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SCHOOL OF INFORMATION AND TECHNOLOGY

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SYSADM1 – Kerberos Lab Activity: A step-by-step Guide

Objective:

Set up a basic Kerberos authentication system to understand how Kerberos manages secure logins through ticket-based access.

Setup Requirements:

- Two VMs in Oracle VM, both running a Linux distribution like Ubuntu or CentOS.
- VM1: Kerberos Server
- VM2: Kerberos Client

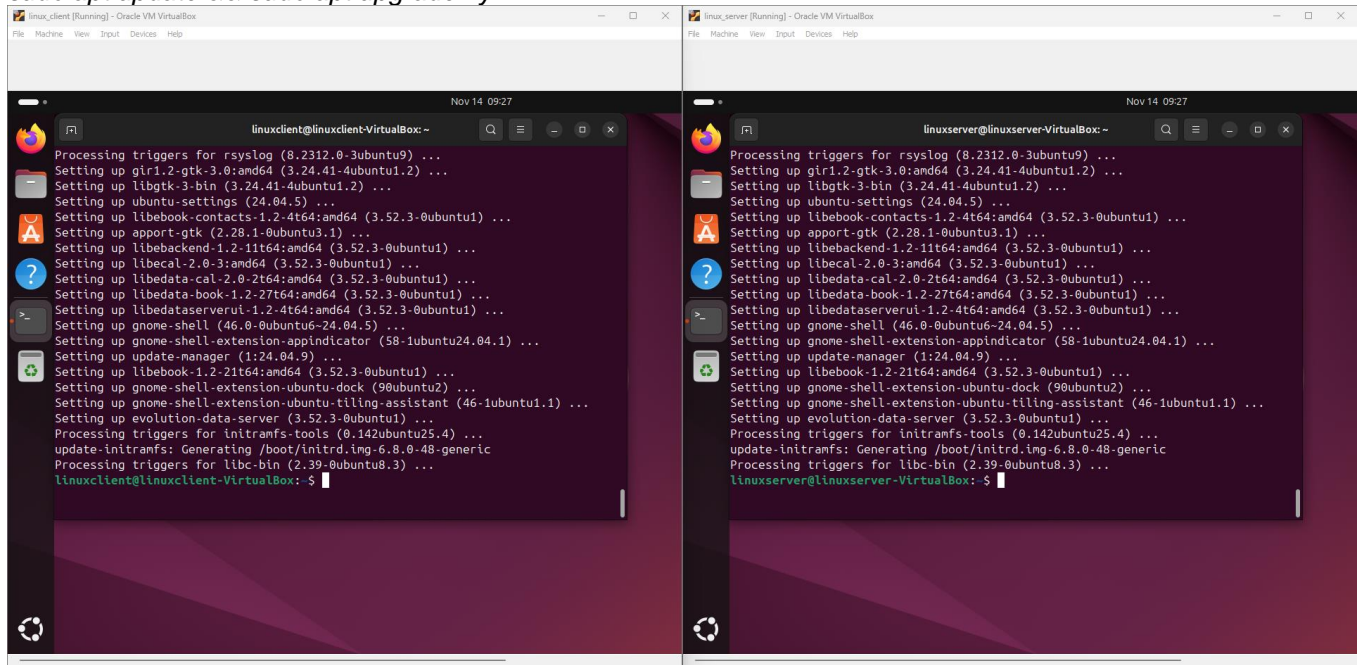
Step 1: Initial Setup and Package Installation

1. Update Packages on Both VMs:

- Open a terminal on each VM and run:

bash

sudo apt update && sudo apt upgrade -y



2. Install Kerberos Server Packages on VM1 (Kerberos Server):

- In VM1, install the Kerberos Key Distribution Center (KDC) and admin server:

bash

sudo apt install krb5-kdc krb5-admin-server -y

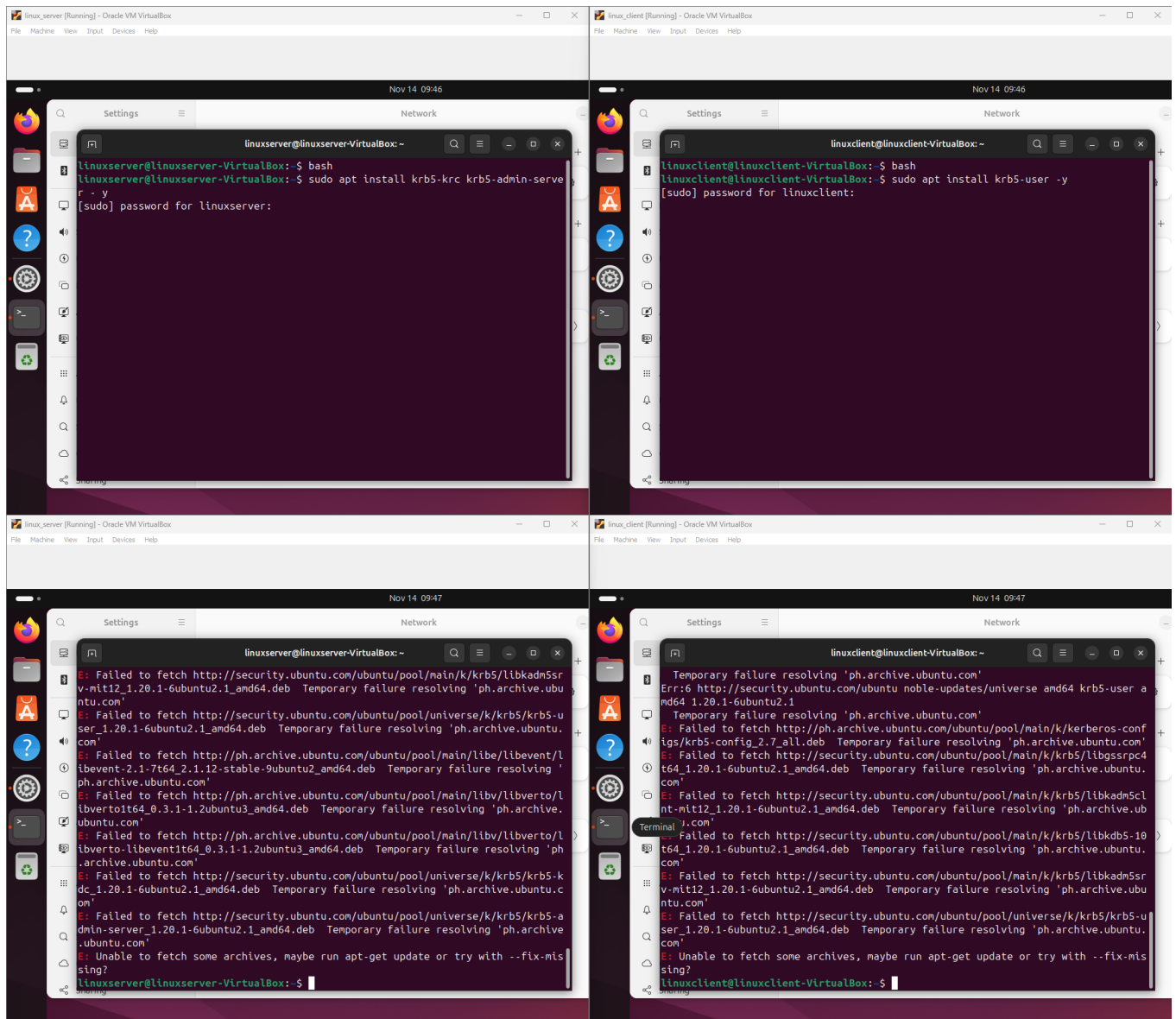
3. Install Kerberos Client Package on VM2 (Kerberos Client):

- In VM2, install the Kerberos client software:

bash

sudo apt install krb5-user -y

- During installation, when prompted, enter the Kerberos realm you plan to set up, e.g., MYLAB.LOCAL.



1. **Edit the Kerberos Configuration File:**

- bash*

The screenshot shows a Linux server environment. In the foreground, a terminal window titled 'linuxserver@linuxserver-VirtualBox: ~' displays the following output:

```

v-mit12_1.20.1-6ubuntu2.1_amd64.deb Temporary failure resolving 'ph.archive.ubuntu.com'
E: Failed to fetch http://security.ubuntu.com/ubuntu/pool/universe/k/krb5/krb5-user_1.20.1-6ubuntu2.1_amd64.deb Temporary failure resolving 'ph.archive.ubuntu.com'
E: Failed to fetch http://ph.archive.ubuntu.com/ubuntu/pool/main/libe/libevent/libevent-2.1-7t64_2.1.12-stable-9ubuntu2_amd64.deb Temporary failure resolving 'ph.archive.ubuntu.com'
E: Failed to fetch http://ph.archive.ubuntu.com/ubuntu/pool/main/libv/libverto/libverto1t64_0.3.1-1.2ubuntu3_amd64.deb Temporary failure resolving 'ph.archive.ubuntu.com'
E: Failed to fetch http://ph.archive.ubuntu.com/ubuntu/pool/main/libv/libverto/libverto-libevent1t64_0.3.1-1.2ubuntu3_amd64.deb Temporary failure resolving 'ph.archive.ubuntu.com'
E: Failed to fetch http://security.ubuntu.com/ubuntu/pool/universe/k/krb5/krb5-kdc_1.20.1-6ubuntu2.1_amd64.deb Temporary failure resolving 'ph.archive.ubuntu.com'
E: Failed to fetch http://security.ubuntu.com/ubuntu/pool/universe/k/krb5/krb5-admin-server_1.20.1-6ubuntu2.1_amd64.deb Temporary failure resolving 'ph.archive.ubuntu.com'
E: Unable to fetch some archives, maybe run apt-get update or try with --fix-missing?
linuxserver@linuxserver-VirtualBox:~$ bash
linuxserver@linuxserver-VirtualBox:~$ sudo nano /etc/krb5.conf

```

In the background, a file manager window is open, showing the 'Settings' tab. The 'Network' section is visible, and the system clock indicates 'Nov 14 09:49'.

- Set the realm as MYLAB.LOCAL. You should also specify the KDC and admin server as VM1's hostname or IP address:

ini

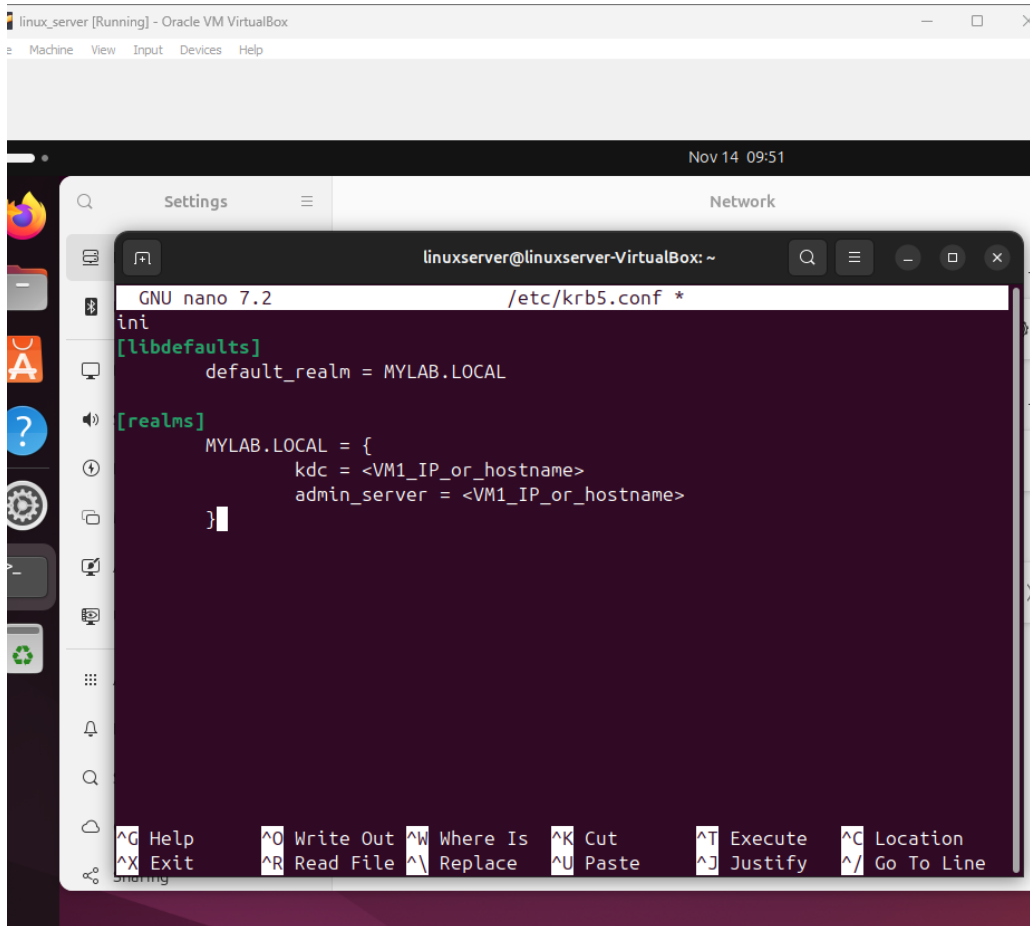
[libdefaults]

default_realm = MYLAB.LOCAL

[realms]

```
MYLAB.LOCAL = {  
    kdc = <VM1_IP_or_hostname>  
    admin_server = <VM1_IP_or_hostname>  
}
```

- Save and close the file (Ctrl+X, then Y, and Enter to confirm).

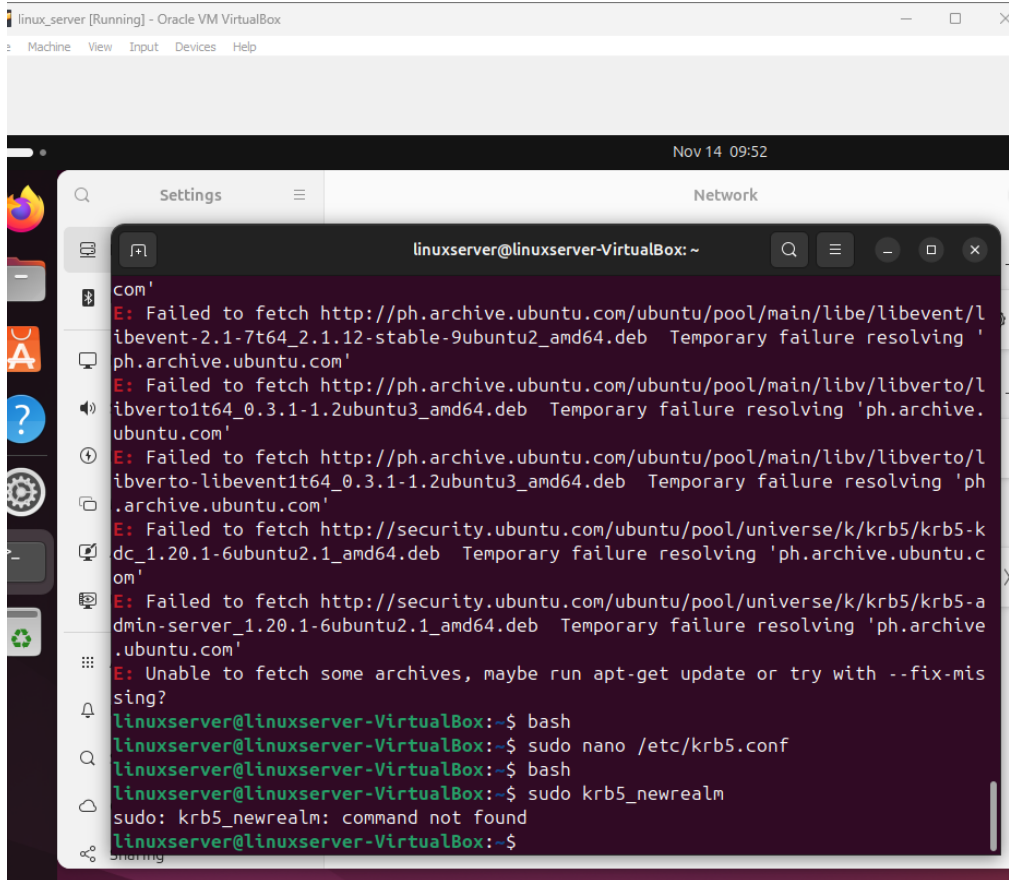


2. Initialize the Kerberos Database:

- Create the database for the Kerberos realm:

bash

sudo krb5_newrealm



```
linux_server [Running] - Oracle VM VirtualBox
Machine View Input Devices Help

Nov 14 09:52

Settings Network

linuxserver@linuxserver-VirtualBox: ~
com'
E: Failed to fetch http://ph.archive.ubuntu.com/ubuntu/pool/main/libe/libevent/l
ibevent-2.1-7t64_2.1.12-stable-9ubuntu2_amd64.deb Temporary failure resolving '
ph.archive.ubuntu.com'
E: Failed to fetch http://ph.archive.ubuntu.com/ubuntu/pool/main/libv/libverto/l
ibverto1t64_0.3.1-1.2ubuntu3_amd64.deb Temporary failure resolving 'ph.archive.
ubuntu.com'
E: Failed to fetch http://ph.archive.ubuntu.com/ubuntu/pool/main/libv/libverto/l
ibverto-libevent1t64_0.3.1-1.2ubuntu3_amd64.deb Temporary failure resolving 'ph
.archive.ubuntu.com'
E: Failed to fetch http://security.ubuntu.com/ubuntu/pool/universe/k/krb5/krb5-k
dc_1.20.1-6ubuntu2.1_amd64.deb Temporary failure resolving 'ph.archive.ubuntu.c
om'
E: Failed to fetch http://security.ubuntu.com/ubuntu/pool/universe/k/krb5/krb5-a
dmin-server_1.20.1-6ubuntu2.1_amd64.deb Temporary failure resolving 'ph.archive
.ubuntu.com'
E: Unable to fetch some archives, maybe run apt-get update or try with --fix-mis
sing?
linuxserver@linuxserver-VirtualBox:~$ bash
linuxserver@linuxserver-VirtualBox:~$ sudo nano /etc/krb5.conf
linuxserver@linuxserver-VirtualBox:~$ bash
linuxserver@linuxserver-VirtualBox:~$ sudo krb5_newrealm
sudo: krb5_newrealm: command not found
linuxserver@linuxserver-VirtualBox:~$
```

- You will be prompted to set a password for the Kerberos database.

3. Start and Enable the Kerberos Services:

- Start the KDC and admin server, and ensure they start automatically on boot:

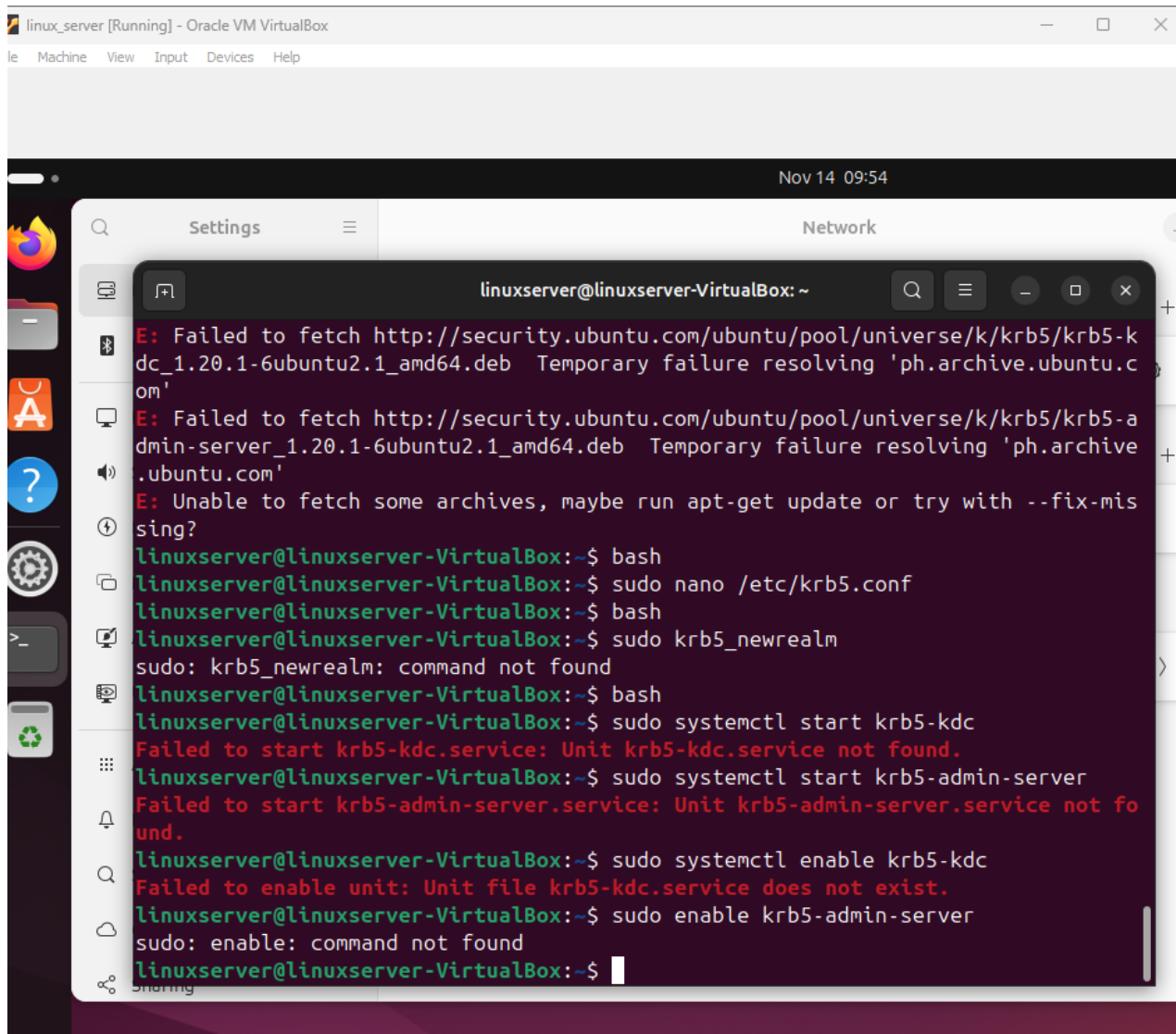
bash

sudo systemctl start krb5-kdc

sudo systemctl start krb5-admin-server

sudo systemctl enable krb5-kdc

sudo systemctl enable krb5-admin-server



```
linux_server [Running] - Oracle VM VirtualBox
Machine View Input Devices Help

Nov 14 09:54

Settings Network

linuxserver@linuxserver-VirtualBox: ~
E: Failed to fetch http://security.ubuntu.com/ubuntu/pool/universe/k/krb5/krb5-kdc_1.20.1-6ubuntu2.1_amd64.deb Temporary failure resolving 'ph.archive.ubuntu.com'
E: Failed to fetch http://security.ubuntu.com/ubuntu/pool/universe/k/krb5/krb5-admin-server_1.20.1-6ubuntu2.1_amd64.deb Temporary failure resolving 'ph.archive.ubuntu.com'
E: Unable to fetch some archives, maybe run apt-get update or try with --fix-missing?
linuxserver@linuxserver-VirtualBox:~$ bash
linuxserver@linuxserver-VirtualBox:~$ sudo nano /etc/krb5.conf
linuxserver@linuxserver-VirtualBox:~$ bash
linuxserver@linuxserver-VirtualBox:~$ sudo krb5_newrealm
sudo: krb5_newrealm: command not found
linuxserver@linuxserver-VirtualBox:~$ bash
linuxserver@linuxserver-VirtualBox:~$ sudo systemctl start krb5-kdc
Failed to start krb5-kdc.service: Unit krb5-kdc.service not found.
linuxserver@linuxserver-VirtualBox:~$ sudo systemctl start krb5-admin-server
Failed to start krb5-admin-server.service: Unit krb5-admin-server.service not found.
linuxserver@linuxserver-VirtualBox:~$ sudo systemctl enable krb5-kdc
Failed to enable unit: Unit file krb5-kdc.service does not exist.
linuxserver@linuxserver-VirtualBox:~$ sudo enable krb5-admin-server
sudo: enable: command not found
linuxserver@linuxserver-VirtualBox:~$
```

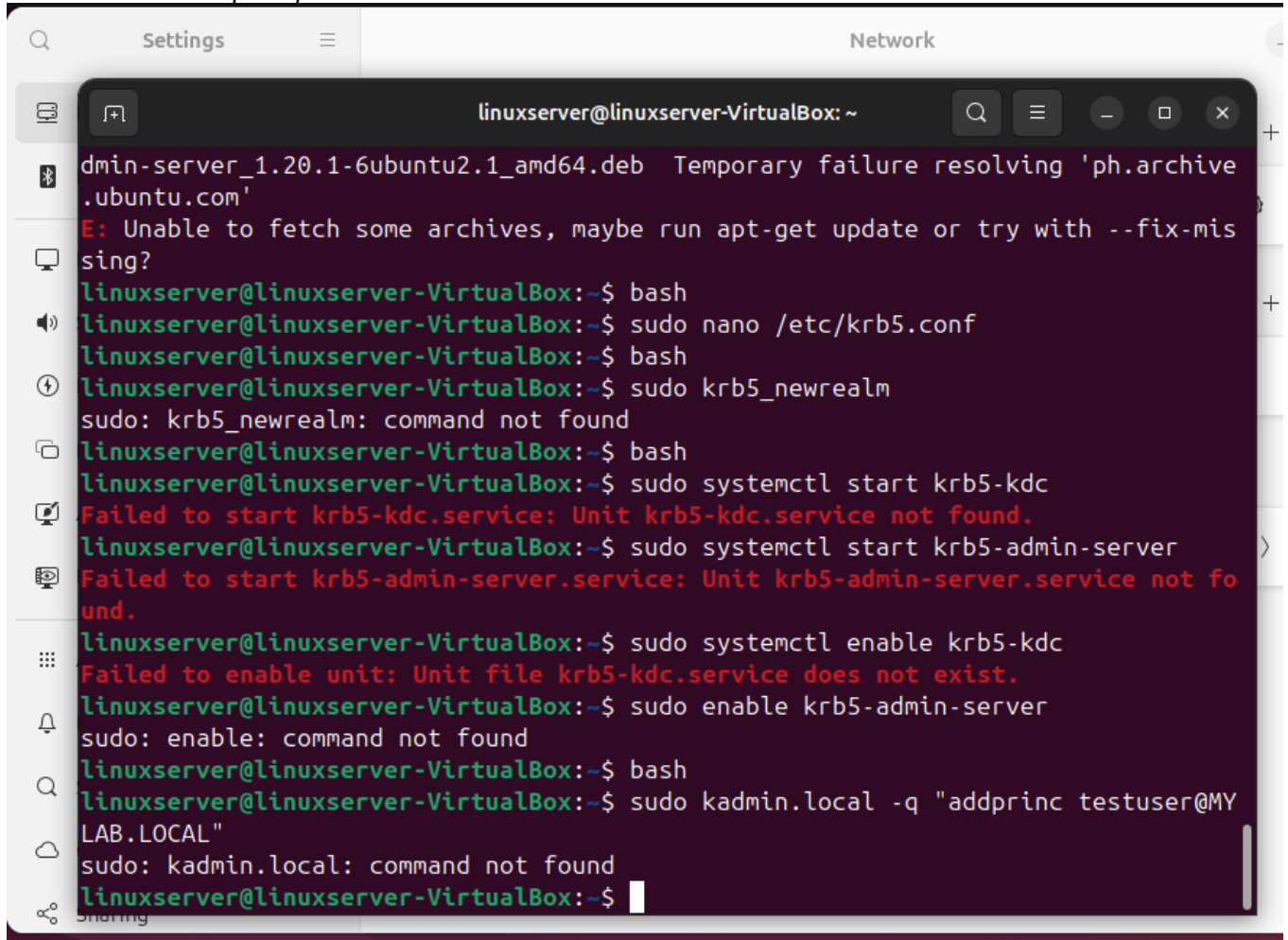
Step 3: Set Up a Kerberos User Principal

1. Create a New User Principal:

- Run the following command to create a test user in the Kerberos realm:

bash

sudo kadmin.local -q "addprinc testuser@MYLAB.LOCAL"



```
linuxserver@linuxserver-VirtualBox: ~  
dmin-server_1.20.1-6ubuntu2.1_amd64.deb Temporary failure resolving 'ph.archive  
.ubuntu.com'  
E: Unable to fetch some archives, maybe run apt-get update or try with --fix-mis  
sing?  
linuxserver@linuxserver-VirtualBox:~$ bash  
linuxserver@linuxserver-VirtualBox:~$ sudo nano /etc/krb5.conf  
linuxserver@linuxserver-VirtualBox:~$ bash  
linuxserver@linuxserver-VirtualBox:~$ sudo krb5_newrealm  
sudo: krb5_newrealm: command not found  
linuxserver@linuxserver-VirtualBox:~$ bash  
linuxserver@linuxserver-VirtualBox:~$ sudo systemctl start krb5-kdc  
Failed to start krb5-kdc.service: Unit krb5-kdc.service not found.  
linuxserver@linuxserver-VirtualBox:~$ sudo systemctl start krb5-admin-server  
Failed to start krb5-admin-server.service: Unit krb5-admin-server.service not fo  
und.  
linuxserver@linuxserver-VirtualBox:~$ sudo systemctl enable krb5-kdc  
Failed to enable unit: Unit file krb5-kdc.service does not exist.  
linuxserver@linuxserver-VirtualBox:~$ sudo enable krb5-admin-server  
sudo: enable: command not found  
linuxserver@linuxserver-VirtualBox:~$ bash  
linuxserver@linuxserver-VirtualBox:~$ sudo kadmin.local -q "addprinc testuser@MY  
LAB.LOCAL"  
sudo: kadmin.local: command not found  
linuxserver@linuxserver-VirtualBox:~$
```

- Set a password for testuser.

2. Verify the User Principal:

- To confirm the principal is created, list all principals:

bash

sudo kadmin.local -q "listprincs"

```
linuxserver@linuxserver-VirtualBox: ~  
sing?  
linuxserver@linuxserver-VirtualBox:~$ bash  
linuxserver@linuxserver-VirtualBox:~$ sudo nano /etc/krb5.conf  
linuxserver@linuxserver-VirtualBox:~$ bash  
linuxserver@linuxserver-VirtualBox:~$ sudo krb5_newrealm  
sudo: krb5_newrealm: command not found  
linuxserver@linuxserver-VirtualBox:~$ bash  
linuxserver@linuxserver-VirtualBox:~$ sudo systemctl start krb5-kdc  
Failed to start krb5-kdc.service: Unit krb5-kdc.service not found.  
linuxserver@linuxserver-VirtualBox:~$ sudo systemctl start krb5-admin-server  
Failed to start krb5-admin-server.service: Unit krb5-admin-server.service not found.  
linuxserver@linuxserver-VirtualBox:~$ sudo systemctl enable krb5-kdc  
Failed to enable unit: Unit file krb5-kdc.service does not exist.  
linuxserver@linuxserver-VirtualBox:~$ sudo enable krb5-admin-server  
sudo: enable: command not found  
linuxserver@linuxserver-VirtualBox:~$ bash  
linuxserver@linuxserver-VirtualBox:~$ sudo kadmin.local -q "addprinc testuser@MYLAB.LOCAL"  
sudo: kadmin.local: command not found  
linuxserver@linuxserver-VirtualBox:~$ bash  
linuxserver@linuxserver-VirtualBox:~$ sudo kadmin.local -q "listprincs"  
sudo: kadmin.local: command not found  
linuxserver@linuxserver-VirtualBox:~$
```

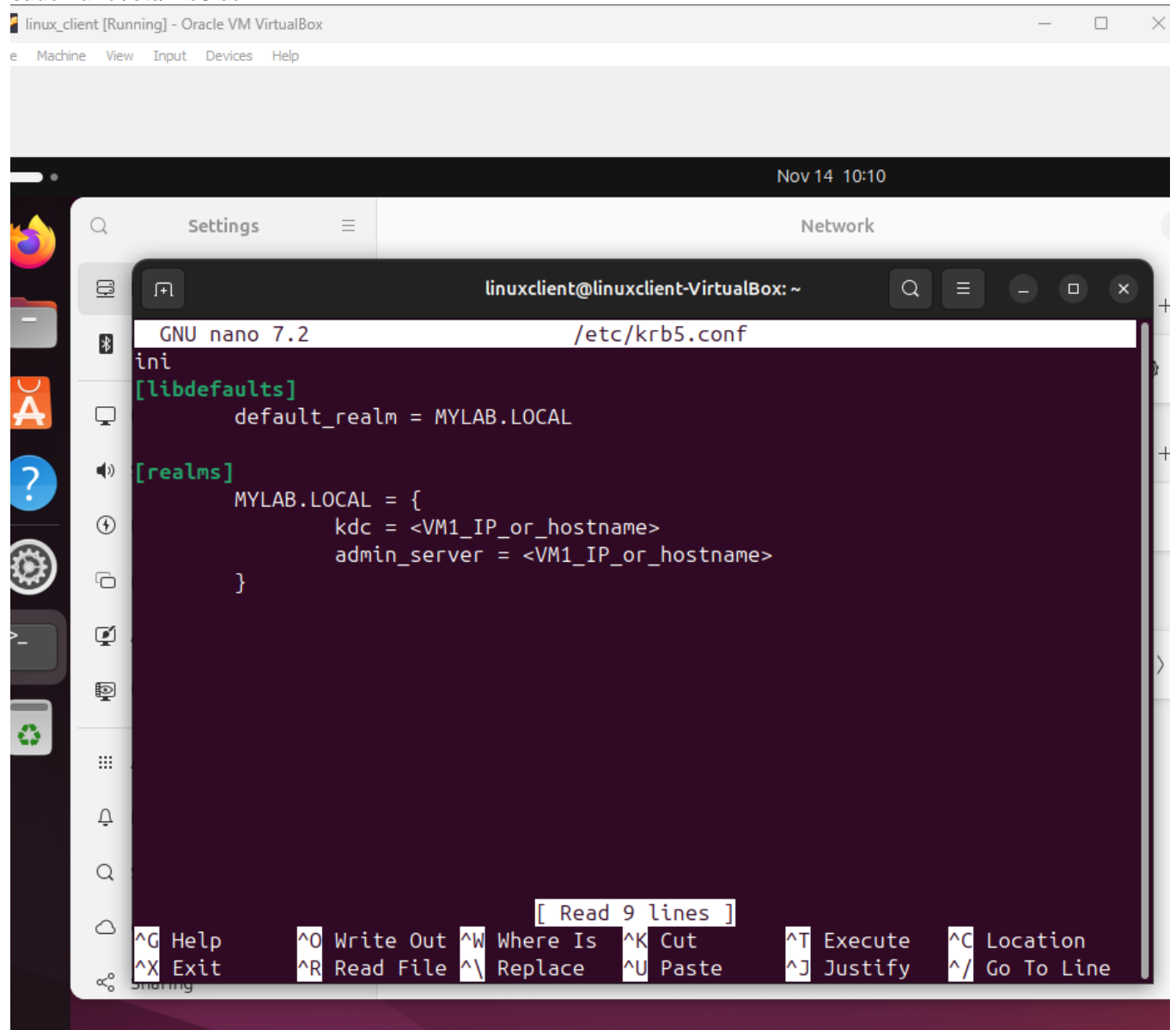
Step 4: Configure the Kerberos Client (VM2)

1. Edit the Kerberos Configuration File on VM2:

- Open /etc/krb5.conf for editing on VM2:

bash

sudo nano /etc/krb5.conf



```
linux_client [Running] - Oracle VM VirtualBox
Machine View Input Devices Help

Nov 14 10:10

Settings Network

linuxclient@linuxclient-VirtualBox: ~
GNU nano 7.2 /etc/krb5.conf
ini
[libdefaults]
    default_realm = MYLAB.LOCAL

[realms]
    MYLAB.LOCAL = {
        kdc = <VM1_IP_or_hostname>
        admin_server = <VM1_IP_or_hostname>
    }

[ Read 9 lines ]
^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute   ^C Location
^X Exit      ^R Read File ^\ Replace   ^U Paste     ^J Justify   ^_ Go To Line
```

- Set the default realm to MYLAB.LOCAL and point to the KDC and admin server on VM1. The configuration should match what you set on VM1.

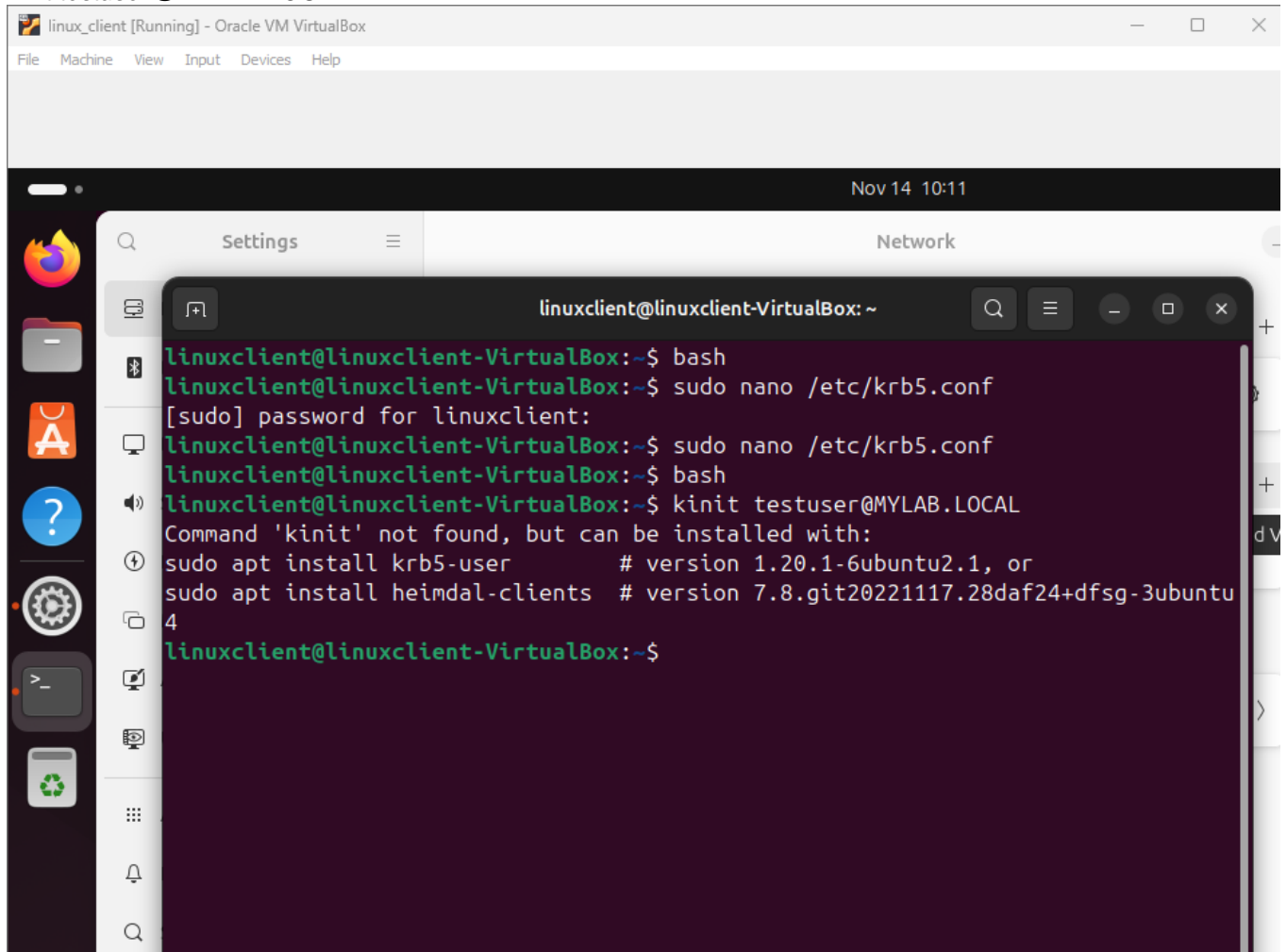
Step 5: Test Kerberos Authentication

1. Request a Kerberos Ticket for the User on VM2:

- In the terminal on VM2, request a ticket for testuser:

bash

kinit testuser@MYLAB.LOCAL



```
linux_client [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

Nov 14 10:11

Settings Network

linuxclient@linuxclient-VirtualBox: ~
linuxclient@linuxclient-VirtualBox:~$ bash
linuxclient@linuxclient-VirtualBox:~$ sudo nano /etc/krb5.conf
[sudo] password for linuxclient:
linuxclient@linuxclient-VirtualBox:~$ sudo nano /etc/krb5.conf
linuxclient@linuxclient-VirtualBox:~$ bash
linuxclient@linuxclient-VirtualBox:~$ kinit testuser@MYLAB.LOCAL
Command 'kinit' not found, but can be installed with:
sudo apt install krb5-user          # version 1.20.1-6ubuntu2.1, or
sudo apt install heimdal-clients    # version 7.8.git20221117.28daf24+dfsg-3ubuntu
4
linuxclient@linuxclient-VirtualBox:~$
```

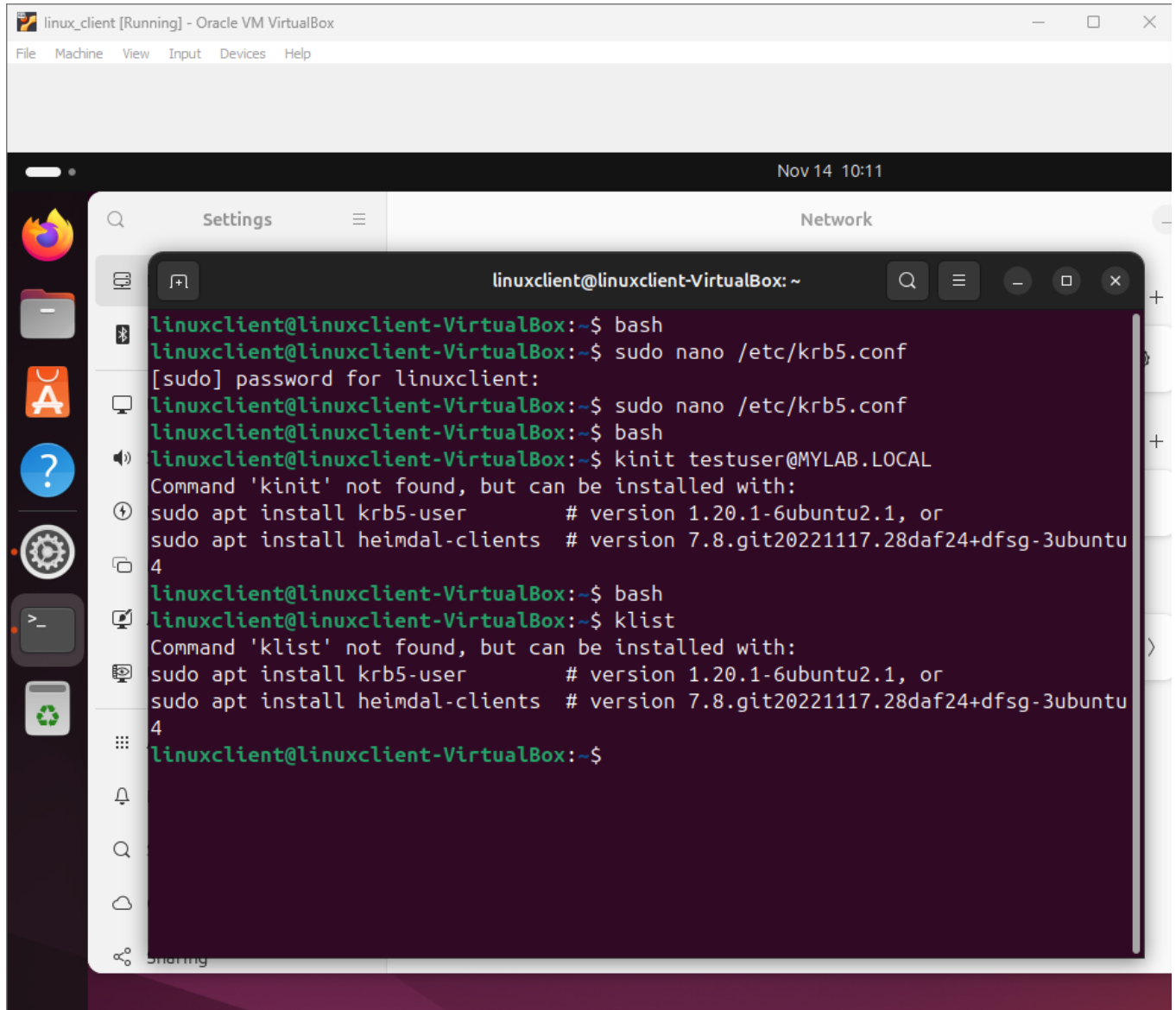
- Enter the password you set for testuser.

2. Verify the Ticket:

- Check if the ticket was issued by listing active Kerberos tickets:

bash

klist



```
linuxclient@linuxclient-VirtualBox:~$ bash
linuxclient@linuxclient-VirtualBox:~$ sudo nano /etc/krb5.conf
[sudo] password for linuxclient:
linuxclient@linuxclient-VirtualBox:~$ sudo nano /etc/krb5.conf
linuxclient@linuxclient-VirtualBox:~$ bash
linuxclient@linuxclient-VirtualBox:~$ kinit testuser@MYLAB.LOCAL
Command 'kinit' not found, but can be installed with:
sudo apt install krb5-user          # version 1.20.1-6ubuntu2.1, or
sudo apt install heimdal-clients    # version 7.8.git20221117.28daf24+dfsg-3ubuntu
4
linuxclient@linuxclient-VirtualBox:~$ bash
linuxclient@linuxclient-VirtualBox:~$ klist
Command 'klist' not found, but can be installed with:
sudo apt install krb5-user          # version 1.20.1-6ubuntu2.1, or
sudo apt install heimdal-clients    # version 7.8.git20221117.28daf24+dfsg-3ubuntu
4
linuxclient@linuxclient-VirtualBox:~$
```

- You should see details about the ticket, such as the principal and expiration time, confirming successful Kerberos authentication.