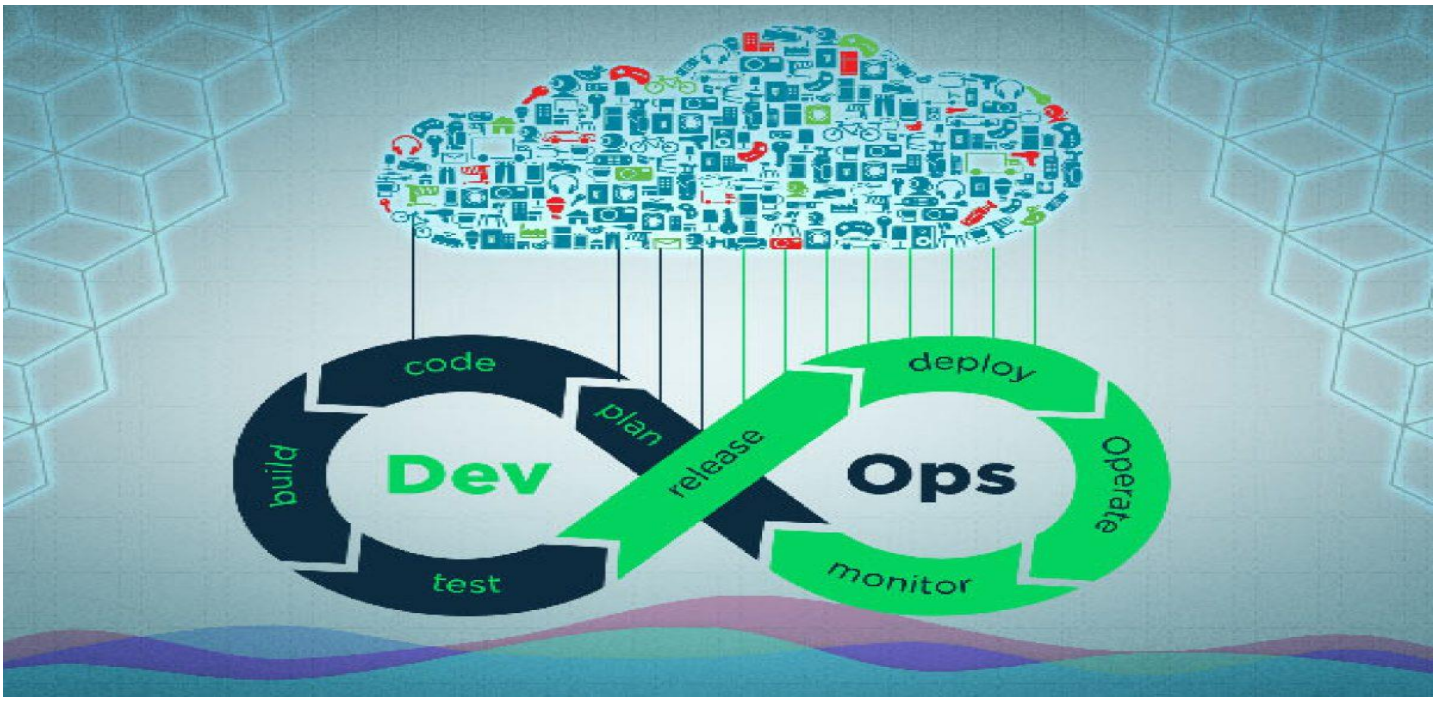
DevOps Task 4-:CI/CD Pipeline with Dynamic Distributed Jenkins Cluster



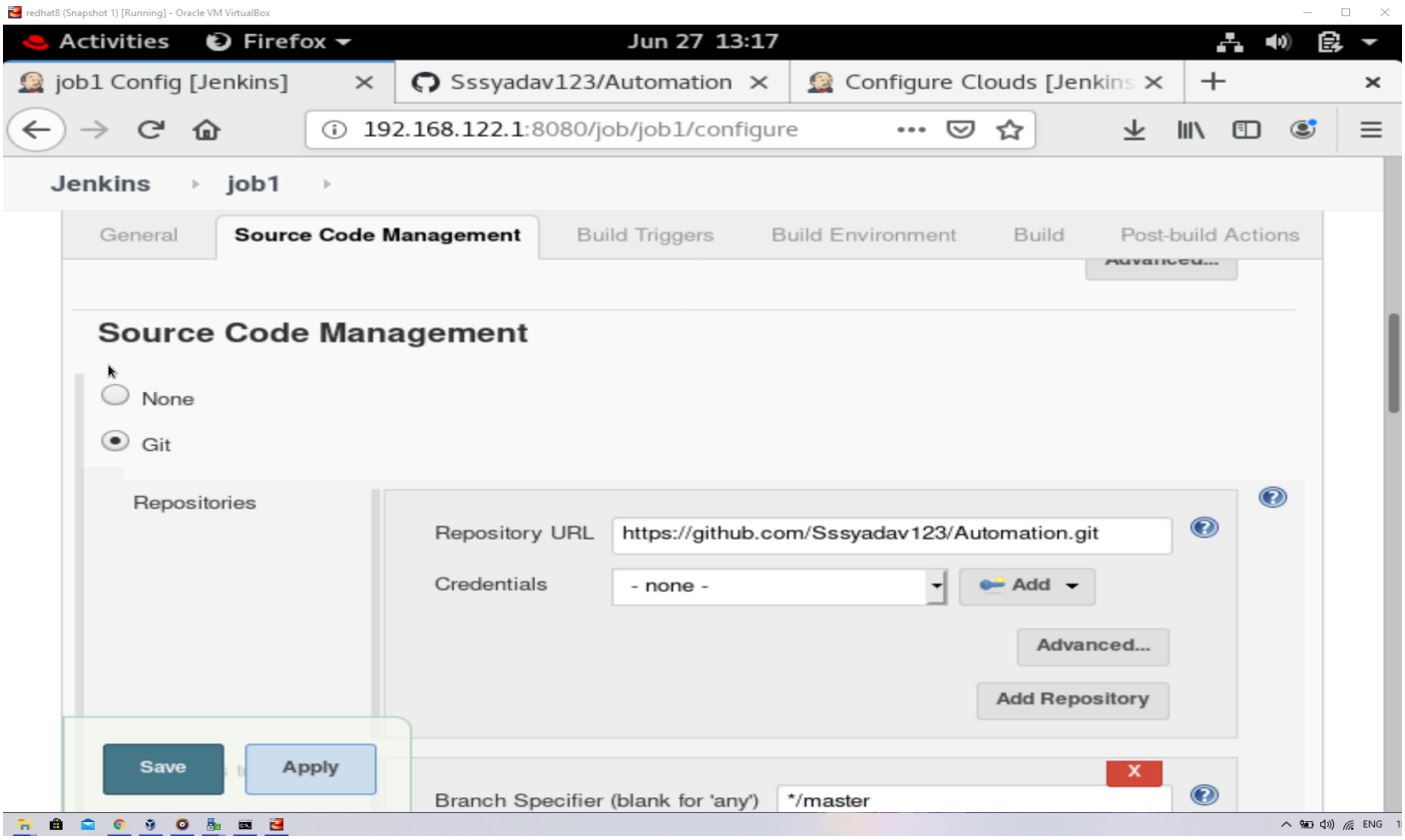
Step - 1 Create a Dockerfile that has Apache Web Server installed and push it onto Github.

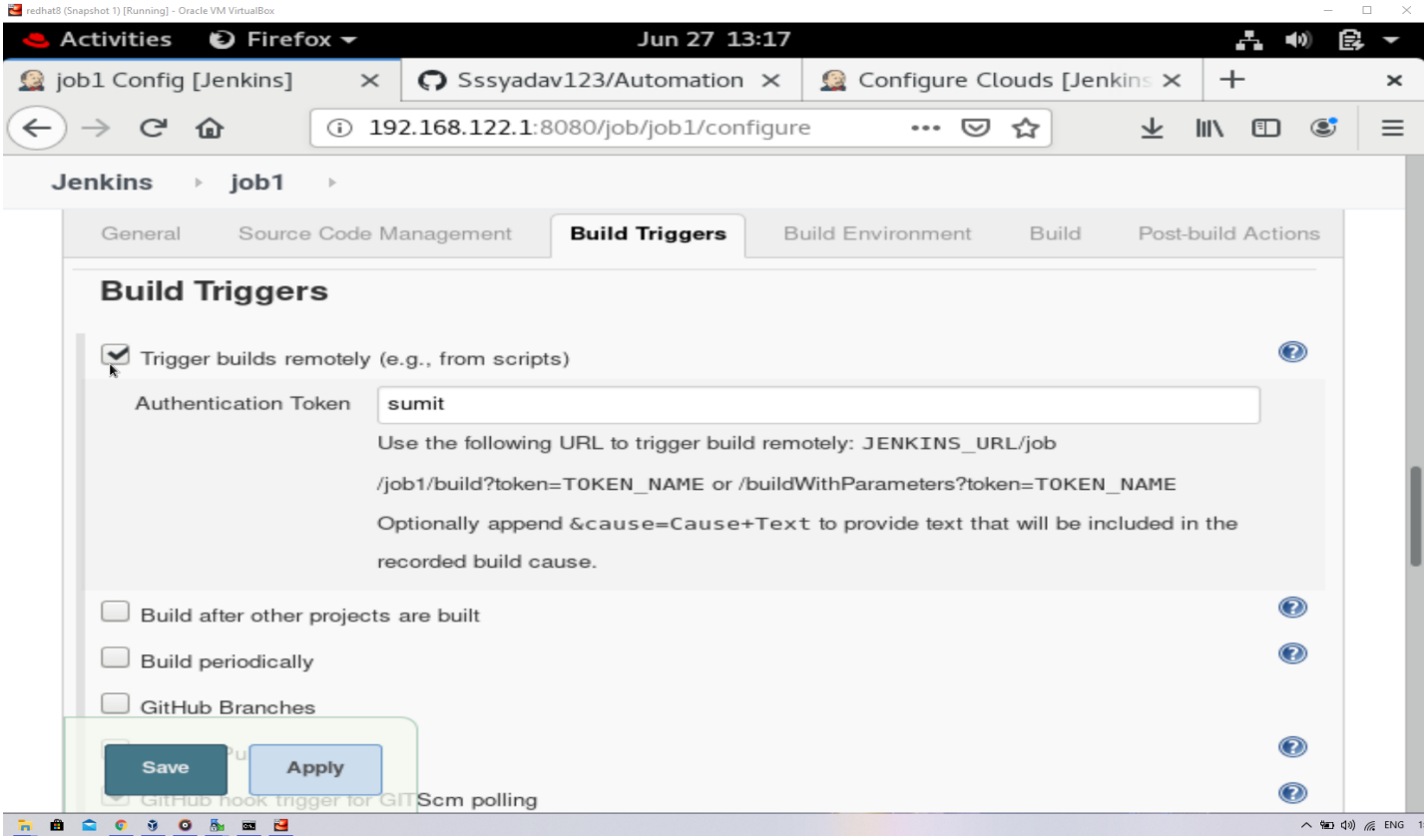
Also push the code that needs to be deployed on that server. A demo Dockerfile is :

```
FROM centos:latest
RUN yum install sudo -y
RUN yum install /sbin/service -y
RUN yum install httpd -y
COPY *.html /var/www/html
CMD /usr/sbin/httpd -DFOREGROUND && /bin/bash
EXPOSE 80
```

Step - 2 Now, a Jenkins task needs to be configured to auto download the Dockerfile &

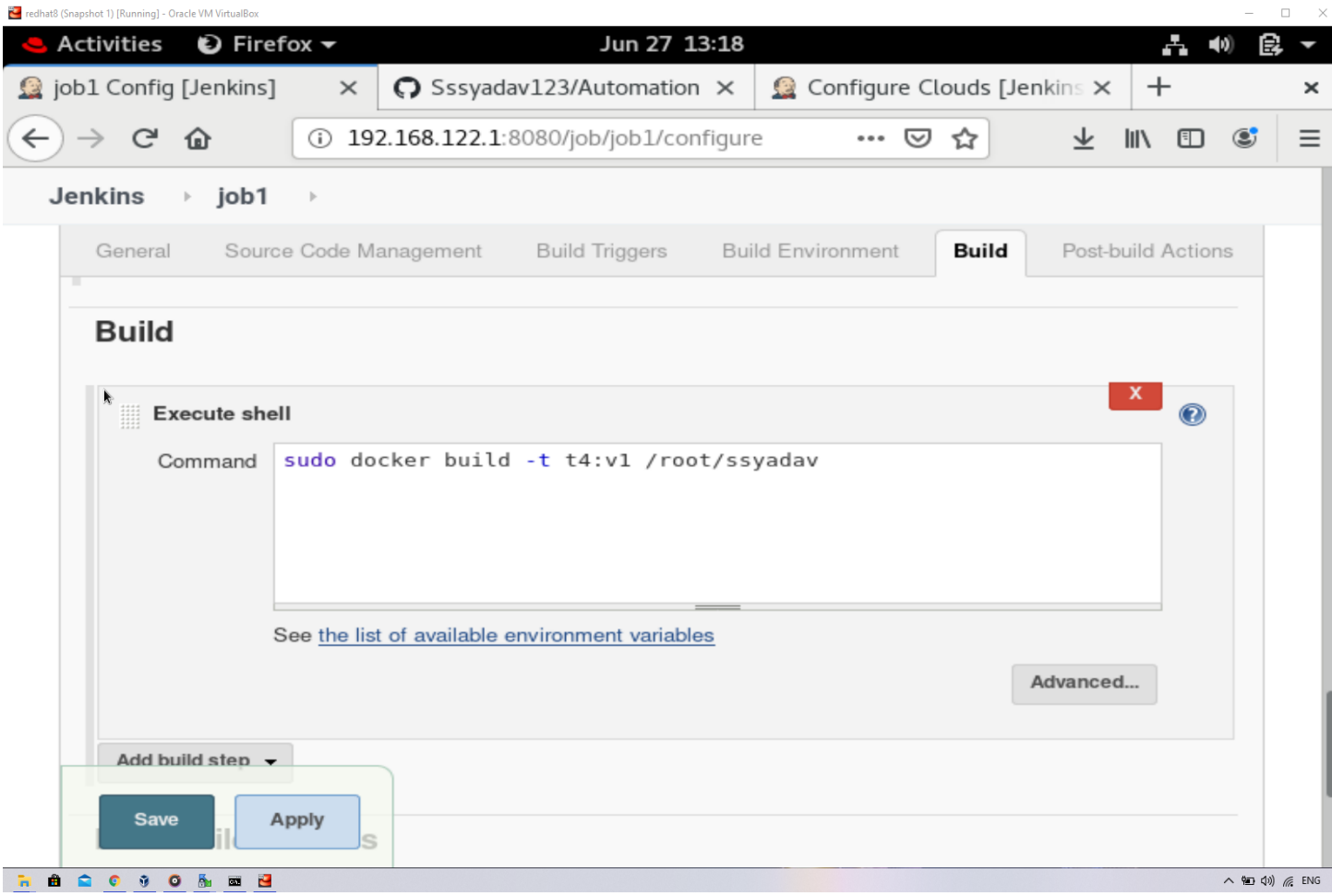
the code whenever they are pushed onto Github.





Step - 3 Next Jenkins task will build an image from this Dockerfile. This image would have all the code

that needs to be deployed. This image will also be automatically pushed to Github.



Step - 4 Now, we need to create a container that has Kubectl pre-configured, so that we can use it as a dynamic slave

to deploy the server image using Kubernetes.On the official Kubectl website, a yum repo is mentioned that can be used

to download and configure Kubectl in any linux container. I have used that same repo file.

kube.repo

```
[kubernetes]
name=Kubernetes
baseurl=https://packages.cloud.google.com/yum/repos/kubernetes-el7-x86_64
enabled=1
gpgcheck=1
repo_gpgcheck=1
```

```
gpgkey=https://packages.cloud.google.com/yum/doc/yum-key.gpg
https://packages.cloud.google.com/yum/doc/rpm-package-key.gpg
```

Store this repo in any folder in your Redhat. In the same folder, create a Dockerfile using the following specifications:

(Note - You should also have the reqd. ca.crt, client.crt, client.key in the same folder. If you don't have, then copy it before building this Dockerfile)

```
FROM centos:latest
COPY ./kube.repo /etc/yum.repos.d/
RUN yum install openssh-server -y
Run yum install java -y
RUN yum install kubectl -y
RUN yum install git -y
RUN yum install sudo -y
COPY ca.crt /root/
COPY client.crt /root/
COPY client.key /root/
COPY Info /root/.kube/
RUN ssh-keygen -A
CMD ["/usr/sbin/sshd", "-D"] && /bin/bash
```

Also, you need to have your kubectl configuration file in the same folder. Here, I have named it as

Info

```
apiVersion: v1
kind: Config

clusters:
- cluster:
   server: https://192.168.99.104:8443
   certificate-authority: /root/ca.crt
name: mycl

contexts:
- context:
   cluster: mycl
   user: sumit

users:
- name: sumit
```

```
 user:
   client-key: /root/client.key
   client-certificate: /root/client.crt
```

When you have done all this configuration properly, you need to build this Dockerfile :

```
docker build -t <name> /<location of Dockerfile>
```

** Step - 5** Now, you need to make some changes in Docker Service so that it can be used remotely using ssh. By default, this option is

not enabled in Docker. So open the file **/usr/lib/systemd/system/docker.service** in any text editor &

make the following changes in the line that I have highlighted:

```
   [Unit]
         Description=Docker Application Container Engine
         Documentation=https://docs.docker.com
         BindsTo=containerd.service
         After=network-online.target firewalld.service
         Wants=network-online.target
         Requires=docker.socket

         [Service]
         Type=notify
         # the default is not to use systemd for cgroups because the delegate issues
still
         # exists and systemd currently does not support the cgroup feature set
required
         # for containers run by docker
      *** ExecStart=/usr/bin/dockerd -H fd:// -H tcp://0.0.0.0:4243  *****
         ExecReload=/bin/kill -s HUP $MAINPID
         TimeoutSec=0
         RestartSec=2
         Restart=always

         # Note that StartLimit* options were moved from "Service" to "Unit" in
systemd 229.
         @@@
         "/usr/lib/systemd/system/docker.service" 47L, 1642C           14,57
Top
```

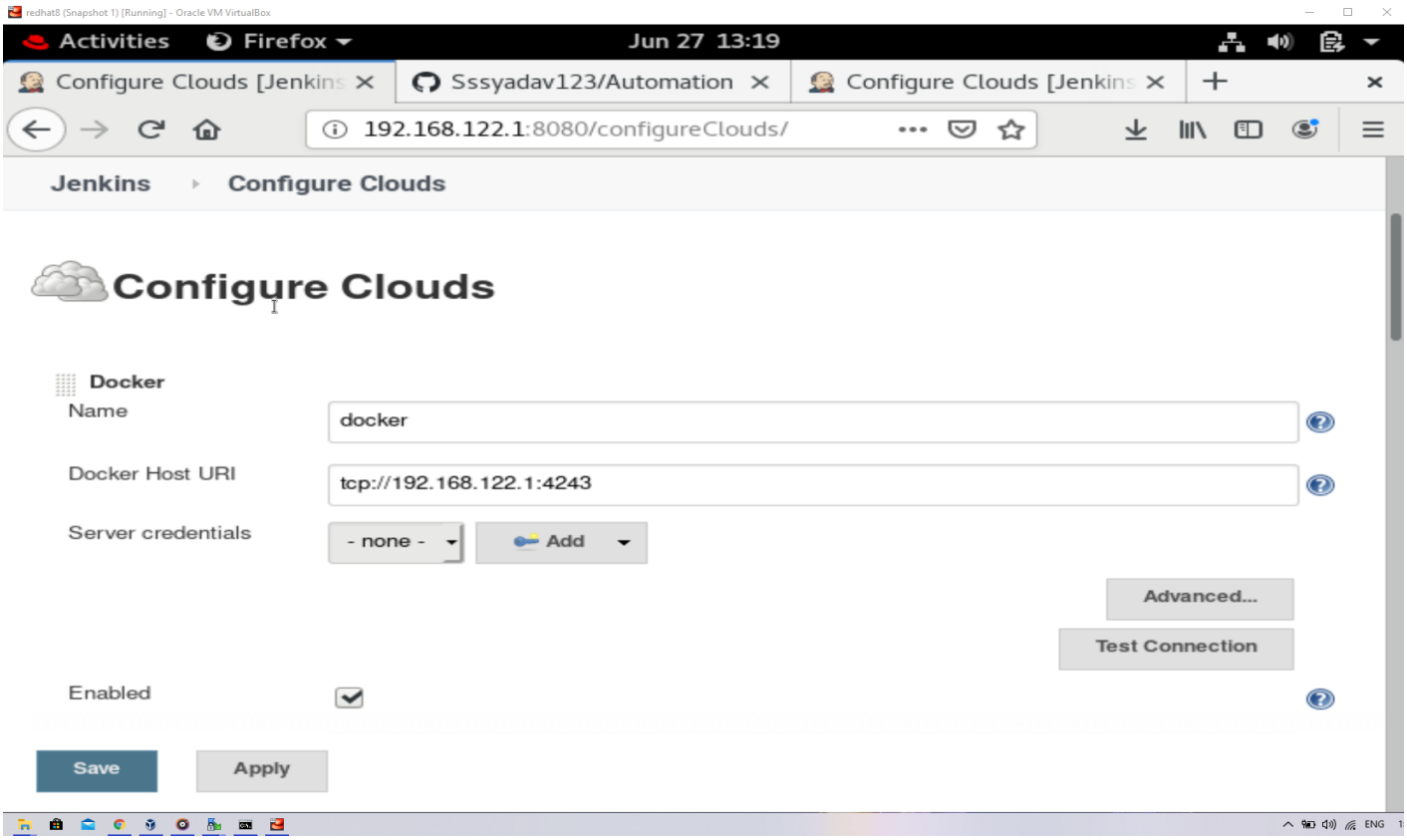
Now, after making changes in this file, reload your daemon services & restart your docker using the following commands:

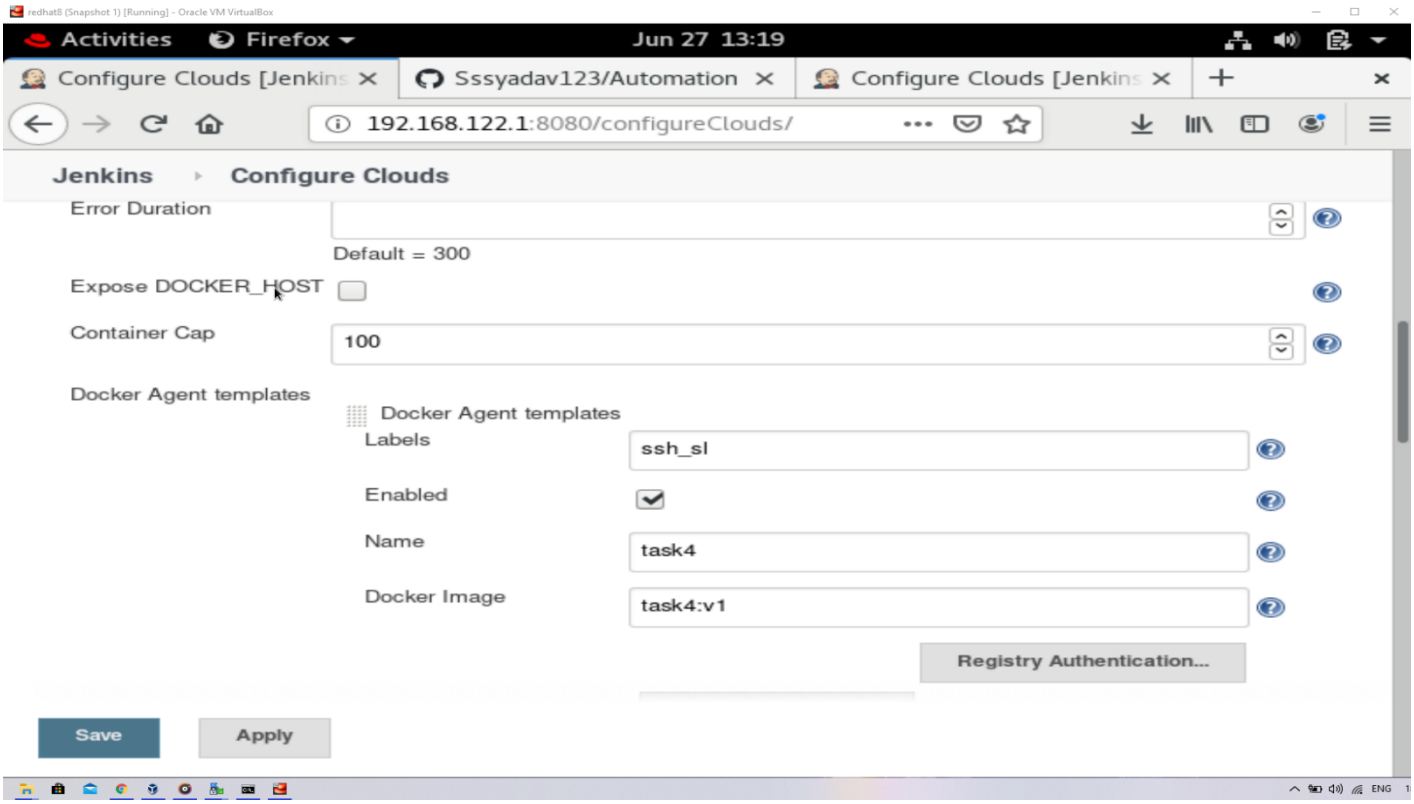
```
systemctl daemon-reload
system restart docker
```

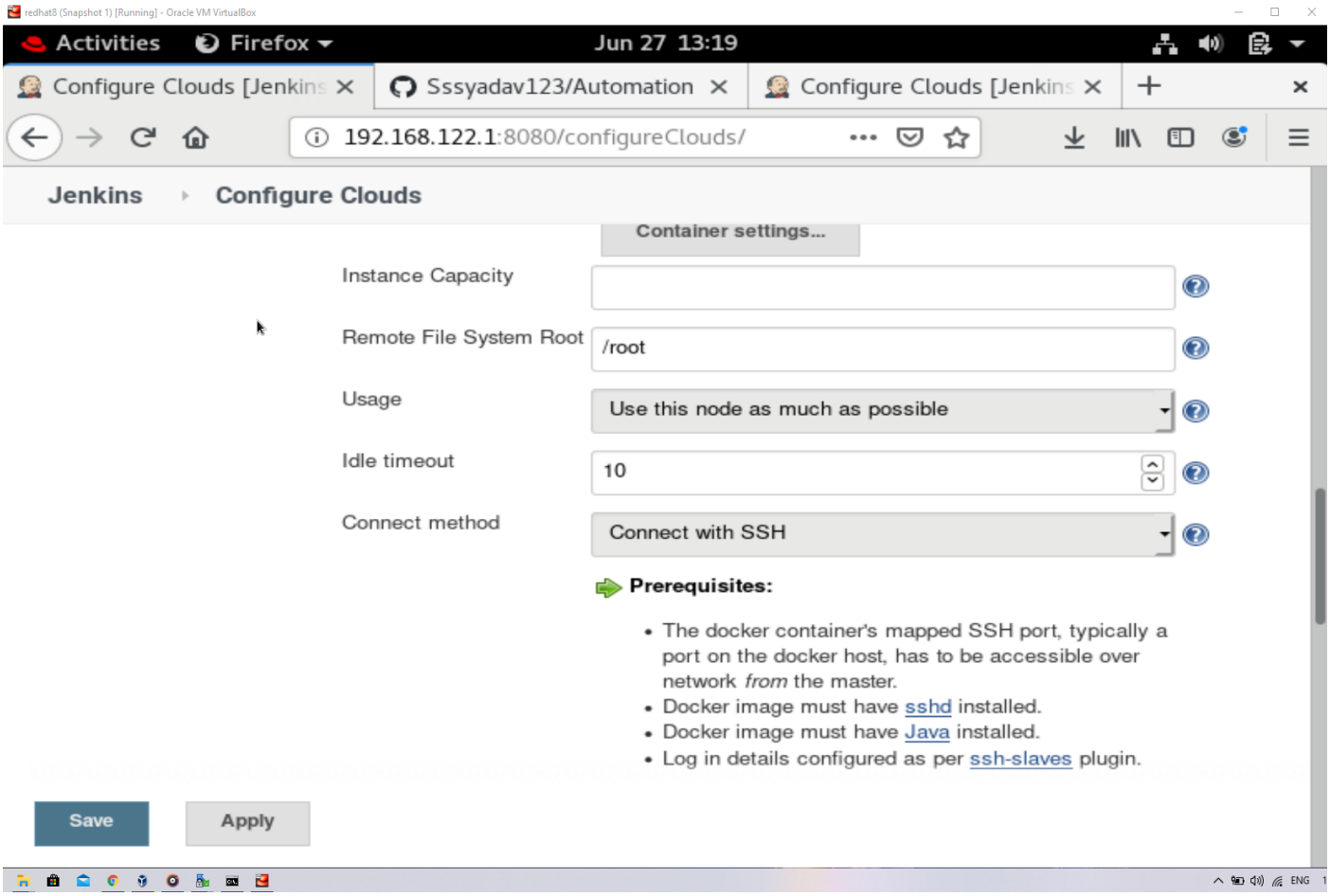
Step - 6 Now, you need to configure the docker cloud in your jenkins. For this, you'll need to download a plugin known as ***docker***.

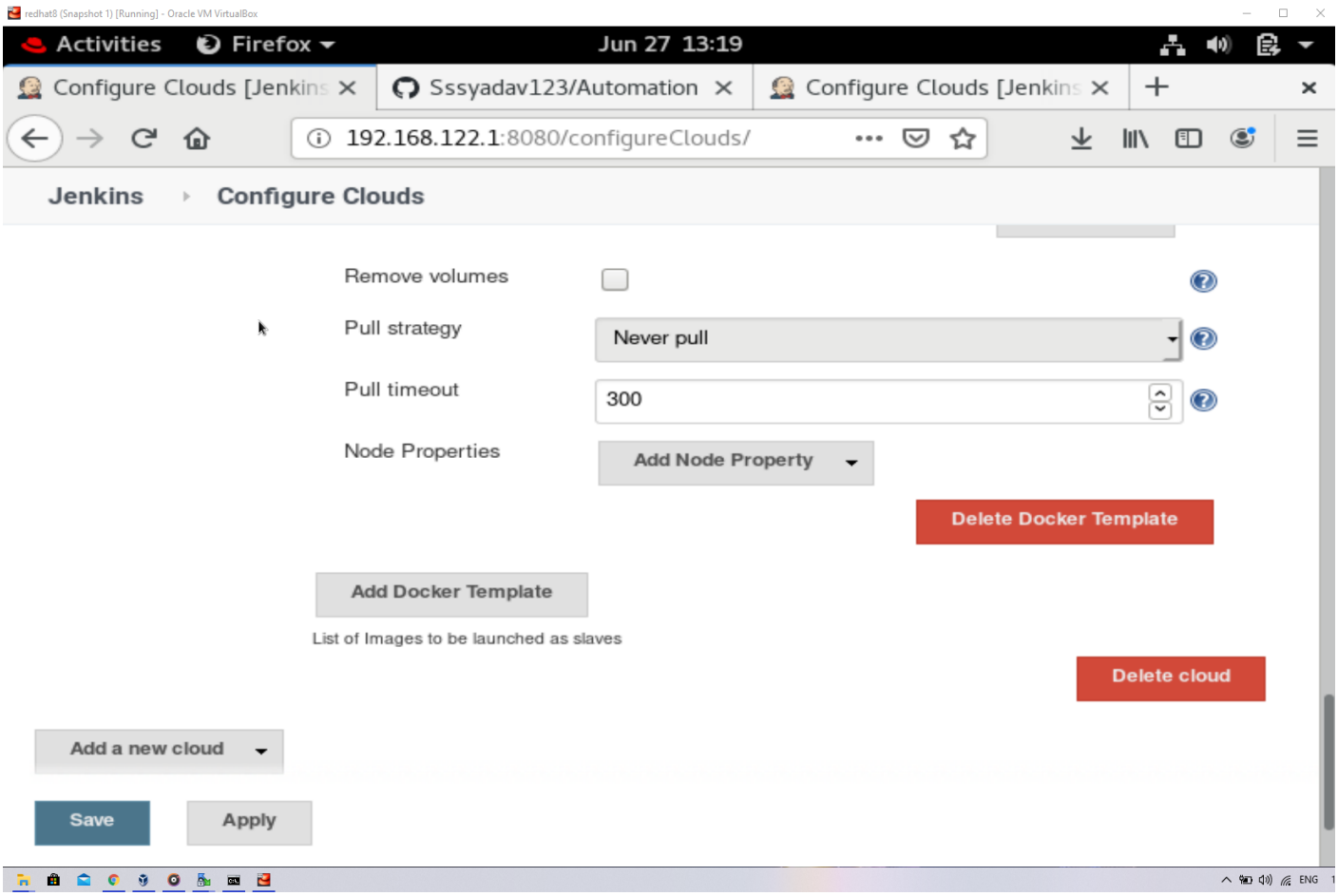
After downloading this plugin, go to ***Manage Jenkins***. From there, go to ***Manage Nodes and Clouds***. Select the ***Configure Clouds*** option from the left.

Configure the cloud as follows :

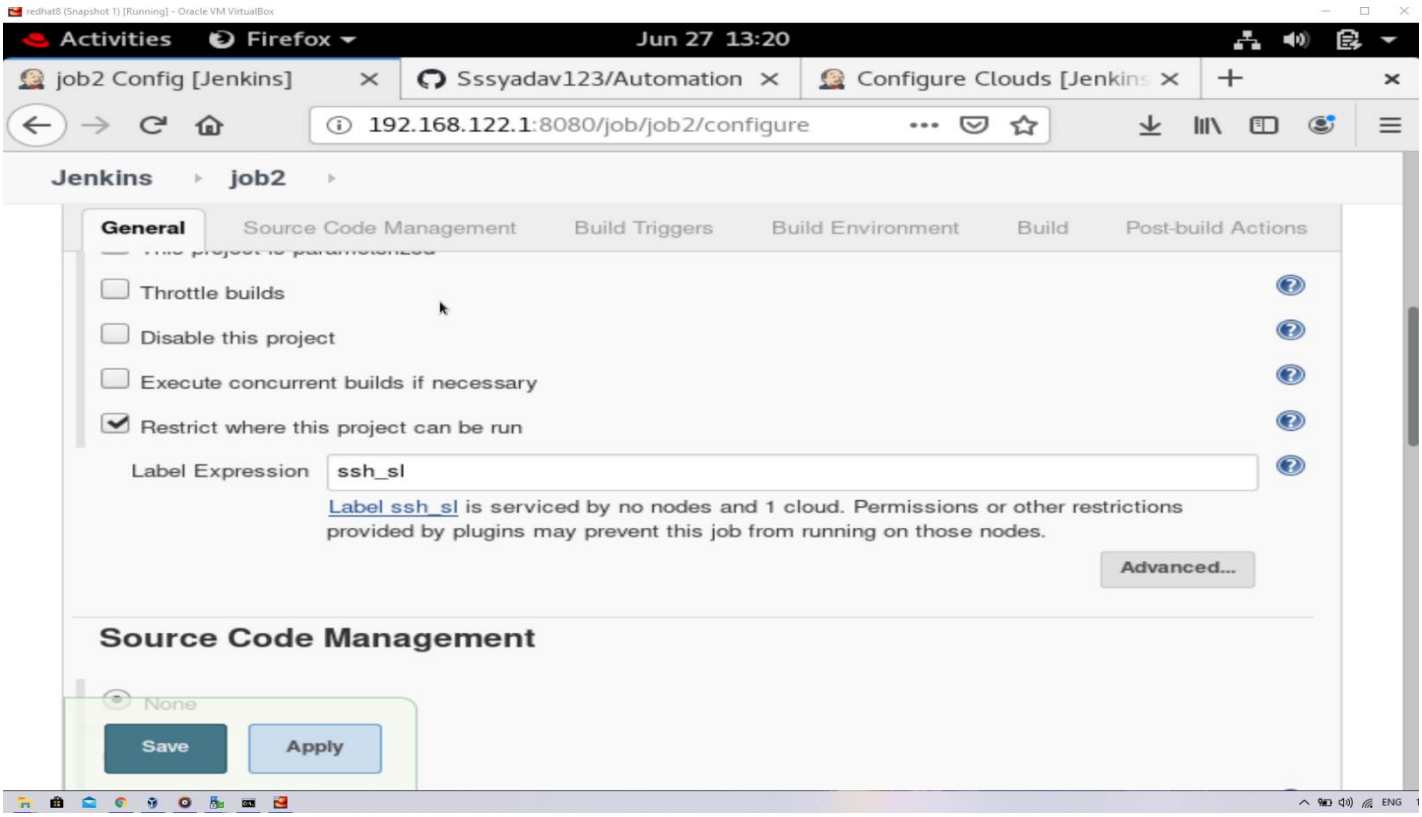



Activities
Firefox
Jun 27 13:19
Configure Clouds [Jenkins
Sssyadav123/Automation
Configure Clouds [Jenkins
192.168.122.1:8080/configureClouds/
Jenkins
Configure Clouds
Error Duration
Default = 300
Expose DOCKER_HOST
Container Cap
100
Docker Agent templates
Docker Agent templates
Labels
ssh_sl
Enabled
Name
task4
Docker Image
task4:v1
Registry Authentication...
Save
Apply


redhat8 (Snapshot 1) [Running] - Oracle VM VirtualBox
Activities
Firefox
Jun 27 13:19
Configure Clouds [Jenkins
Sssyadav123/Automation
Configure Clouds [Jenkins
192.168.122.1:8080/configureClouds/
Jenkins
Configure Clouds
Container settings...
Instance Capacity
Remote File System Root
/root
Usage
Use this node as much as possible
Idle timeout
10
Connect method
Connect with SSH
Prerequisites:
The docker container's mapped SSH port, typically a port on the docker host, has to be accessible over network from the master.
Docker image must have sshd installed.
Docker image must have Java installed.
Log in details configured as per ssh-slaves plugin.
Save
Apply



Step - 7 Now, a Jenkins task will work to create the Deployment with the image. This task will also do Rollout in case of any updates.



Now, we go into cmd & check whether the Deployment is done or not.

Command Prompt

```
C:\Users\Dell\OneDrive\Desktop\kube_code>kubectl get deployments
NAME    READY   UP-TO-DATE   AVAILABLE   AGE
task4   4/4     4            4           32m

C:\Users\Dell\OneDrive\Desktop\kube_code>kubectl get pods
NAME                     READY   STATUS    RESTARTS   AGE
task4-5f688b7dbf-6wdtt   1/1     Running   0          32m
task4-5f688b7dbf-7mf6c   1/1     Running   0          32m
task4-5f688b7dbf-mcxfn   1/1     Running   0          32m
task4-5f688b7dbf-md66t   1/1     Running   0          32m

C:\Users\Dell\OneDrive\Desktop\kube_code>
```