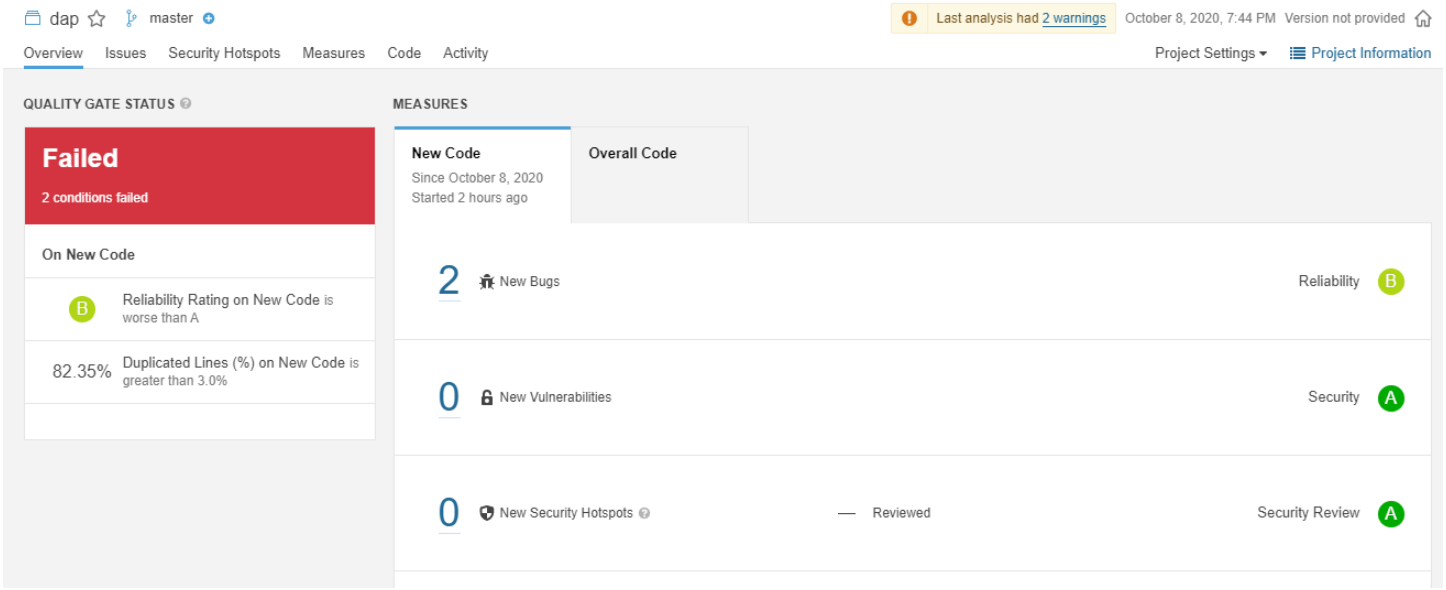


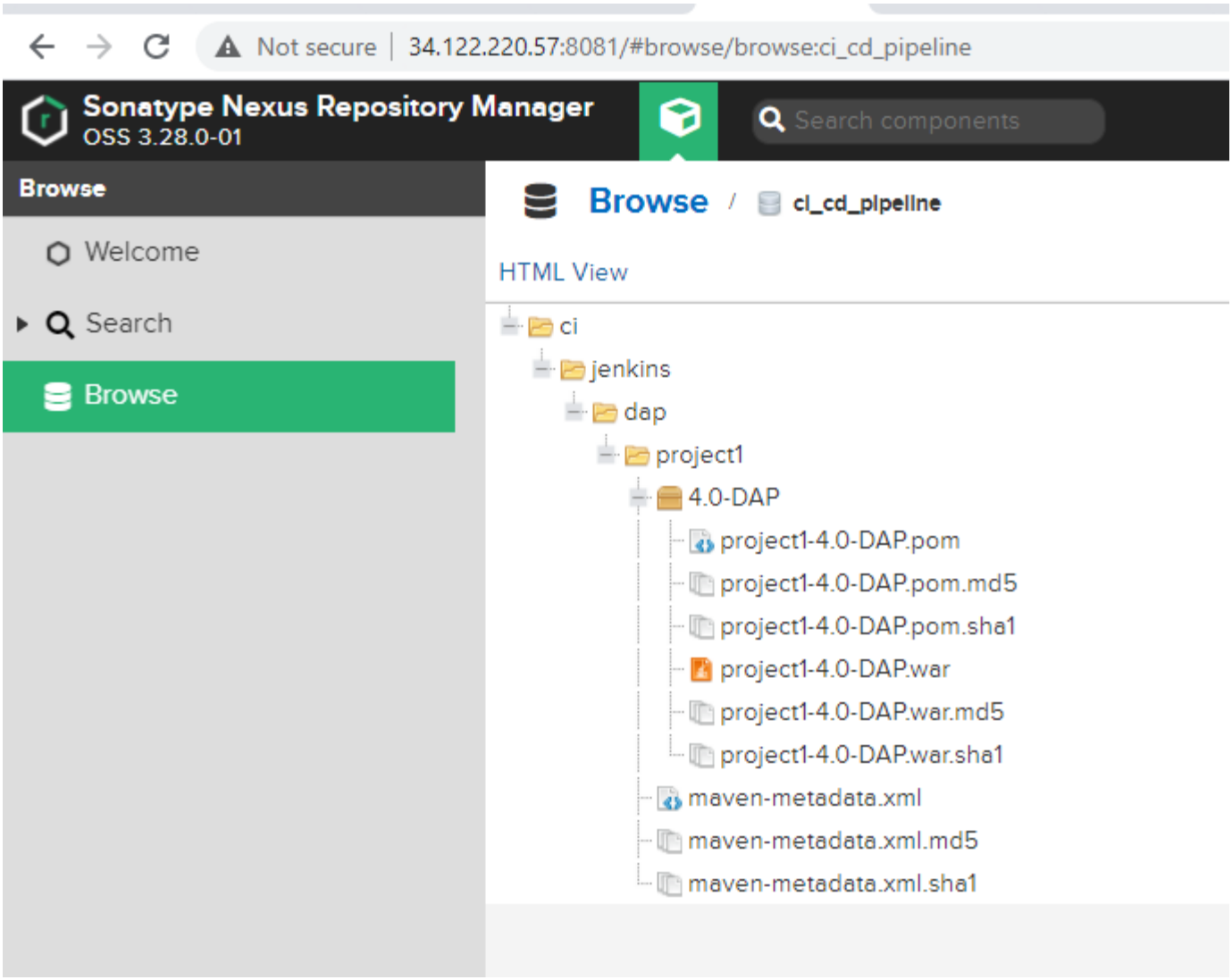
Create Pipeline View

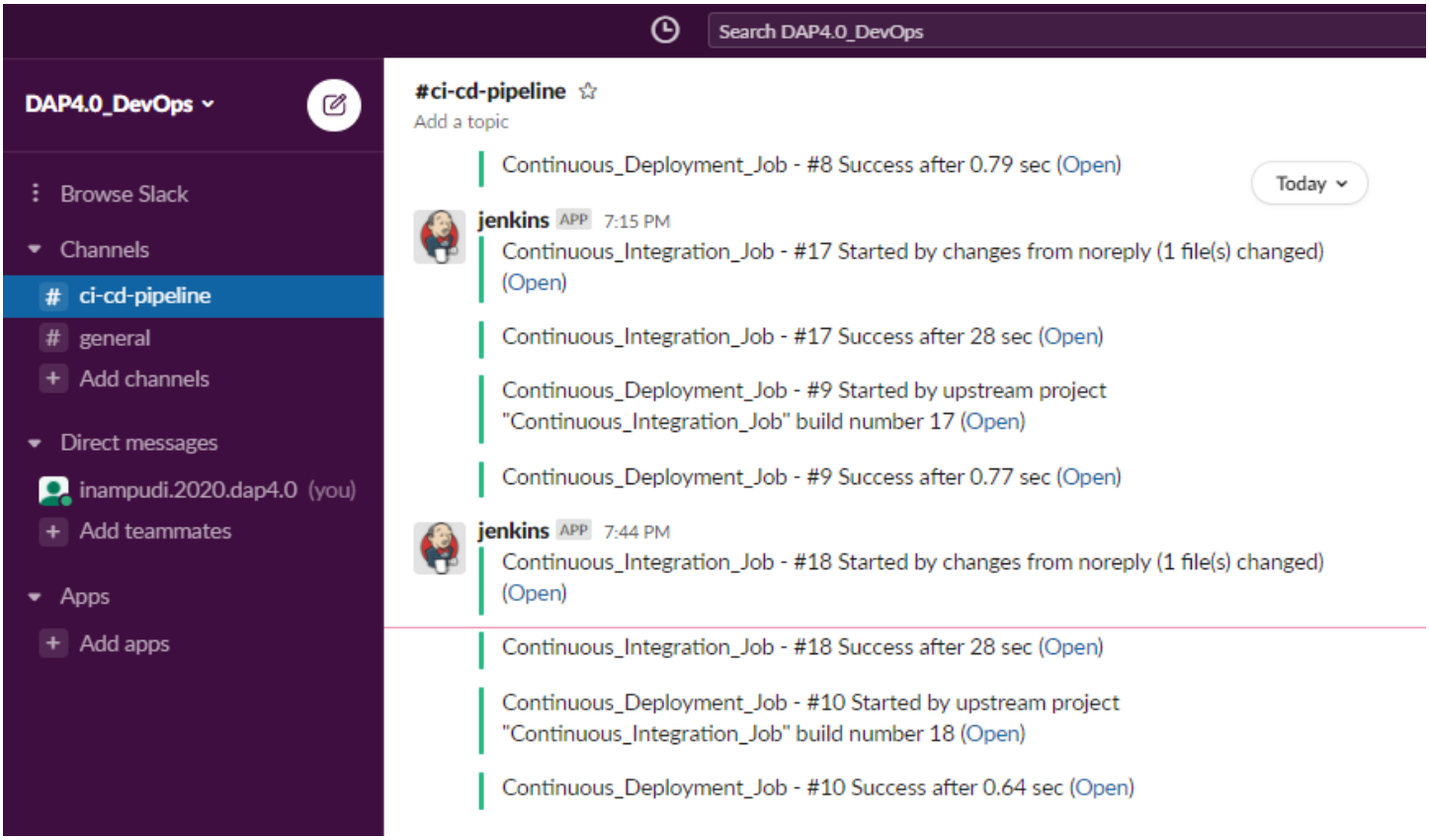


10. Validation Screen Shots

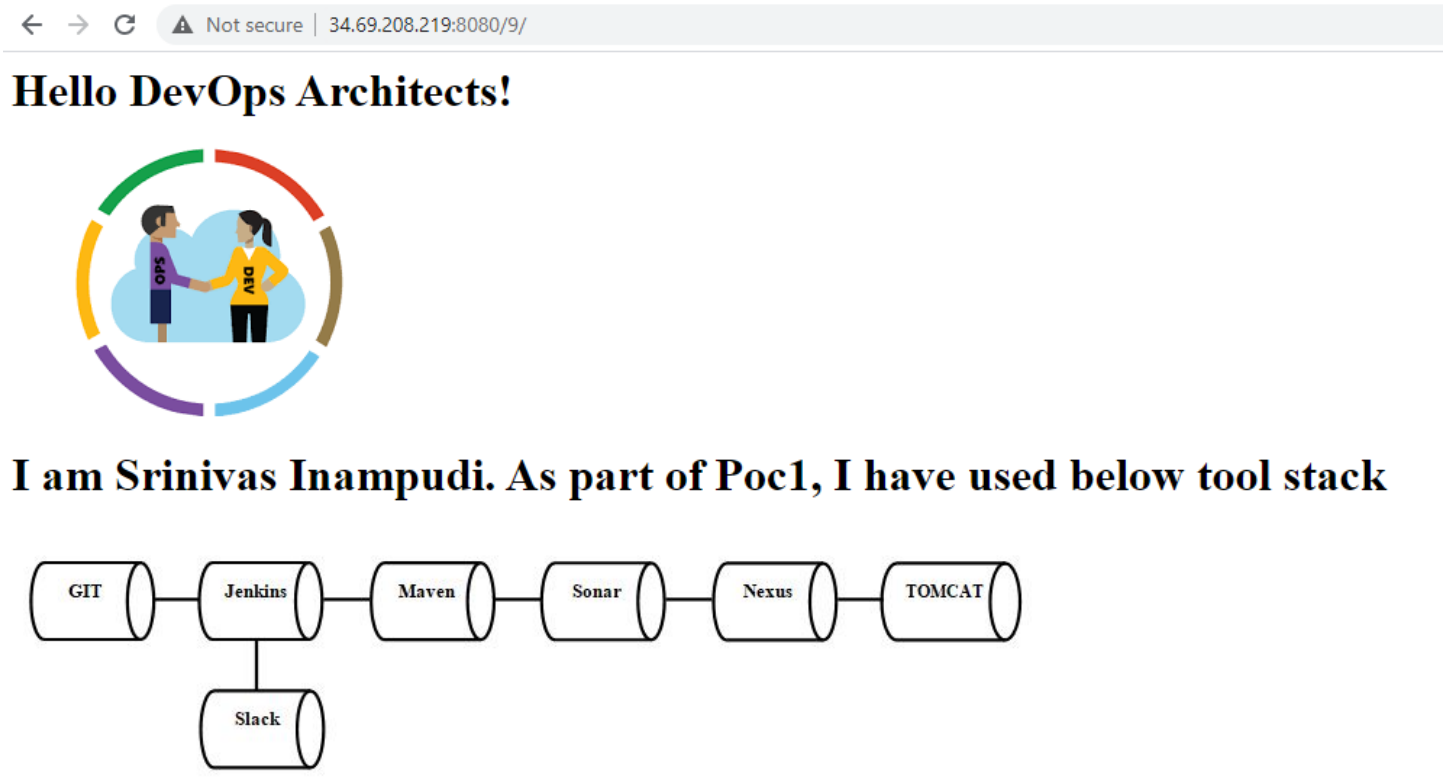




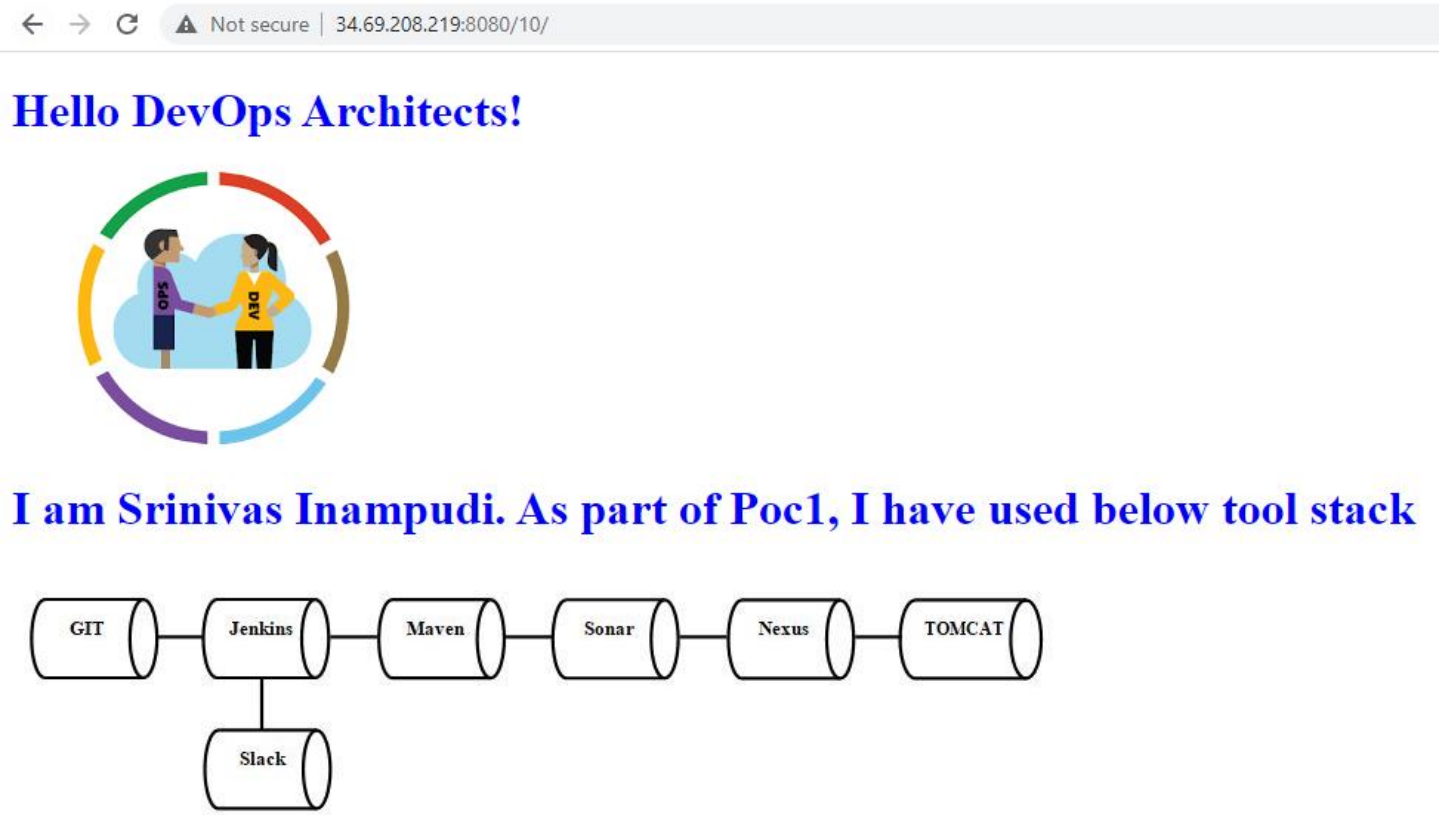

Not secure | 34.122.220.57:8081/#browse/browse:ci_cd_pipeline
Sonatype Nexus Repository Manager
OSS 3.28.0-01
Search components
Browse
Welcome
Search
Browse
Browse / ci_cd_pipeline
HTML View
ci
jenkins
dap
project1
4.0-DAP
project1-4.0-DAP.pom
project1-4.0-DAP.pom.md5
project1-4.0-DAP.pom.sha1
project1-4.0-DAP.war
project1-4.0-DAP.war.md5
project1-4.0-DAP.war.sha1
maven-metadata.xml
maven-metadata.xml.md5
maven-metadata.xml.sha1



TOMCAT URL : http://34.69.208.219:8080/9/



After changing the HTML page, build was initiated and deployed to TOMCAT with the context as 10, which is the latest CD Job Build Number



PoC1 has completed. Thank you