

Project to establish an efficient CI/CD pipeline containing three virtual machines where changes to the Ansible playbook hosted in private GitLab instance on second VM trigger automated deployments of Apache HTTP Server on the third VM, with integrated notifications for pipeline status and relevant information about users.

Candidate Name: Salma Salah
Assigned to: Eng. Amr

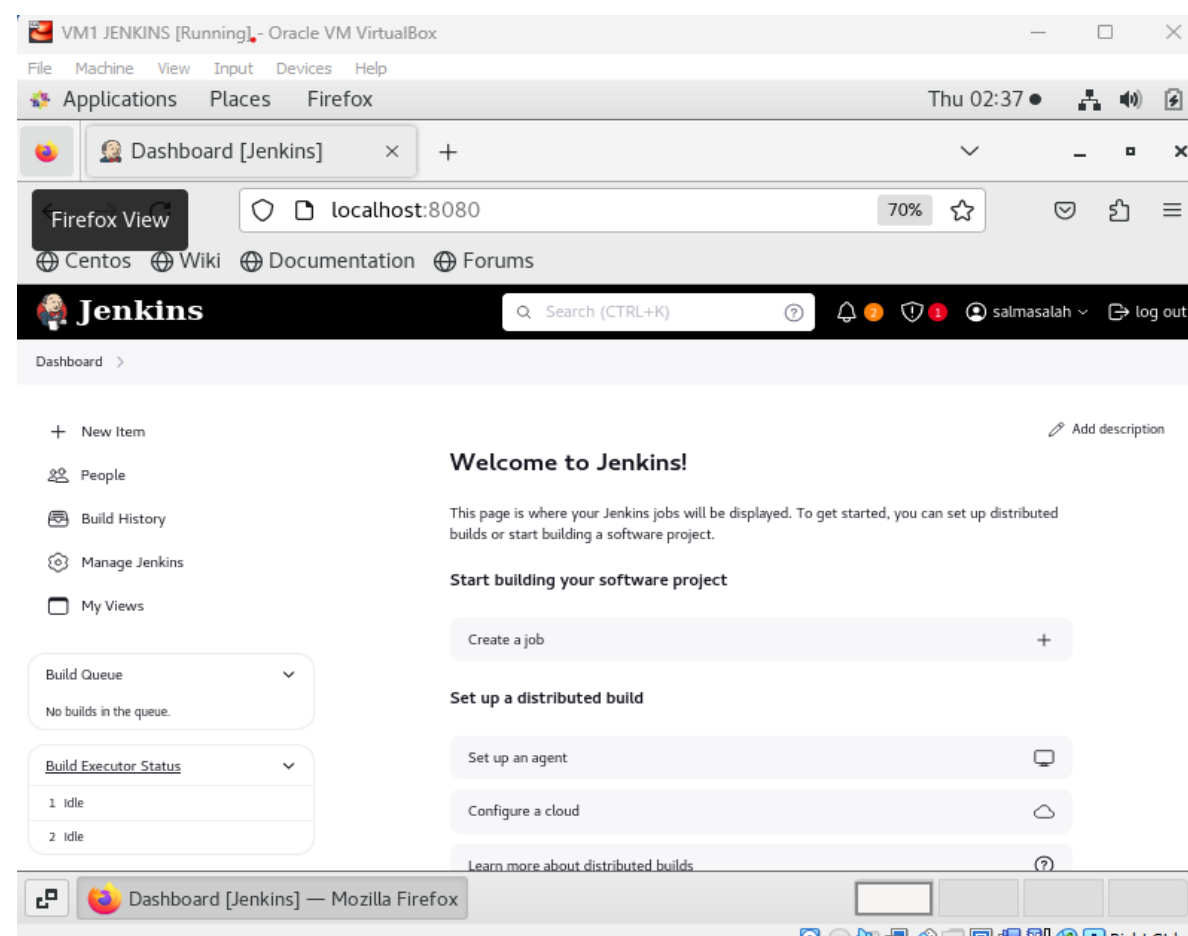


Step 1

Installing Jenkins on VM1 and GitLab on VM2

1) Installing Jenkins

```
salma@salma:~  
2 sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io-2023.key  
3 sudo yum upgrade  
4 sudo yum install fontconfig java-17-openjdk  
5 sudo yum install jenkins  
6 sudo systemctl daemon-reload  
7 sudo systemctl enable jenkins  
8 sudo systemctl start jenkins  
9 sudo systemctl status jenkins  
10 sudo systemctl start jenkins.service  
11 sudo systemctl enable jenkins.service  
12 sudo systemctl start jenkins.service  
13 sudo firewall-cmd --zone=public --add-port=8080/tcp --permanent  
14 sudo firewall-cmd --reload  
15 sudo firewall-cmd --zone=public --add-port=443/tcp --permanent  
16 sudo firewall-cmd --reload  
17 sudo firewall-cmd --zone=public --list-ports  
18 sudo yum remove jenkins  
19 sudo yum install jenkins  
20 sudo systemctl daemon-reload  
21 sudo systemctl enable jenkins.service  
22 sudo systemctl start jenkins.service  
23 sudo systemctl status jenkins  
24 -l  
25 history  
[salma@salma ~]$ s
```



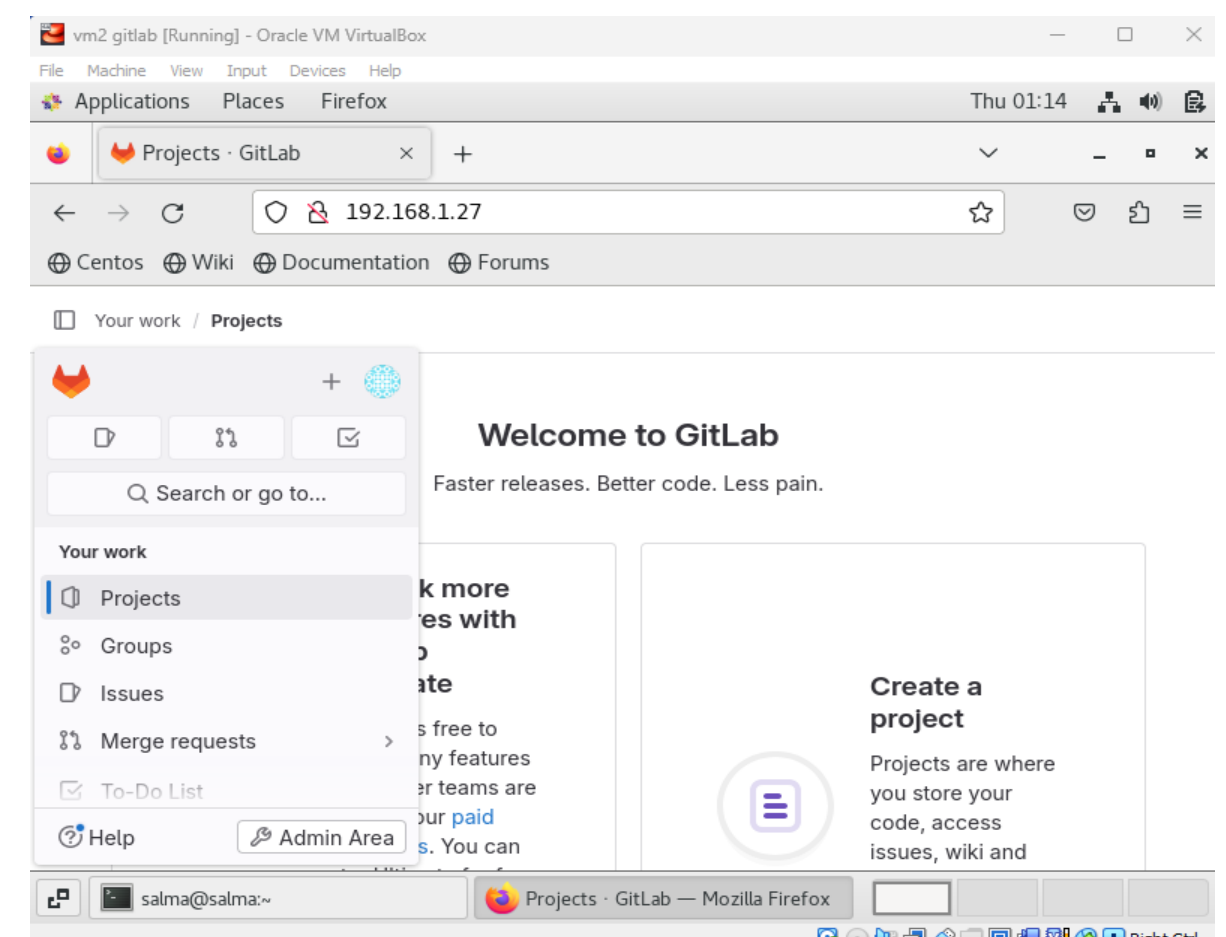
2) Configuring VM2 to have static IP Address

```
salma@salma:/etc/sysconfig/network-scripts  
TYPE="Ethernet"  
PROXY_METHOD="none"  
BROWSER_ONLY="no"  
BOOTPROTO=static  
IPADDR=192.168.1.35  
NETMASK=255.255.255.0  
GATEWAY=192.168.1.1  
DEFROUTE="yes"  
IPV4_FAILURE_FATAL="no"  
IPV6INIT="yes"  
IPV6_AUTOCONF="yes"  
IPV6_DEFROUTE="yes"  
IPV6_FAILURE_FATAL="no"  
IPV6_ADDR_GEN_MODE="stable-privacy"  
NAME="enp0s3"  
UUID="b131b0e6-e4fa-4361-9b3c-0b3787c28df9"  
DEVICE="enp0s3"  
ONBOOT="yes"  
~  
~  
~  
~  
-- INSERT --  
5,20 All
```

```
salma@salma:~  
12 route -n  
13 sudo cd /etc/sysconfig/network-scripts/  
14 cd /etc/sysconfig/network-scripts/  
15 ls  
16 cp ifcfg-enp0s3 ifcfg-backup  
17 sudo cp ifcfg-enp0s3 ifcfg-backup  
18 sudo vim ifcfg-enp0s3  
19 reboot  
20 ifconfig  
21 sudo yum update  
22 sudo yum install -y curl policycoreutils-python openssh-server perl  
23 sudo systemctl start sshd  
24 sudo systemctl enable sshd  
25 sudo systemctl status sshd  
26 sudo firewall-cmd --add-port=8080/tcp --permanent  
27 sudo firewall-cmd --add-port=80/tcp --permanent  
28 sudo firewall-cmd --add-port=443/tcp --permanent  
29 sudo firewall-cmd --list-ports  
30 sudo systemctl reload firewalld  
31 sudo firewall-cmd --list-ports  
32 sudo systemctl start postfix  
33 sudo systemctl enable postfix  
34 sudo systemctl status postfix  
35 curl -s https://packages.gitlab.com/install/repositories/gitlab/gitlab-ee/script  
36 curl -s https://packages.gitlab.com/install/repositories/gitlab/gitlab-ee/script
```

3) Installing GitLab and getting root password to login with

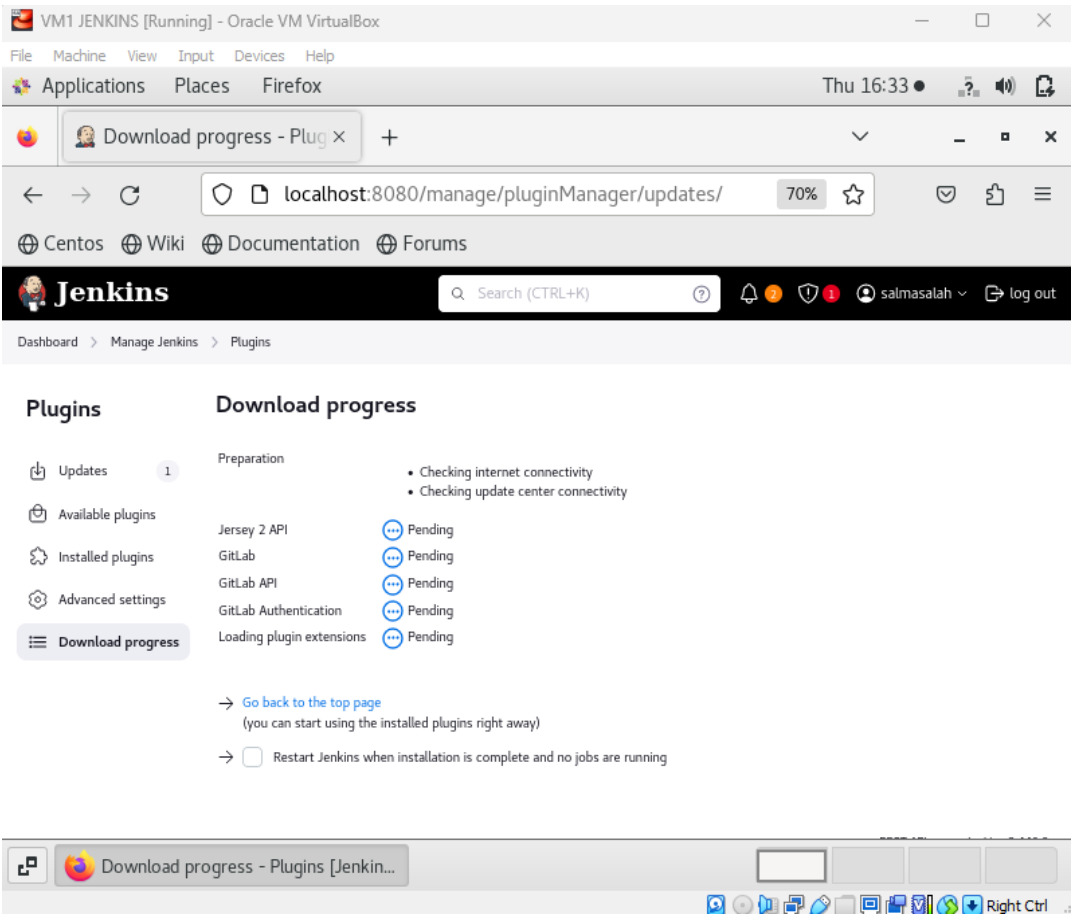
```
salma@salma:~  
18 sudo vim ifcfg-enp0s3  
19 reboot  
20 ifconfig  
21 sudo yum update  
22 sudo yum install -y curl policycoreutils-python openssh-server perl  
23 sudo systemctl start sshd  
24 sudo systemctl enable sshd  
25 sudo systemctl status sshd  
26 sudo firewall-cmd --add-port=8080/tcp --permanent  
27 sudo firewall-cmd --add-port=80/tcp --permanent  
28 sudo firewall-cmd --add-port=443/tcp --permanent  
29 sudo firewall-cmd --list-ports  
30 sudo systemctl reload firewalld  
31 sudo firewall-cmd --list-ports  
32 sudo systemctl start postfix  
33 sudo systemctl enable postfix  
34 sudo systemctl status postfix  
35 curl -s https://packages.gitlab.com/install/repositories/gitlab/gitlab-ee/script  
36 curl -s https://packages.gitlab.com/install/repositories/gitlab/gitlab-ee/script  
37 sudo EXTERNAL_URL="http://192.168.1.22" yum install -y gitlab-ee  
38 sudo vim /etc/gitlab/gitlab.rb  
39 sudo gitlab-ctl reconfigure  
40 sudo cat /etc/gitlab/initial_root_password  
41 cd Desktop
```



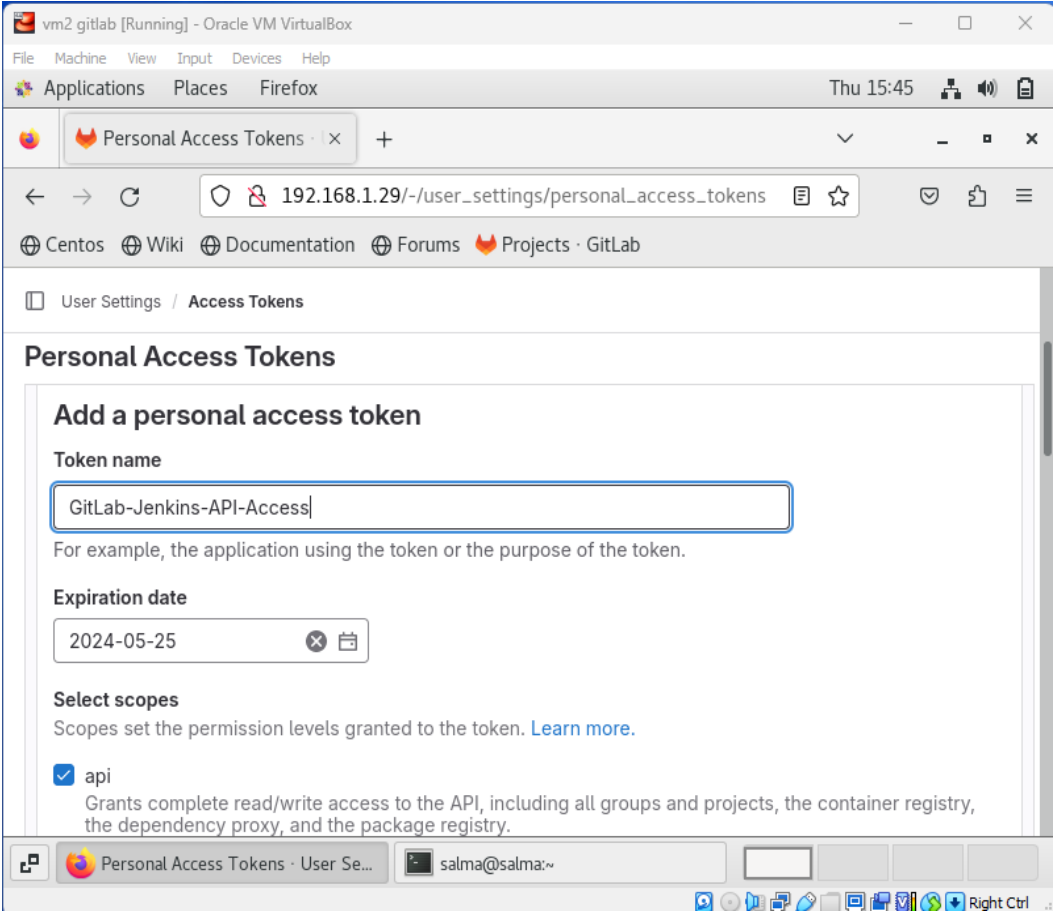
Step 2

Jenkins Integration With GetLab

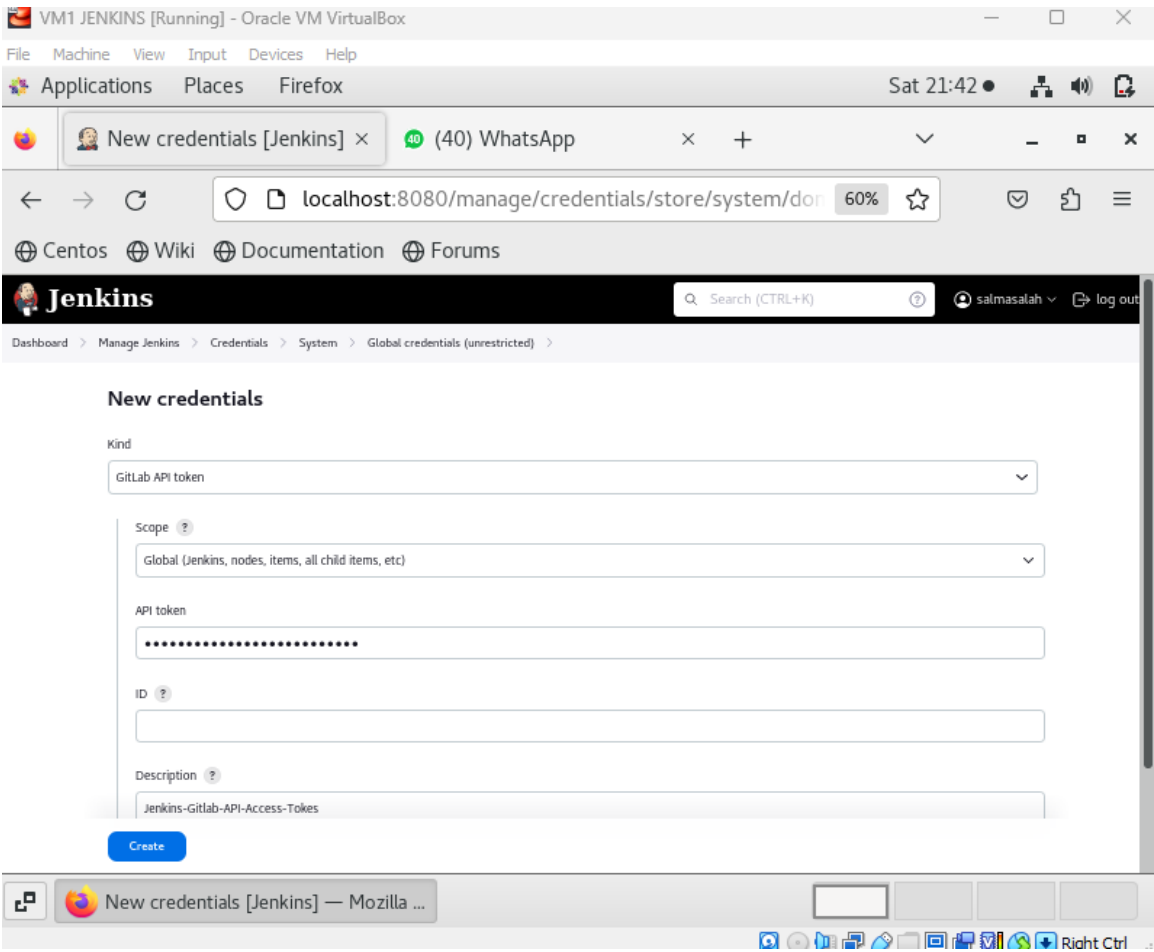
1)Installing Required Plugins



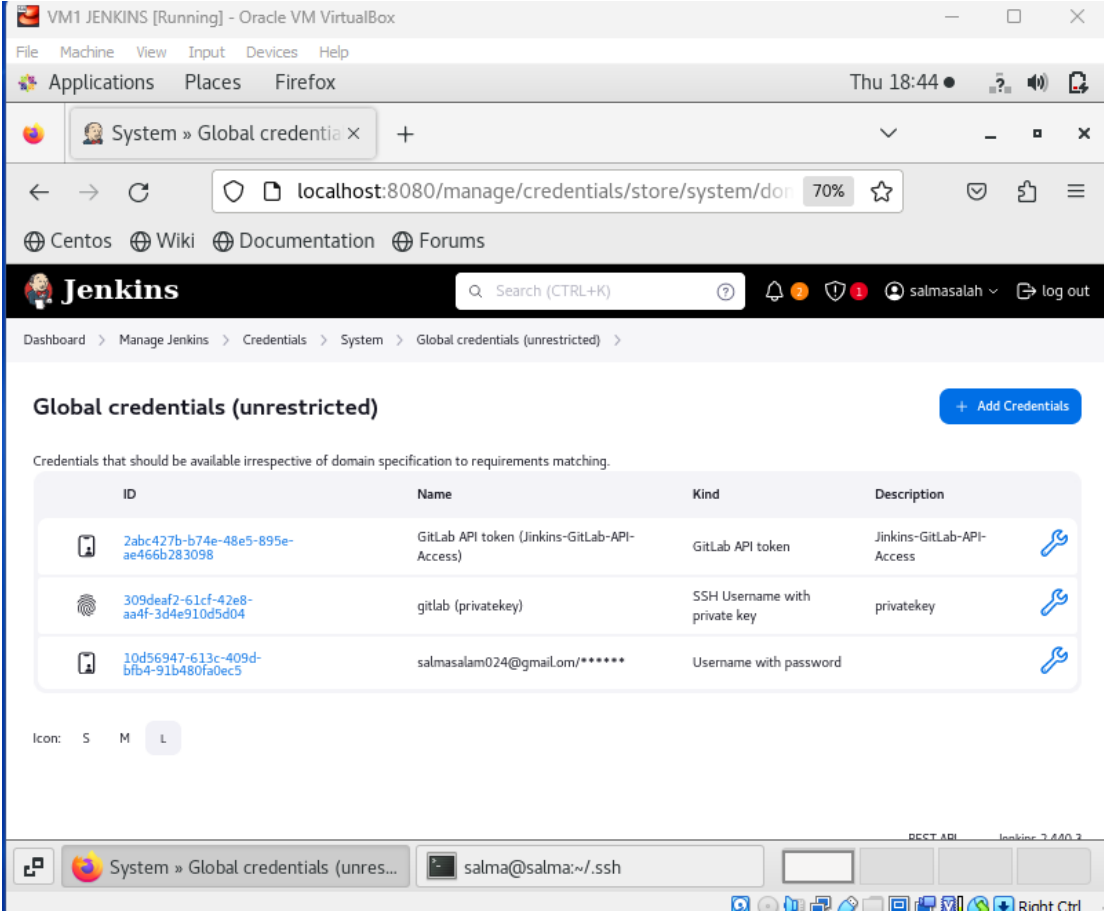
2)Creating API Token



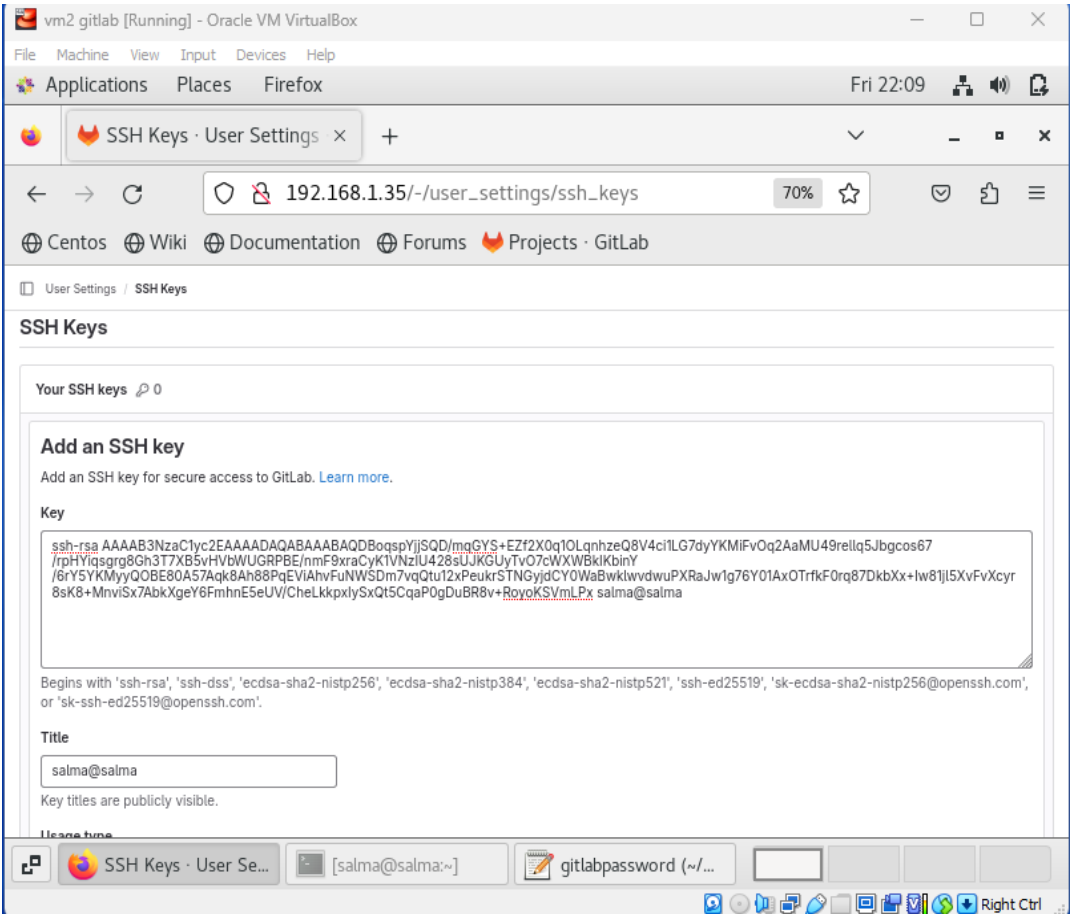
3) Adding token to jenkins



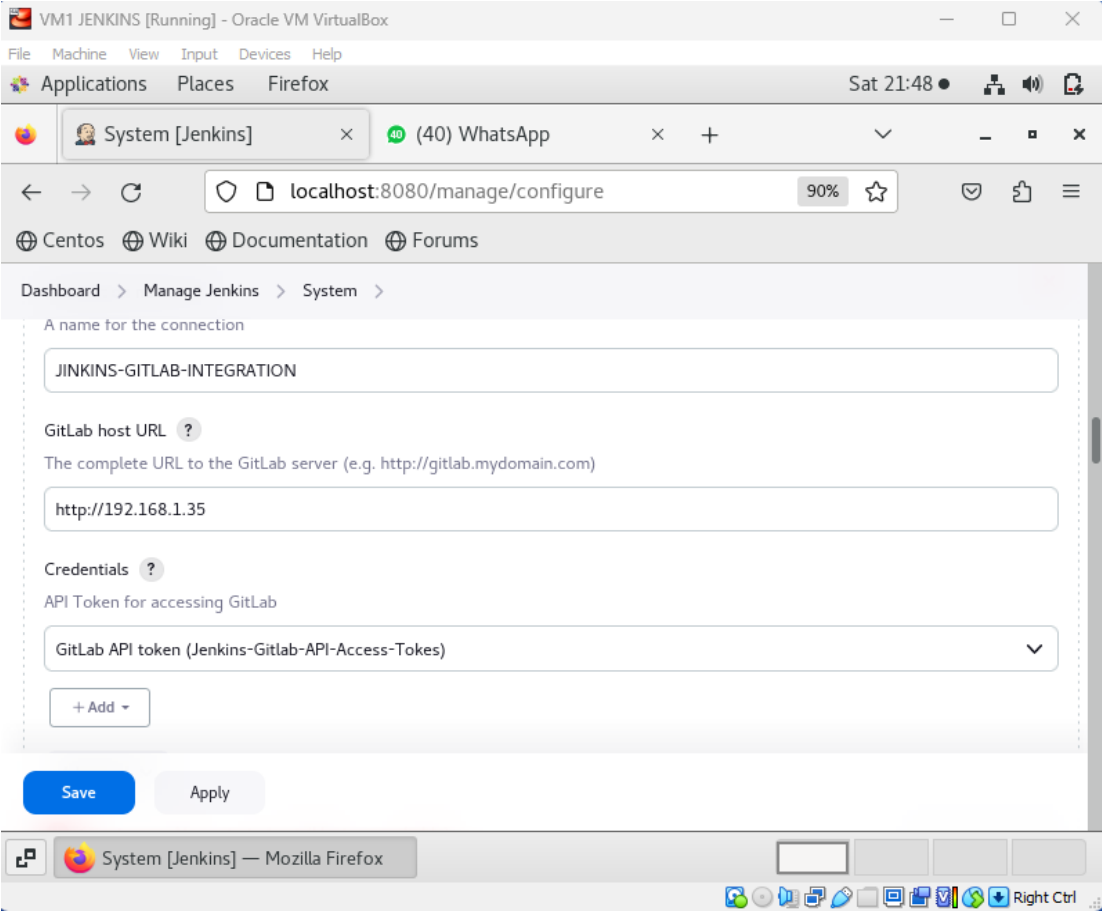
4) Creating SSH key



5) Adding key to Ansible



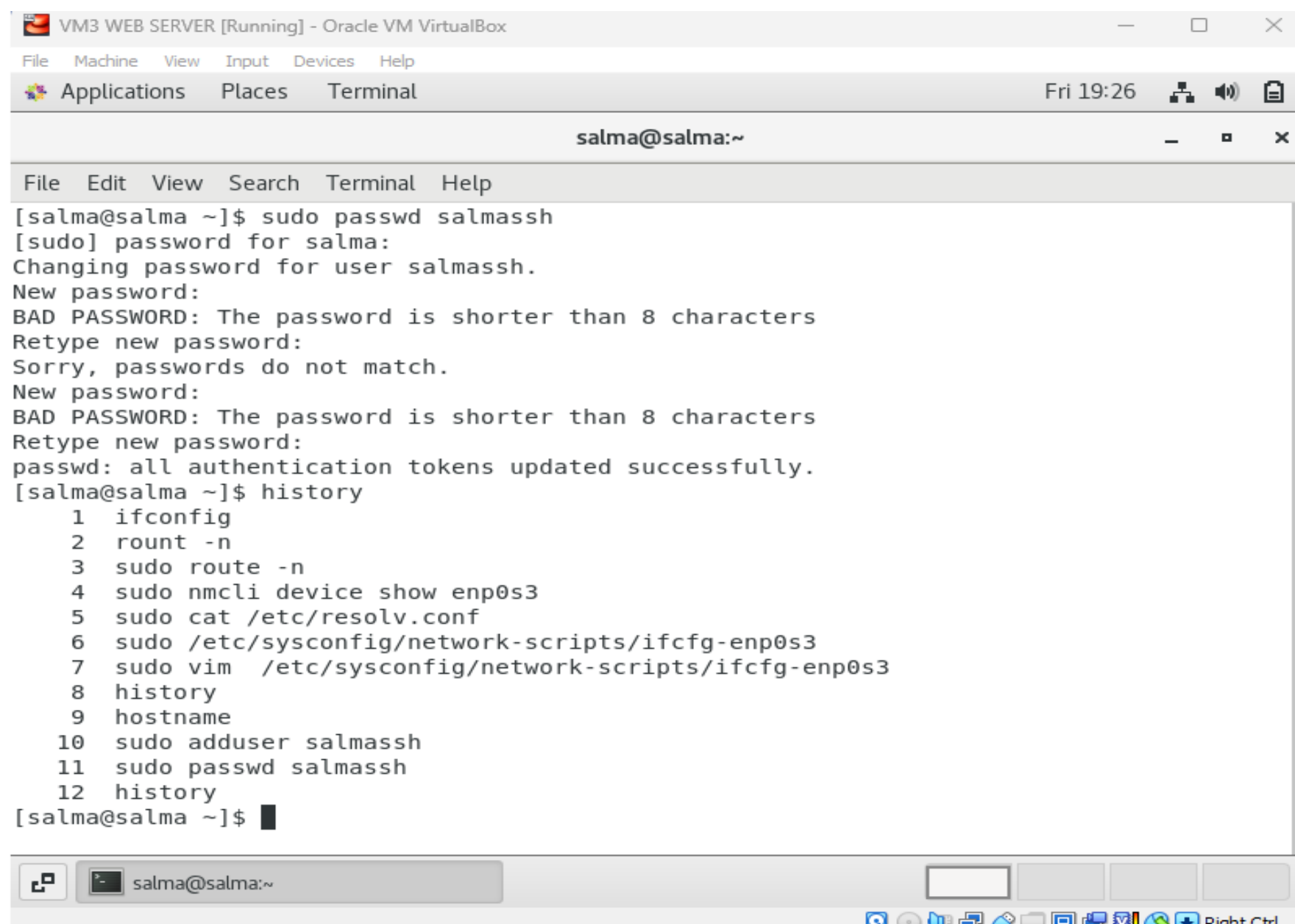
6) Testing Connection



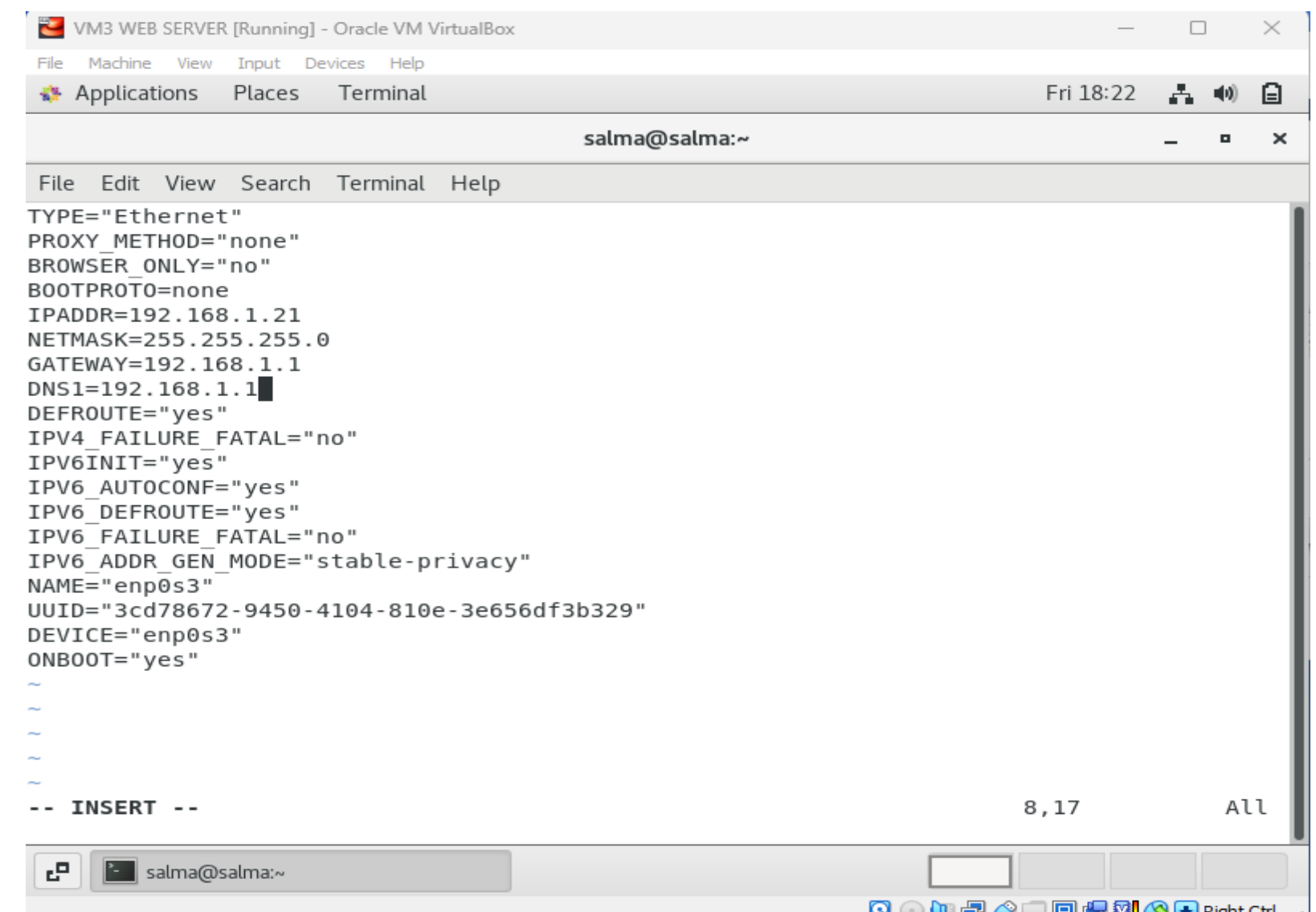
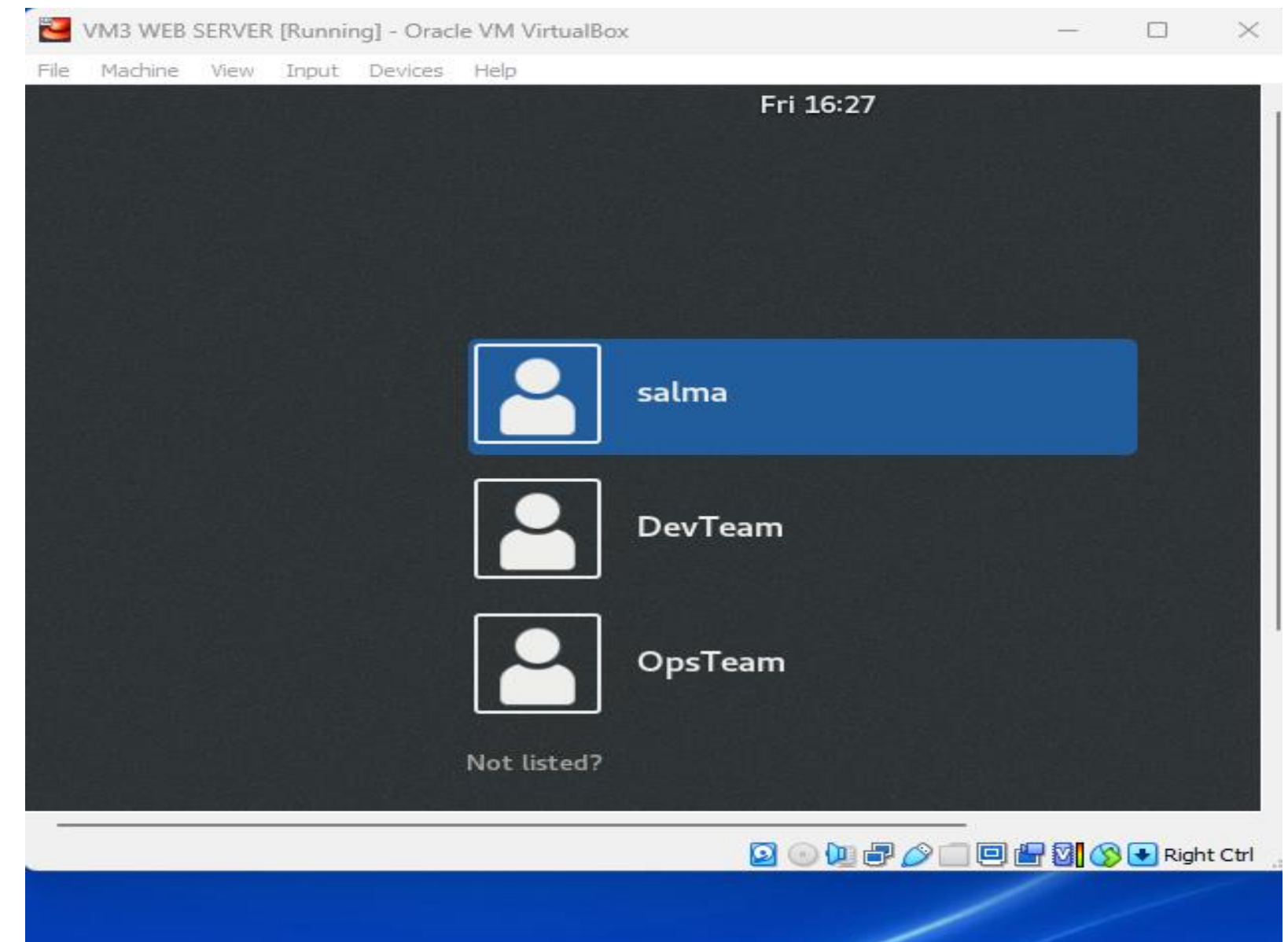
Step3

Configurations on VM3

- 1) Running bash script to create users DevTeam & OpsTeam
- 2) Making IP address STATIC to be used in Ansible Inventory
- 3) Making SSH user to be used in Ansible Inventory



```
VM3 WEB SERVER [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Applications Places Terminal
Fri 19:26
salma@salma:~
File Edit View Search Terminal Help
[salma@salma ~]$ sudo passwd salmassh
[sudo] password for salma:
Changing password for user salmassh.
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
Sorry, passwords do not match.
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: all authentication tokens updated successfully.
[salma@salma ~]$ history
1  ifconfig
2  rount -n
3  sudo route -n
4  sudo nmcli device show enp0s3
5  sudo cat /etc/resolv.conf
6  sudo /etc/sysconfig/network-scripts/ifcfg-enp0s3
7  sudo vim /etc/sysconfig/network-scripts/ifcfg-enp0s3
8  history
9  hostname
10 sudo adduser salmassh
11 sudo passwd salmassh
12 history
[salma@salma ~]$
```

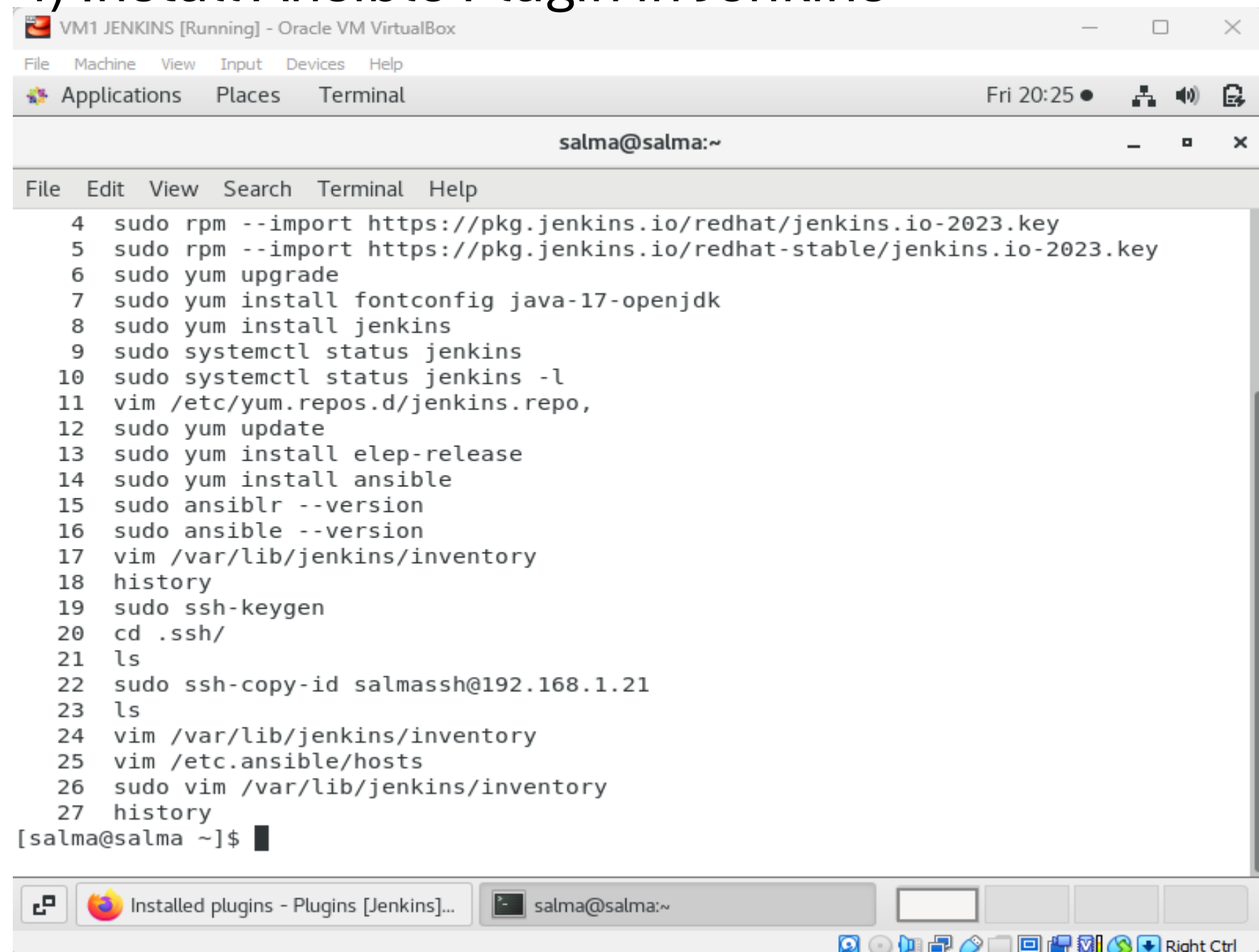


```
VM3 WEB SERVER [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Applications Places Terminal
Fri 18:22
salma@salma:~
File Edit View Search Terminal Help
TYPE="Ethernet"
PROXY_METHOD="none"
BROWSER_ONLY="no"
BOOTPROTO=none
IPADDR=192.168.1.21
NETMASK=255.255.255.0
GATEWAY=192.168.1.1
DNS1=192.168.1.1
DEFROUTE="yes"
IPV4_FAILURE_FATAL="no"
IPV6INIT="yes"
IPV6_AUTOCONF="yes"
IPV6_DEFROUTE="yes"
IPV6_FAILURE_FATAL="no"
IPV6_ADDR_GEN_MODE="stable-privacy"
NAME="enp0s3"
UUID="3cd78672-9450-4104-810e-3e656df3b329"
DEVICE="enp0s3"
ONBOOT="yes"
~
~
~
-- INSERT --
8,17 All
```

Step 4

Ansible Installation and Integration with Jenkins

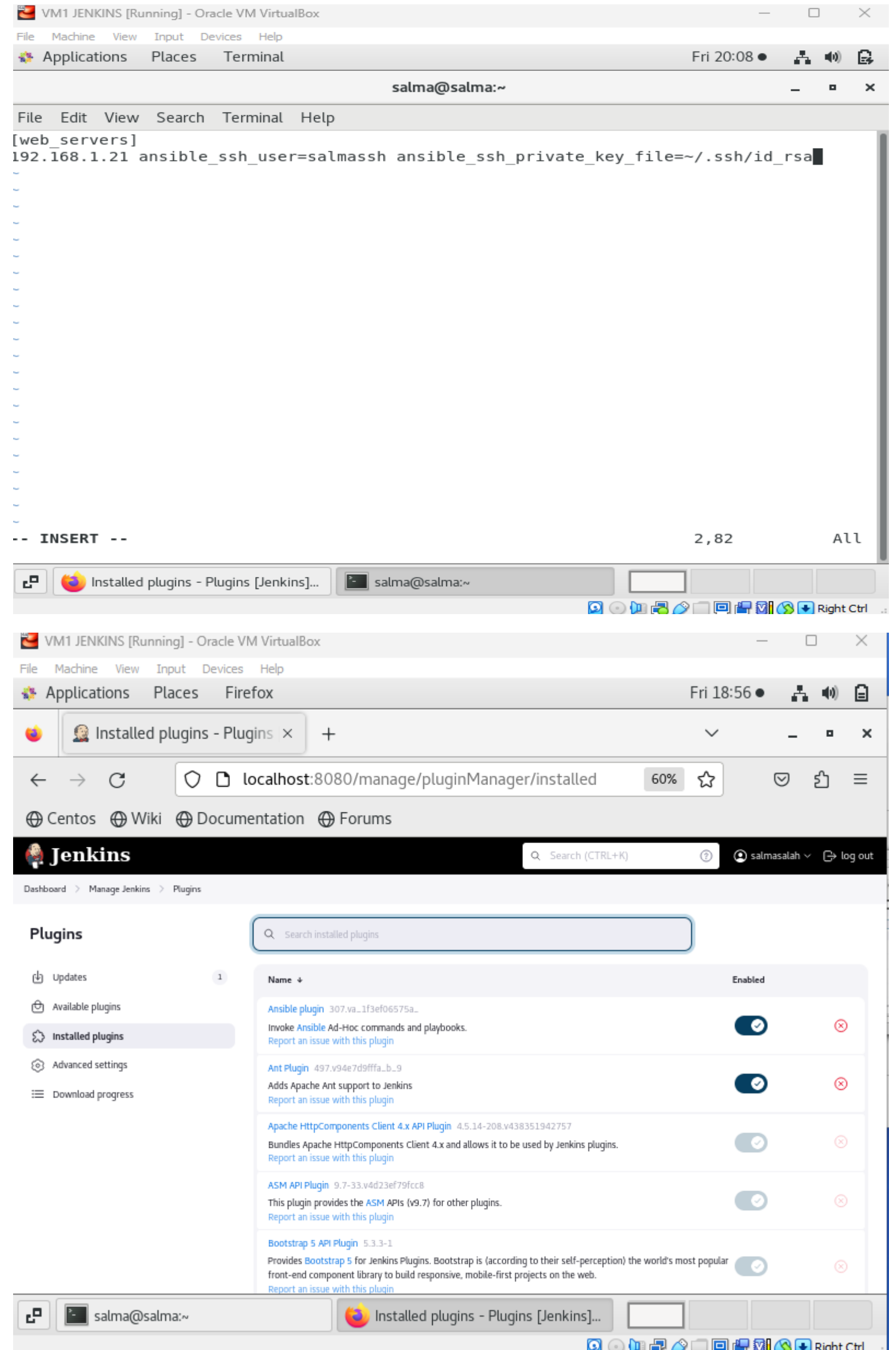
- 1) Install Ansible
- 2) Generate Public and private keys and copy the public to (VM3)
- 3) Configure Ansible Inventory and add IP Address of target machine (VM3) and ssh user name that was created on previous step and add path to private ssh key
- 4) Install Ansible Plugin in Jenkins



```
VM1 JENKINS [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Applications Places Terminal
salma@salma:~
File Edit View Search Terminal Help
[web_servers]
192.168.1.21 ansible_ssh_user=salmassh ansible_ssh_private_key_file=~/.ssh/id_rsa

-- INSERT -- 2,82 All

VM1 JENKINS [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Applications Places Terminal
salma@salma:~
File Edit View Search Terminal Help
4 sudo rpm --import https://pkg.jenkins.io/redhat/jenkins.io-2023.key
5 sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io-2023.key
6 sudo yum upgrade
7 sudo yum install fontconfig java-17-openjdk
8 sudo yum install jenkins
9 sudo systemctl status jenkins
10 sudo systemctl status jenkins -l
11 vim /etc/yum.repos.d/jenkins.repo,
12 sudo yum update
13 sudo yum install elep-release
14 sudo yum install ansible
15 sudo ansible --version
16 sudo ansible --version
17 vim /var/lib/jenkins/inventory
18 history
19 sudo ssh-keygen
20 cd .ssh/
21 ls
22 sudo ssh-copy-id salmassh@192.168.1.21
23 ls
24 vim /var/lib/jenkins/inventory
25 vim /etc/ansible/hosts
26 sudo vim /var/lib/jenkins/inventory
27 history
[salma@salma ~]$
```



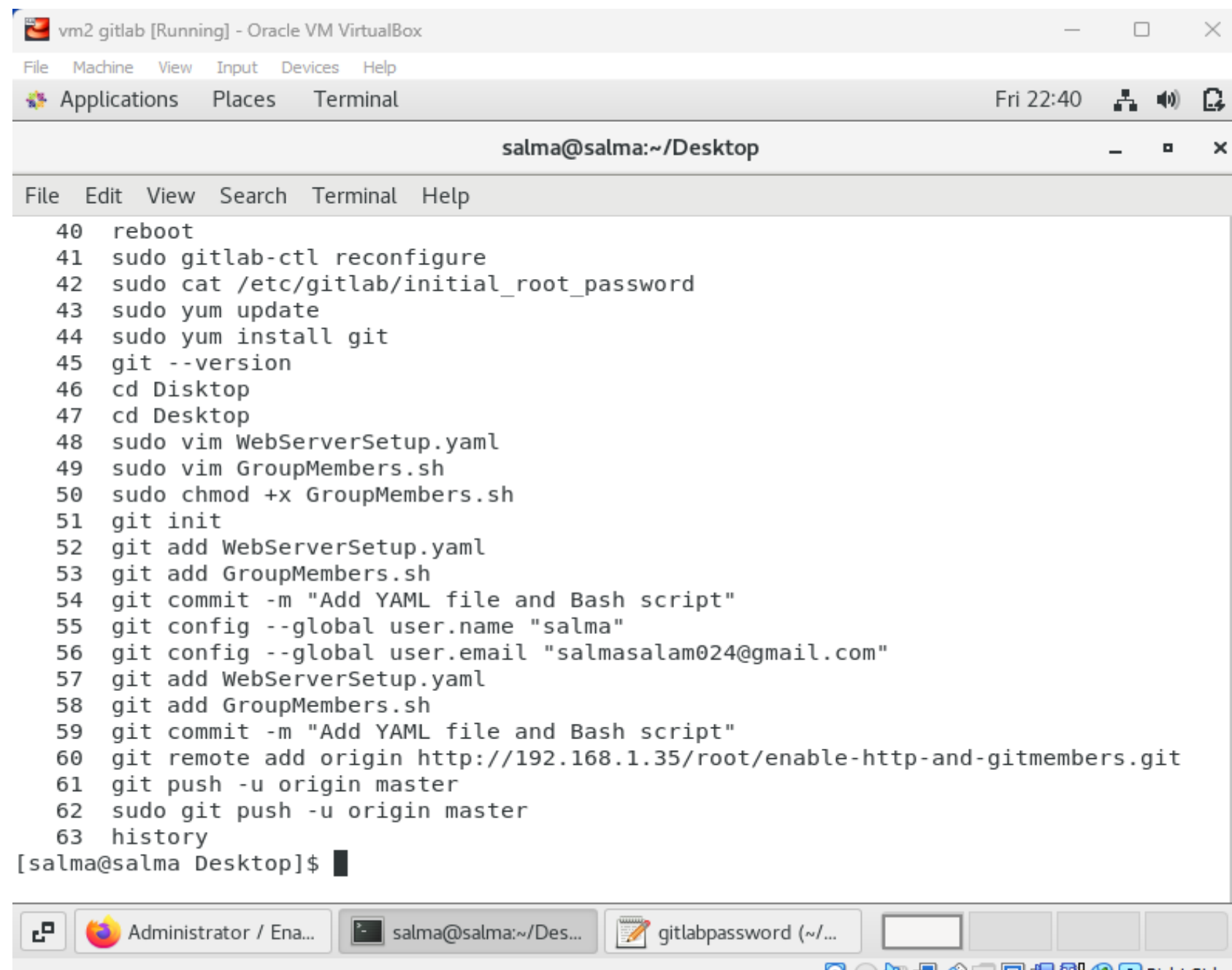
The screenshot shows the Jenkins web interface in a browser window. The address bar displays 'localhost:8080/manage/pluginManager/installed'. The page title is 'Jenkins' and the user is logged in as 'salmasalah'. The 'Plugins' section is active, showing a list of installed plugins with their names, versions, and descriptions. The plugins listed are:

Name	Version	Enabled
Ansible plugin	307.va_1f3ef06575a..	Yes
Ant Plugin	497.v94e7d9fffa_b_9	Yes
Apache HttpComponents Client 4.x API Plugin	4.5.14-208.v438351942757	Yes
ASM API Plugin	9.7-33.v4d23ef79fcc8	Yes
Bootstrap 5 API Plugin	5.3.3-1	Yes

Step 5

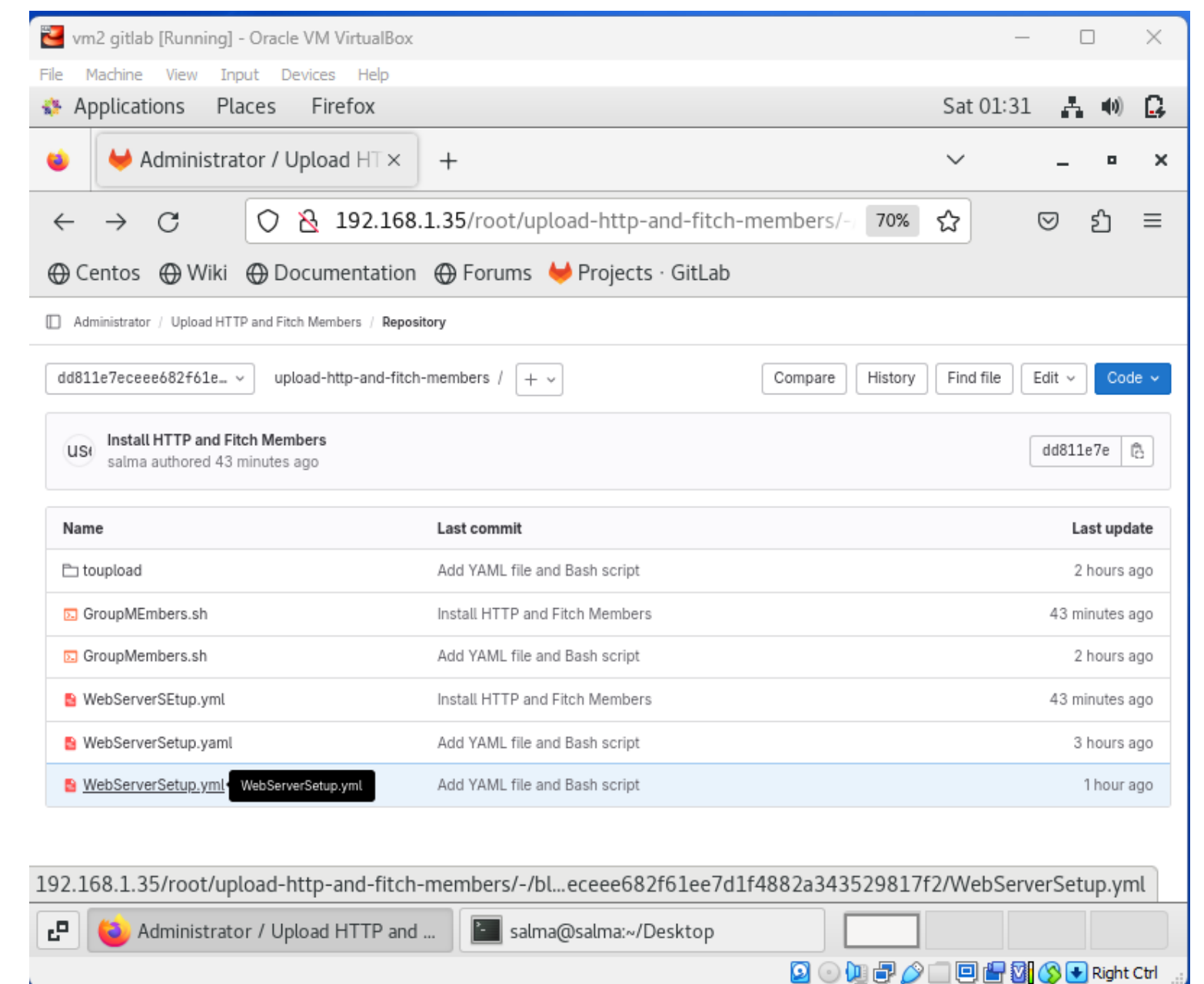
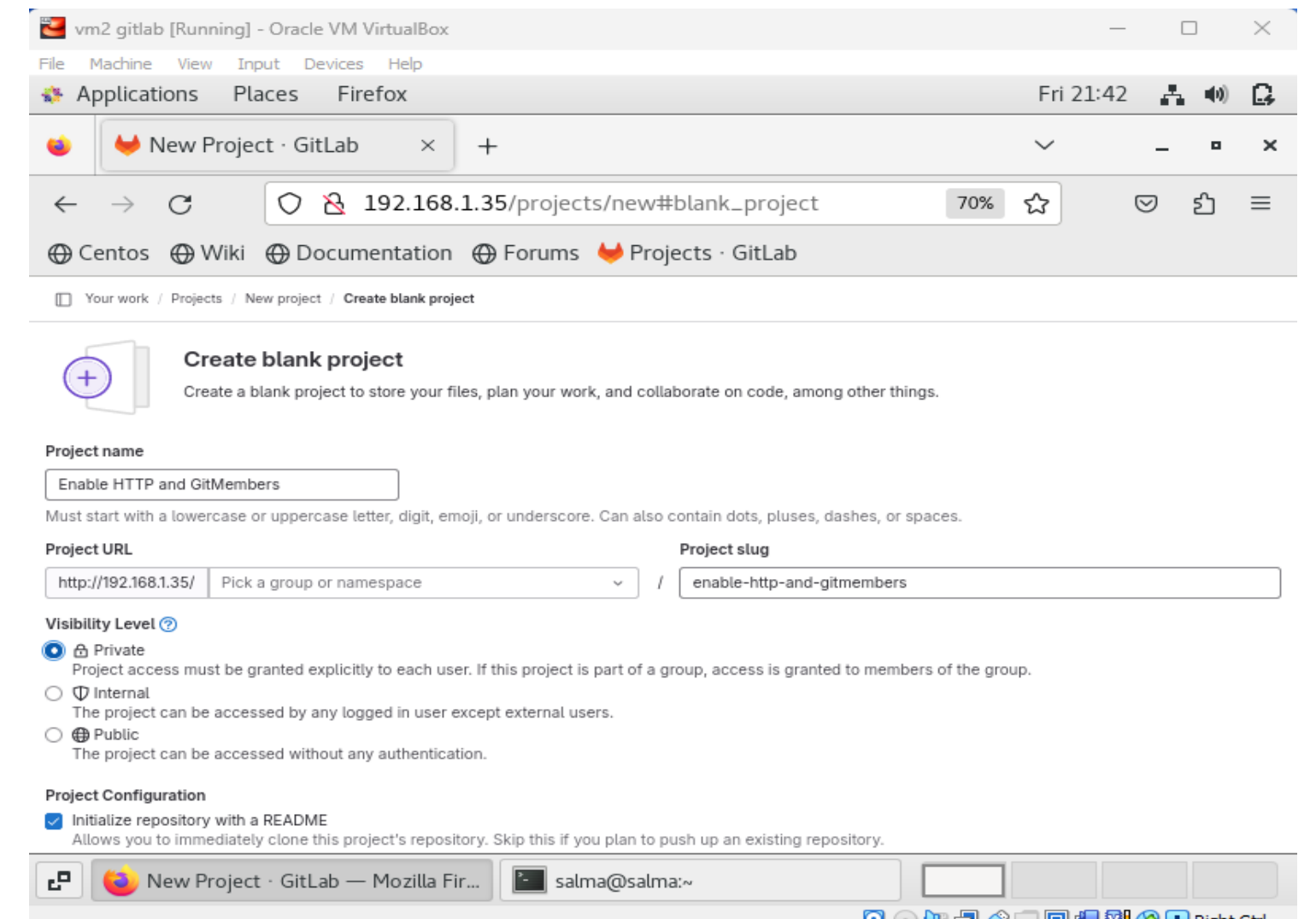
Git Installation and push files into GitLab Repo

- 1) Install Git on VM2
- 2) Making a new repository
- 3) Push (WebServer.yml) & (GetMembers.sh) into the Repo



```
vm2 gitlab [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Applications Places Terminal
Fri 22:40
salma@salma:~/Desktop

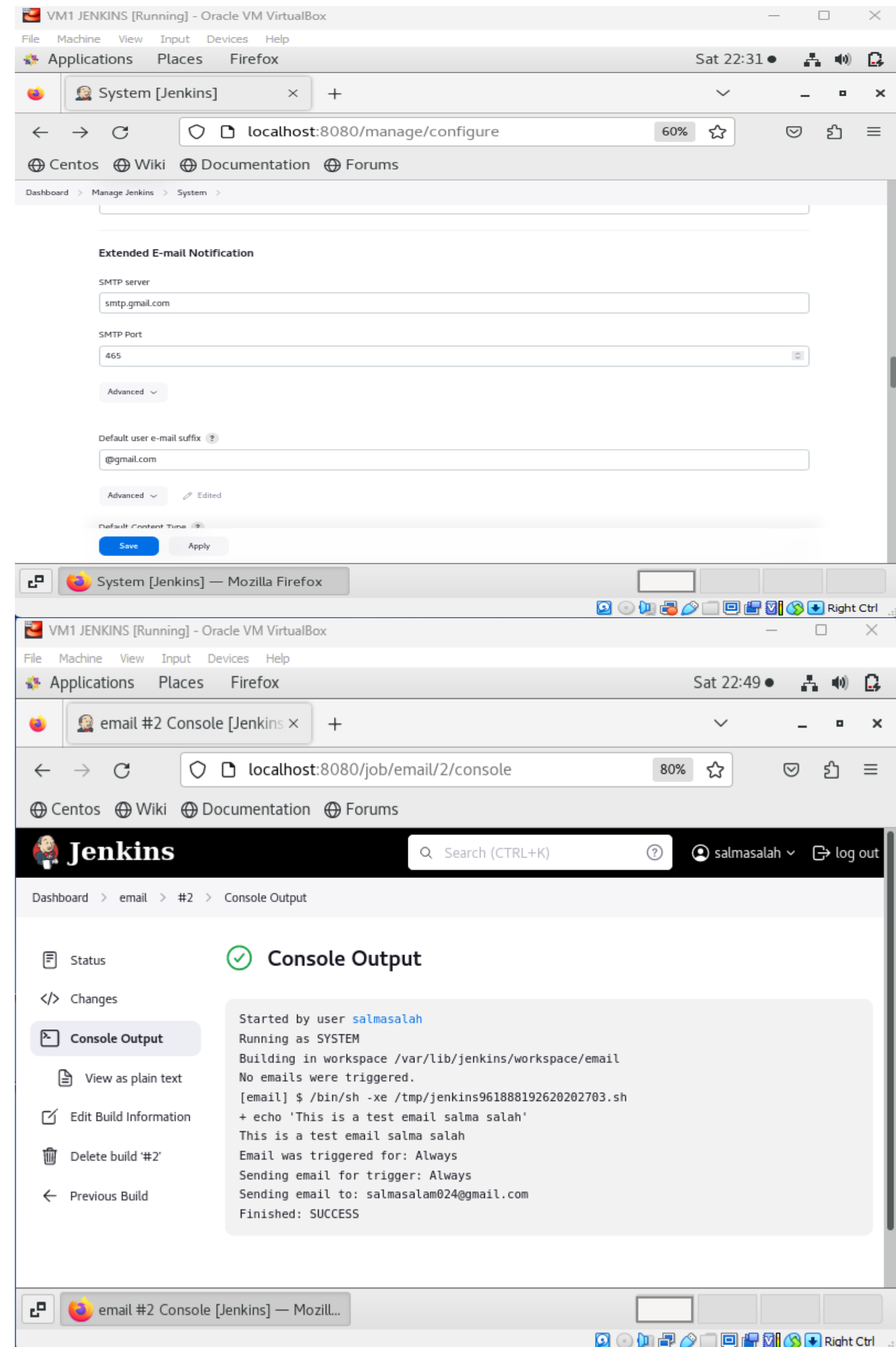
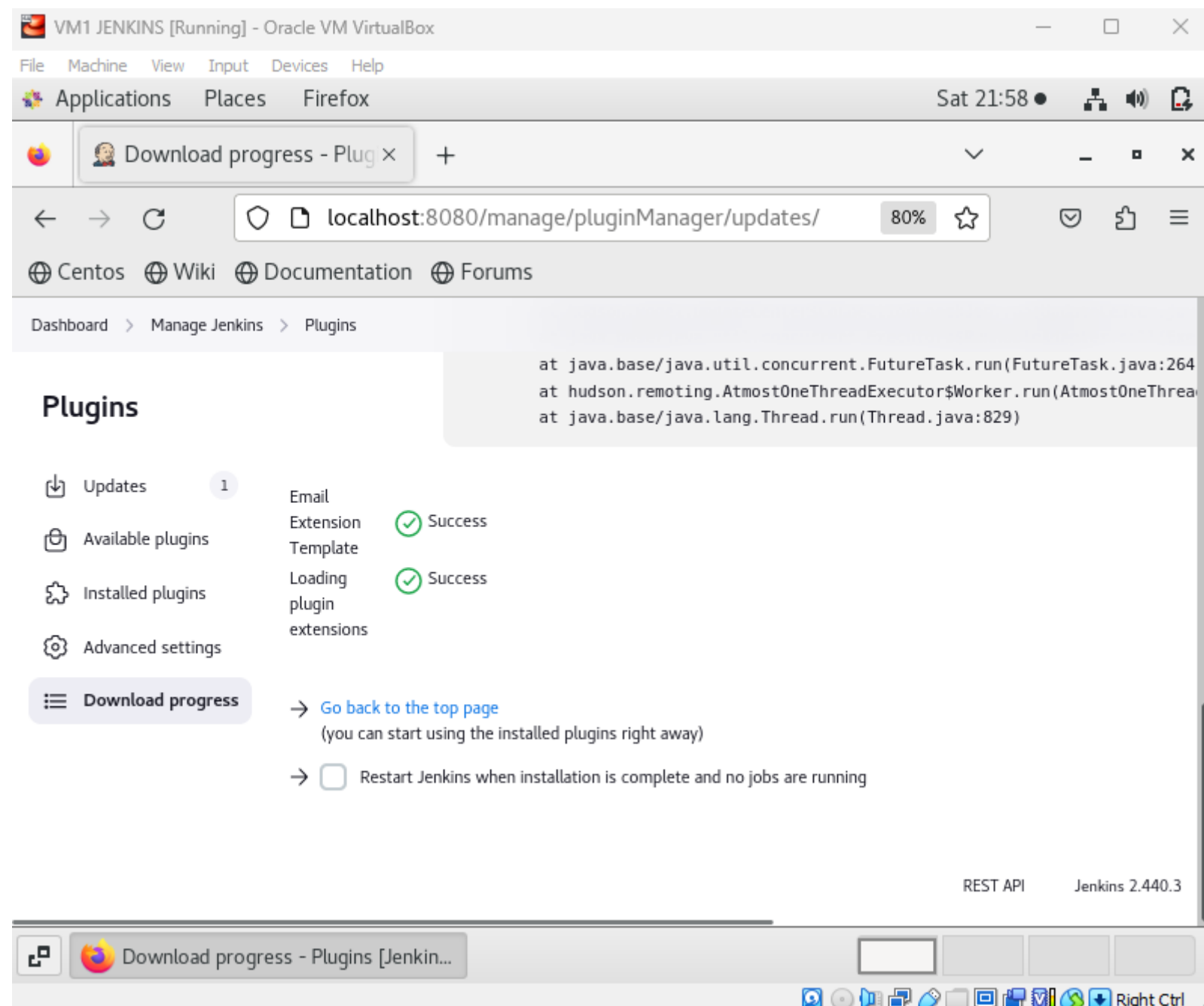
File Edit View Search Terminal Help
40 reboot
41 sudo gitlab-ctl reconfigure
42 sudo cat /etc/gitlab/initial_root_password
43 sudo yum update
44 sudo yum install git
45 git --version
46 cd Desktop
47 cd Desktop
48 sudo vim WebServerSetup.yaml
49 sudo vim GroupMembers.sh
50 sudo chmod +x GroupMembers.sh
51 git init
52 git add WebServerSetup.yaml
53 git add GroupMembers.sh
54 git commit -m "Add YAML file and Bash script"
55 git config --global user.name "salma"
56 git config --global user.email "salmasalam024@gmail.com"
57 git add WebServerSetup.yaml
58 git add GroupMembers.sh
59 git commit -m "Add YAML file and Bash script"
60 git remote add origin http://192.168.1.35/root/enable-http-and-gitmembers.git
61 git push -u origin master
62 sudo git push -u origin master
63 history
[salma@salma Desktop]$
```



Step 6

Setting Up Email Notification in Jenkins

- 1) Install Email Extension Plugin
- 2) Configure Email Notification Settings
- 3) Create a project to test if email notification is working and it's successful



Step 7

PipeLine Configuration

- 1) Create a new project
- 2) Add pipeline configurations and built triggers
- 3) Add Pipeline Script

