

Manage Printers and Printing

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-

Introduction

Welcome to the **Manage Printers and Printing** Practice Lab. In this module you will be provided with the instructions and devices needed to develop your hands-on skills.

Managing
Printers
Printing
CUPS

Learning Outcomes

In this module, you will complete the following exercise:

- Exercise 1 - Manage Printers and Printing

After completing this lab, you will be able to:

- Perform basic CUPS configuration (for local and remote printers)
- Manage user print queues
- Troubleshoot general printing problems

Exam Objectives

The following exam objectives are covered in this lab:

- **LPI: 108.4** Manage printers and printing
- **CompTIA: 2.7** Explain the use and operation of Linux devices.

Note: Our main focus is to cover the practical, hands-on aspects of the exam objectives. We recommend referring to course material or a search engine to research theoretical topics in more detail.

Lab Duration

It will take approximately **1 hour** to complete this lab.

Help and Support

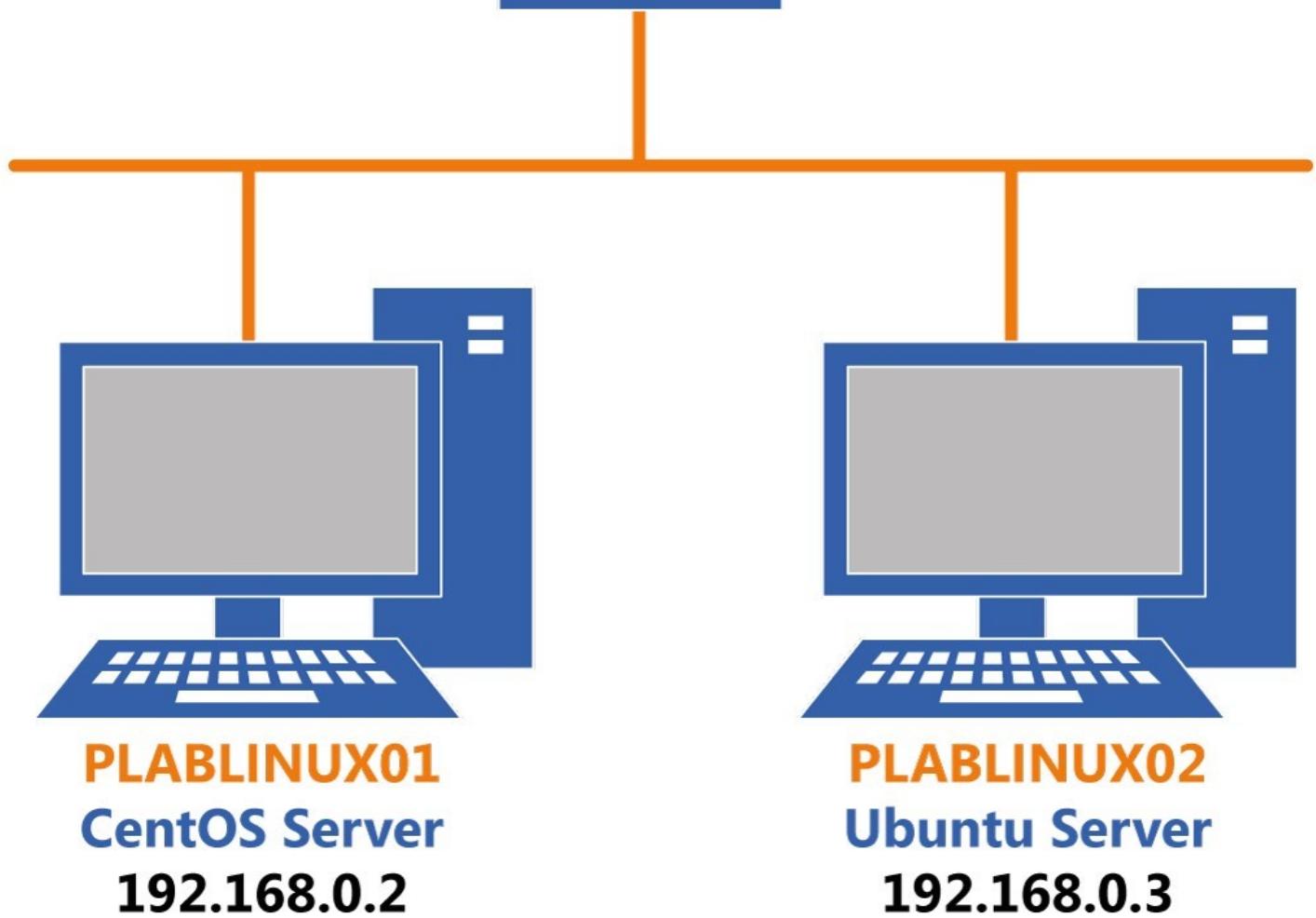
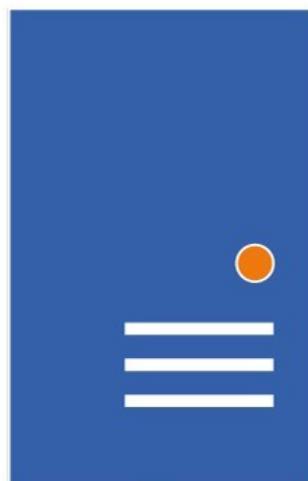
For more information on using Practice Labs, please see our **Help and Support** page. You can also raise a technical support ticket from this page.

Click Next to view the Lab topology used in this module.

Lab Topology

During your session, you will have access to the following lab configuration.

PLABSA01
Windows Server 2016
192.168.0.1



Depending on the exercises you may or may not use all of the devices, but they are shown here in the layout to get an overall understanding of the topology of the lab.

- **PLABSA01** (Windows Server 2016)
- **PLABLINUX01** (CentOS Server)
- **PLABLINUX02** (Ubuntu Server)

Click Next to proceed to the first exercise.

Exercise 1 - Manage Printers and Printing

Printing is a common thing that everyone is pretty much familiar with. Most offices will have a printer and the system administrator manages it. There are a few common terms that one should be familiar with. These terms are:

- Printer - responsible for accepting requests from one or more users to print documents
- Print Queue - Holds the print requests till the associated printer prints them
- Spooling - Sends the print jobs to the printer
- Spooler - Manages the print queue.

In this exercise, you will understand how to manage printers and printing.

Learning Outcomes

After completing this exercise, you will be able to:

- Log into a Linux System
- Perform basic CUPS configuration (for local and remote printers)
- Manage user print queues
- Troubleshoot general printing problems

Your Devices

You will be using the following device in this lab. Please power these on now.

- **PLABLINUX02** (Ubuntu Server)



Task 1 - Basic CUPS configuration (for local and remote printers)

In the Linux environment, it is important to know and understand **Common Unix Protocol (CUPS)**, which uses **Internet Printing Protocol (IPP)**. **CUPS** uses IPP to manage print jobs and print queues. In simple terms, **CUPS** provides a common printing interface to manage printers and print queues. In this task, you will perform basic CUPS configuration.

To configure **CUPS**, perform the following steps:

Step 1

On the desktop, right-click and select **Open in Terminal**.

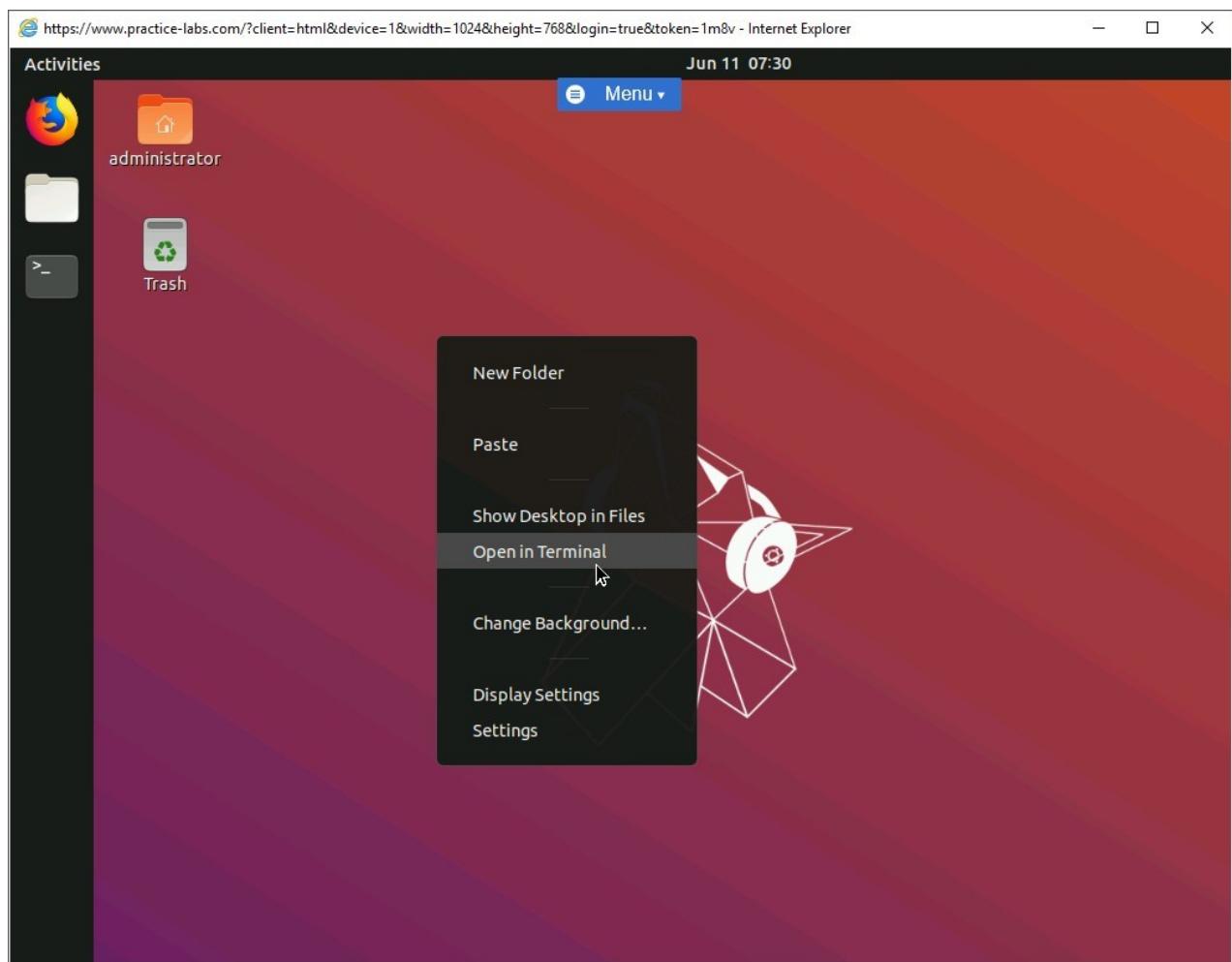


Figure 1.1 Screenshot of PLABLINUX02: Selecting the Open Terminal option from the context menu.

Step 2

The terminal window is displayed.

To check whether **CUPS** is installed in **Ubuntu**, type the following command:

```
sudo /etc/init.d/cups status
```

Press **Enter**.

When prompted, type the following password:

Passw0rd

Press **Enter**.

Note that a message displays that **CUPS** is running.

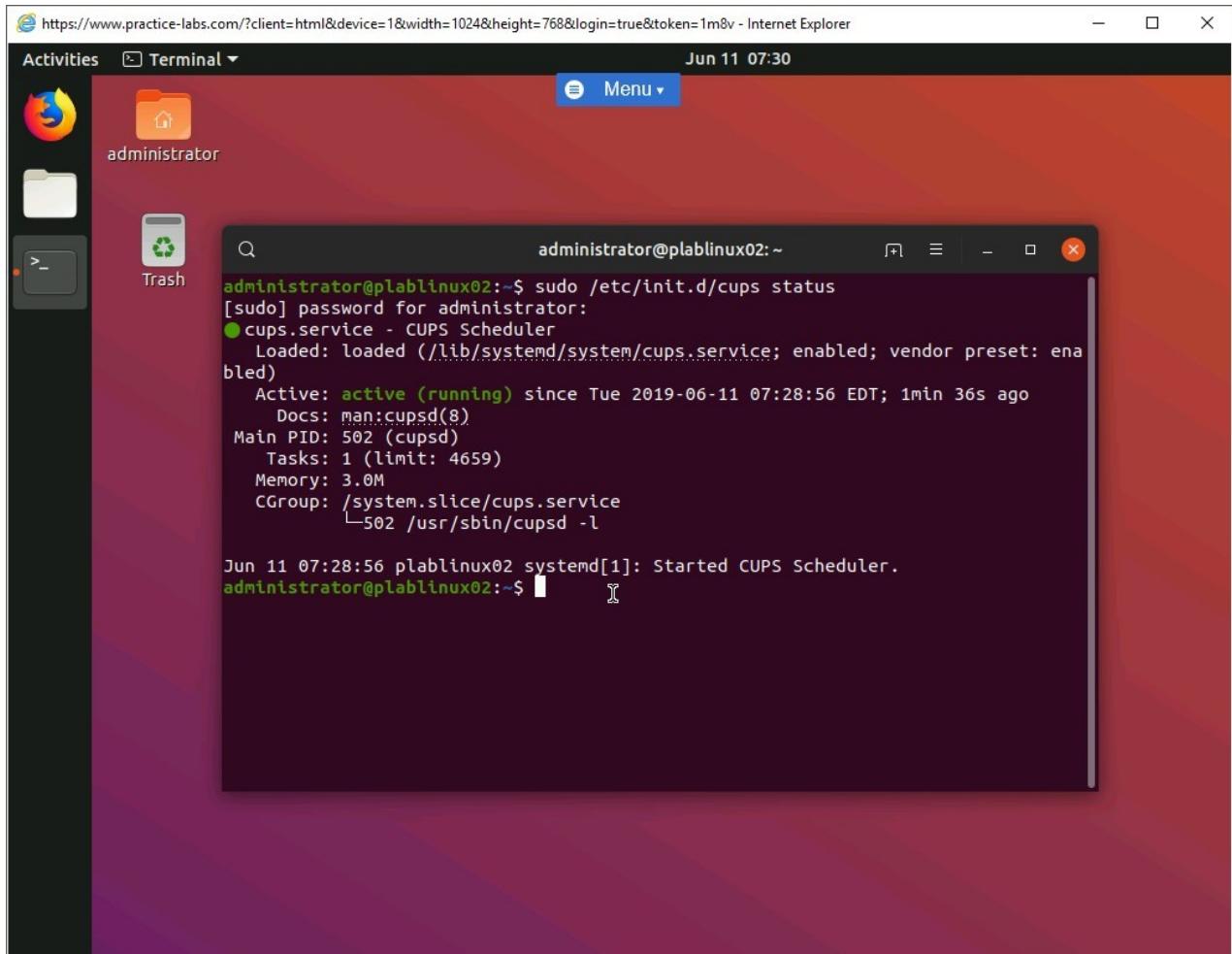


Figure 1.2 Screenshot of PLABLINUX02: Selecting the Open Terminal option from the context menu.

Step 3

Clear the screen by entering the following command:

```
clear
```

CUPS gets its directives from its configuration file, which is **/etc/cups/cupsd.conf**. Note that the directory is **/etc/cups**.

Before you make changes to this file, you should make a copy of the original file and make it read-only.

To make a copy of this file, type the following command:

```
sudo cp /etc/cups/cupsd.conf  
/etc/cups/cupsd.conf.original
```

Press **Enter**.

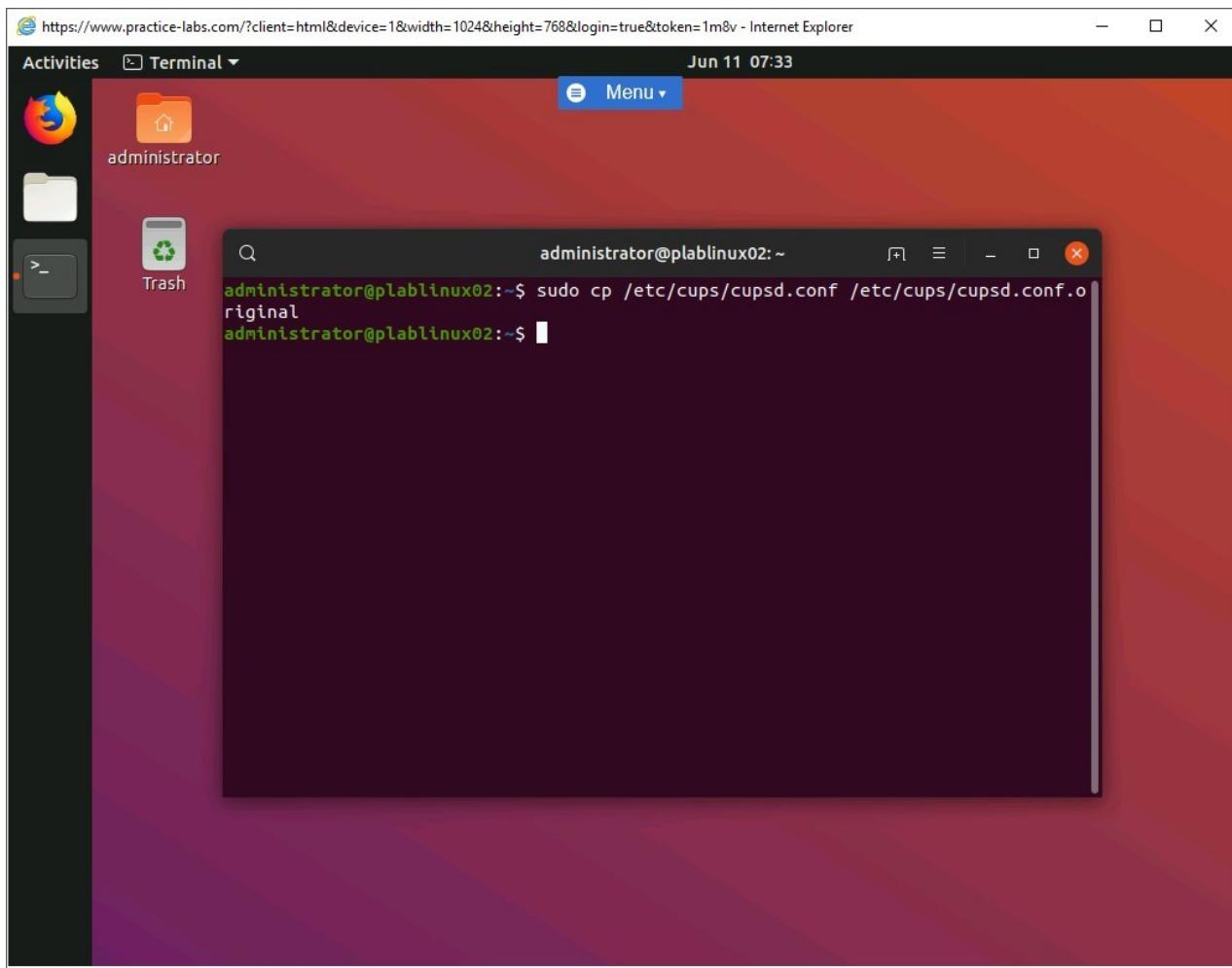


Figure 1.3 Screenshot of PLABLINUX02: Making a copy of the cupsd.conf file.

Step 4

To make it read-only, type the following command:

```
sudo chmod a-w /etc/cups/cupsd.conf.original
```

Press **Enter**.

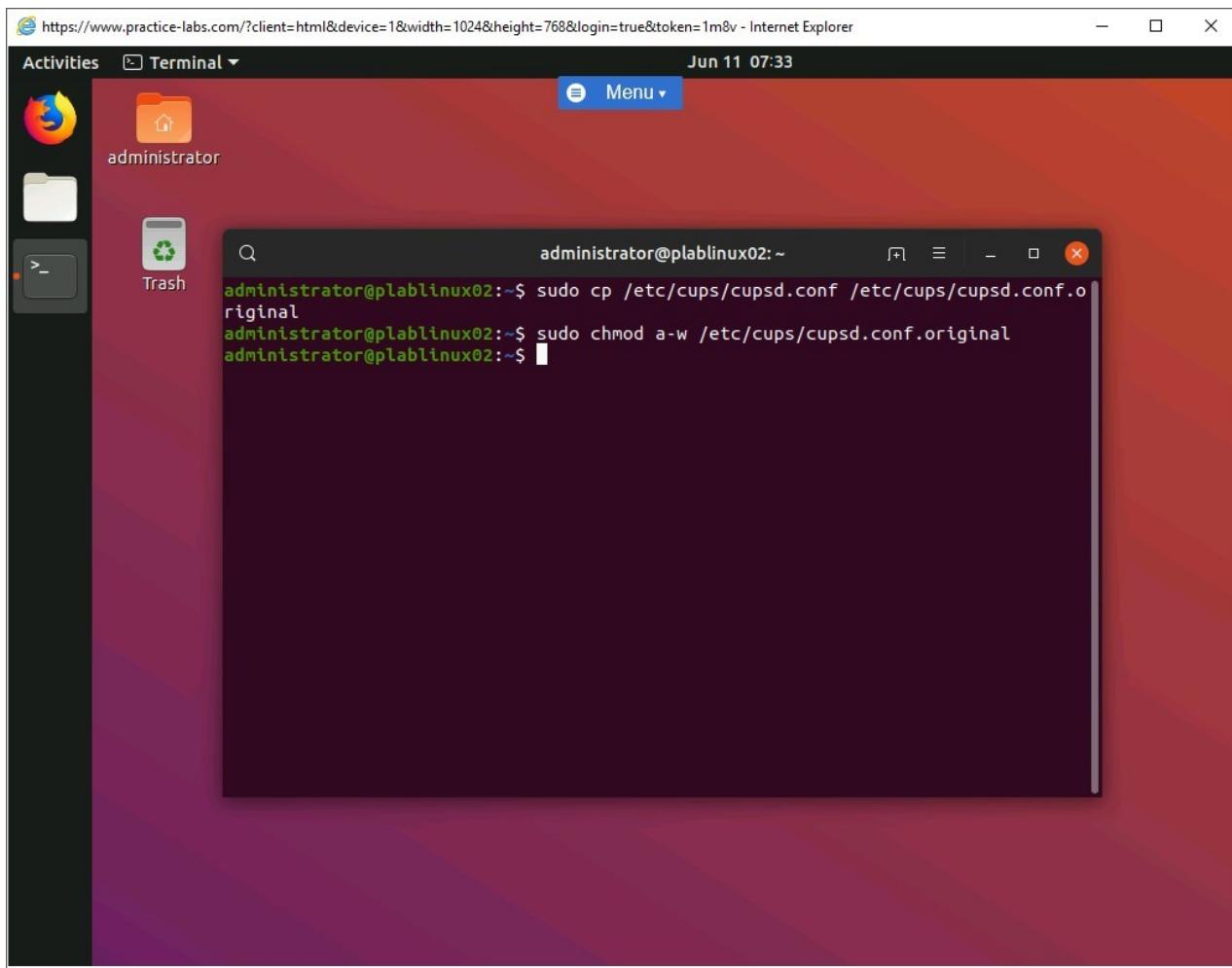


Figure 1.4 Screenshot of PLABLINUX02: Making the cupsd.conf.original file read-only.

Step 5

Let's view the **/etc/cups/cupsd.conf** file. To view this file, type the following command:

```
cat /etc/cups/cupsd.conf
```

Press **Enter**.

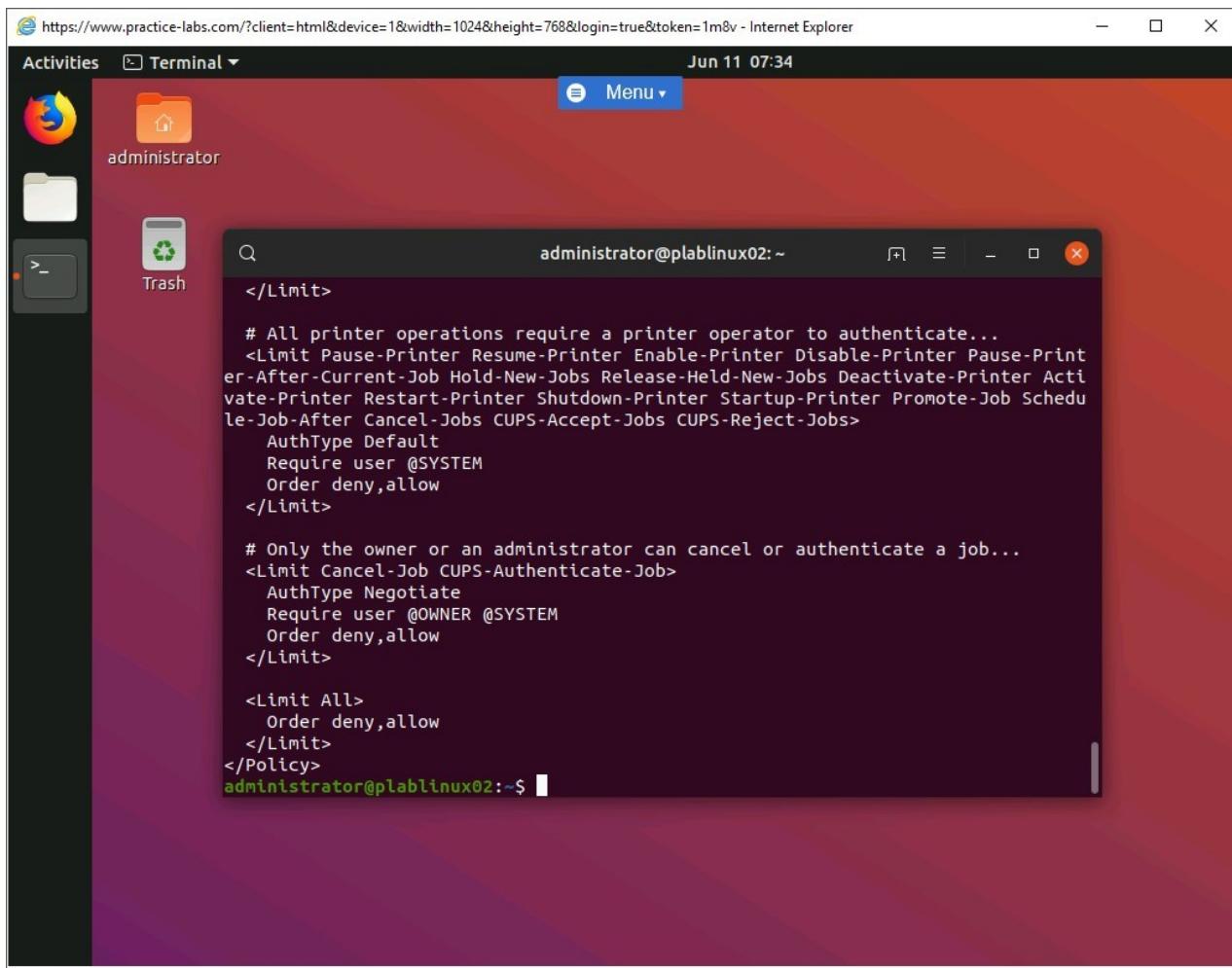


Figure 1.5 Screenshot of PLABLINUX02: Viewing the /etc/cups/cupsd.conf file.

Step 6

Scroll up to the **connection** section. Notice that **CUPS** is configured to listen only from the local system.

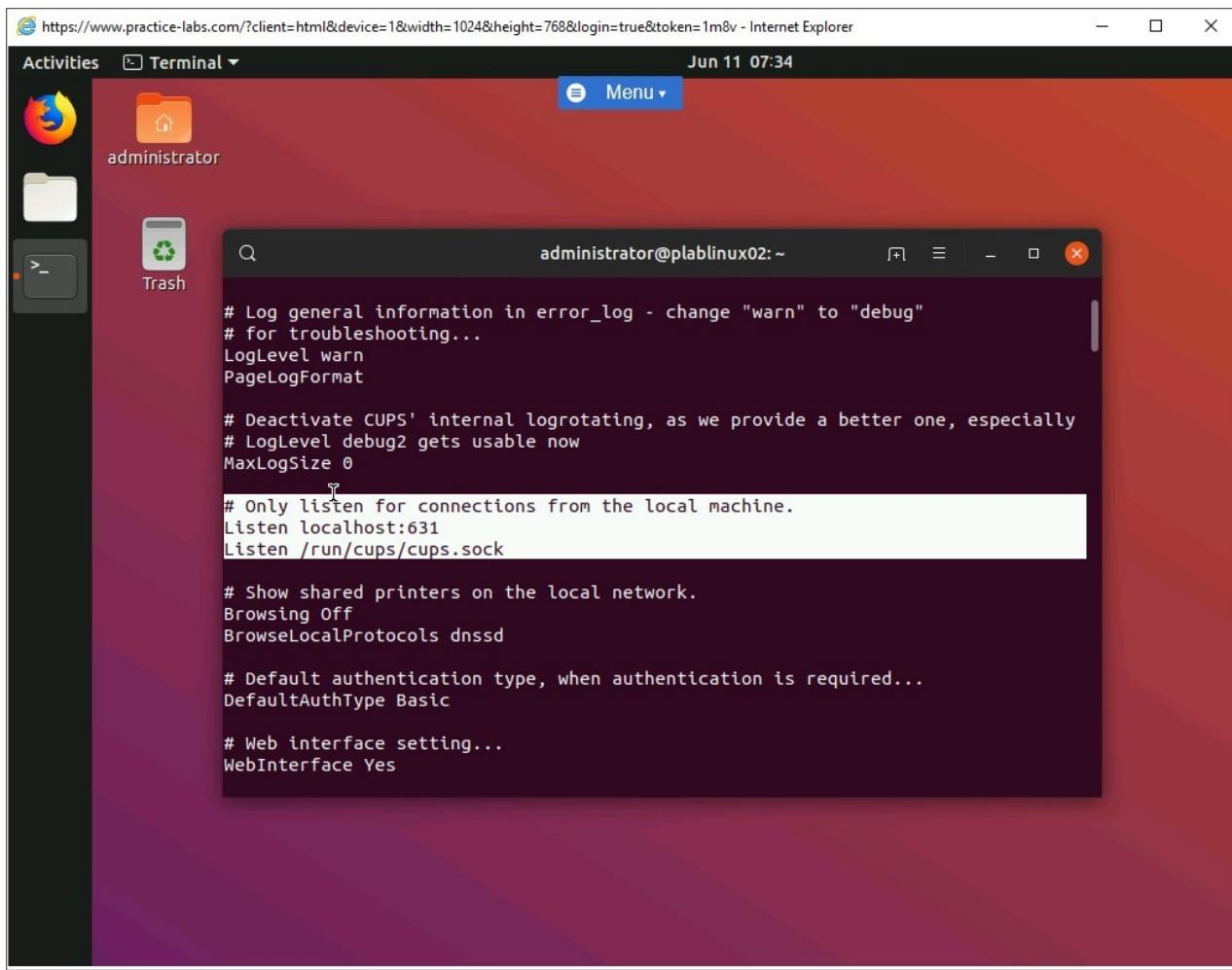


Figure 1.6 Screenshot of PLABLINUX02: Verifying the connection configuration.

Step 7

Scroll down to the **Web interface** section. The **Web interface** setting is configured to **Yes**.

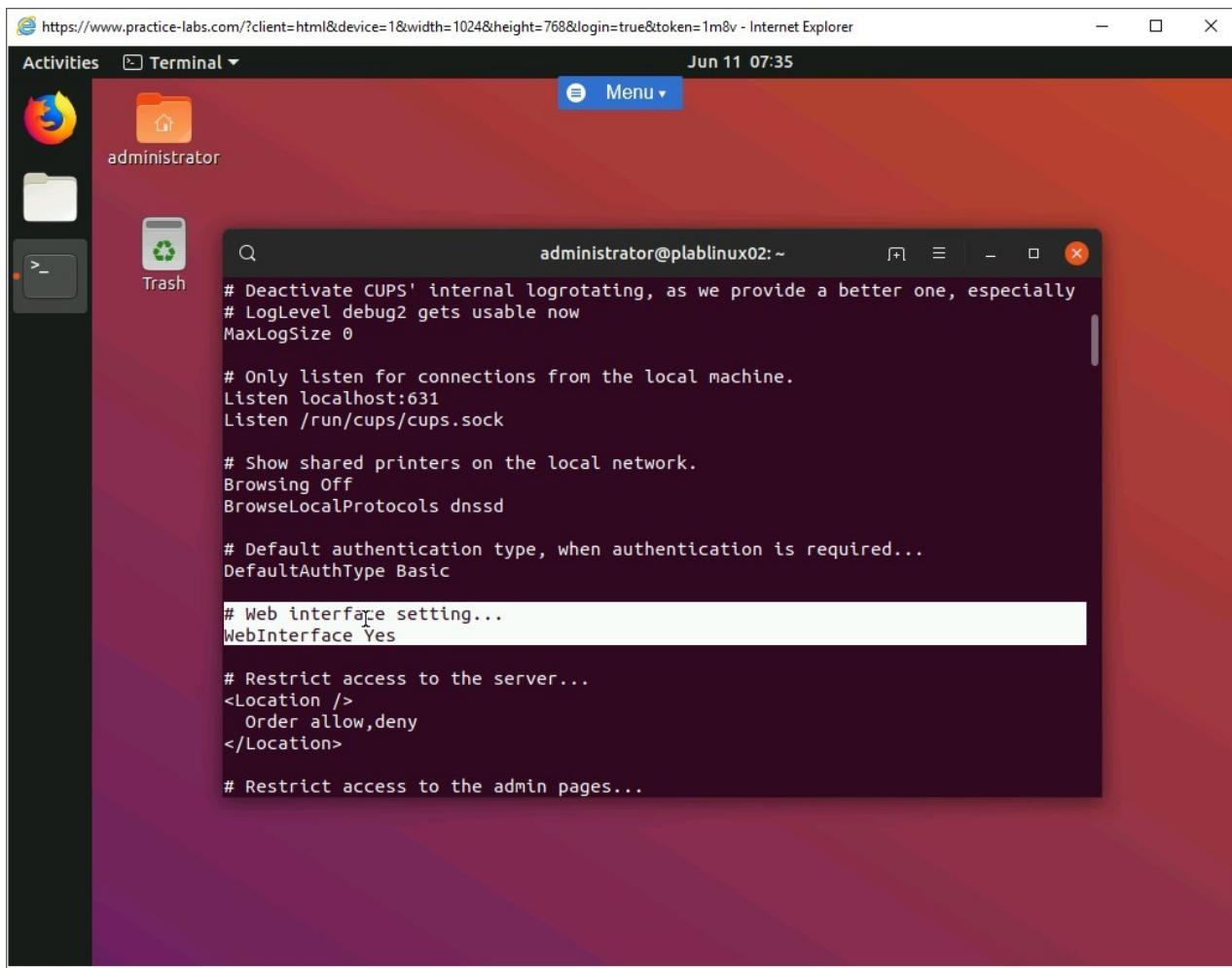


Figure 1.7 Screenshot of PLABLINUX02: Verifying the Web interface configuration.

Step 8

Clear the screen by entering the following command:

```
clear
```

Note that the **/etc/cups/cupsd.conf** file is a read-only file. You will need to make it writable before you make any changes to it. To make this file writable, type the following command:

```
sudo chmod 777 /etc/cups/cupsd.conf
```

Press **Enter**. Now, the file is writable.

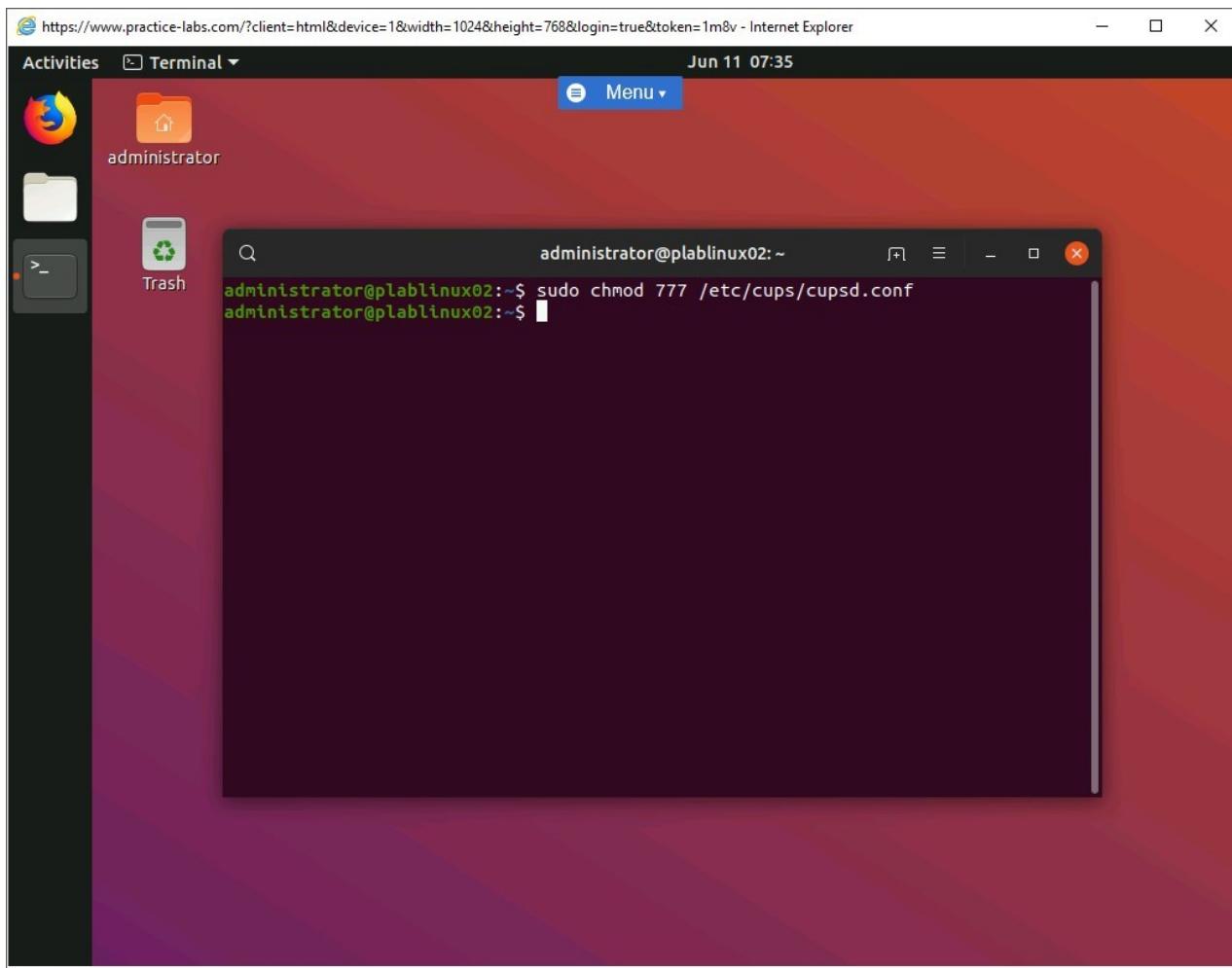


Figure 1.8 Screenshot of PLABLINUX02: Making the cupsd.conf file writable.

Step 9

Clear the screen by entering the following command:

```
clear
```

Let's edit this file and enable **CUPS** to allow access on the LAN also. To edit **/etc/cups/cupsd.conf**, type the following command:

```
gedit /etc/cups/cupsd.conf
```

Press **Enter**.

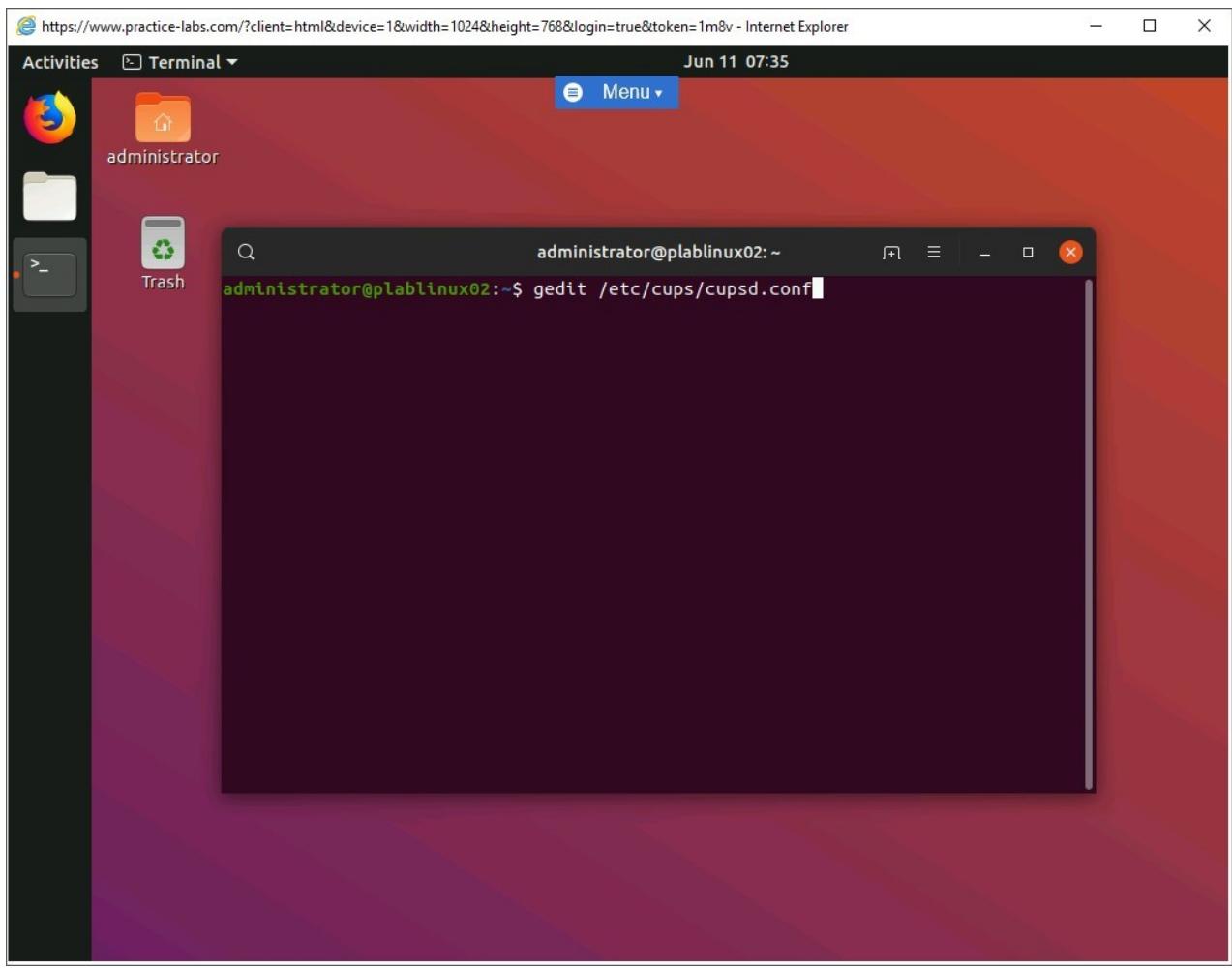
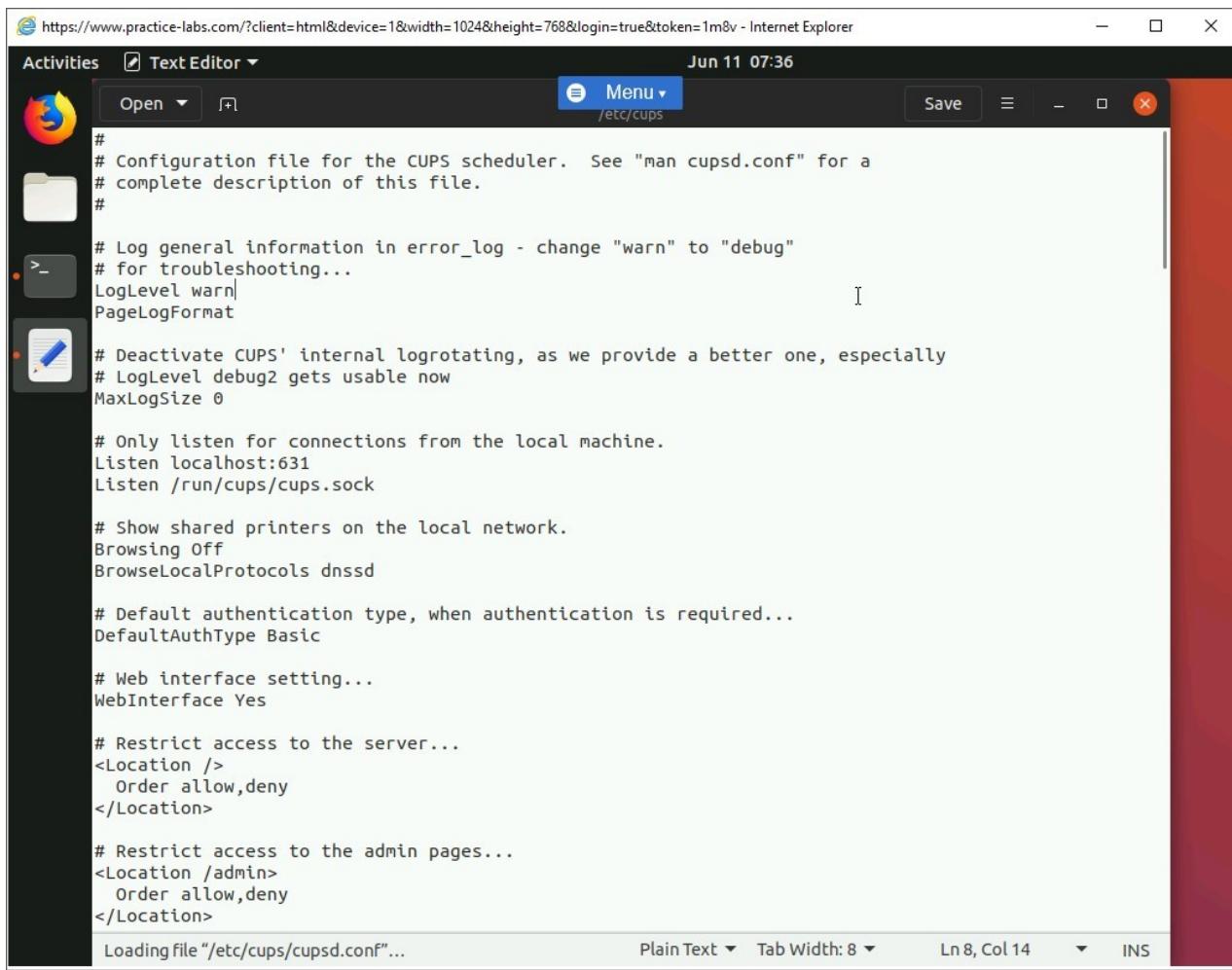


Figure 1.9 Screenshot of PLABLINUX02: Opening the file in the gedit editor.

Step 10

The **gedit** editor opens the **/etc/cups/cupsd.conf** file.



A screenshot of a Linux desktop environment showing a text editor window titled "Text Editor". The window displays the contents of the "/etc/cups/cupsd.conf" file. The file contains configuration settings for the CUPS scheduler, including log levels, listening ports, and security restrictions. The editor has a dark theme with a sidebar containing icons for file operations like Open, Save, and Print.

```
# Configuration file for the CUPS scheduler. See "man cupsd.conf" for a
# complete description of this file.
#
# Log general information in error_log - change "warn" to "debug"
# for troubleshooting...
LogLevel warn
PageLogFormat

# Deactivate CUPS' internal logrotating, as we provide a better one, especially
# LogLevel debug2 gets usable now
MaxLogSize 0

# Only listen for connections from the local machine.
Listen localhost:631
Listen /run/cups/cups.sock

# Show shared printers on the local network.
Browsing Off
BrowseLocalProtocols dnssd

# Default authentication type, when authentication is required...
DefaultAuthType Basic

# Web interface setting...
WebInterface Yes

# Restrict access to the server...
<Location />
  Order allow,deny
</Location>

# Restrict access to the admin pages...
<Location /admin>
  Order allow,deny
</Location>
```

Figure 1.10 Screenshot of PLABLINUX02: Displaying the cupsd.conf file opened in the gedit editor.

Step 11

To enable access to the network, add the following entry:

Listen 192.168.0.3:631

The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is "Activities Text Editor". The date and time displayed are "Jun 11 07:36". The file being edited is "/etc/cups/cupsd.conf". The code in the file is as follows:

```
# Configuration file for the CUPS scheduler. See "man cupsd.conf" for a
# complete description of this file.
#
# Log general information in error_log - change "warn" to "debug"
# for troubleshooting...
LogLevel warn
PageLogFormat

# Deactivate CUPS' internal logrotating, as we provide a better one, especially
# LogLevel debug2 gets usable now
MaxLogSize 0

# Only listen for connections from the local machine.
Listen localhost:631
Listen /run/cups/cups.sock
Listen 192.168.0.3:631

# Show shared printers on the local network.
Browsing Off
BrowseLocalProtocols dnssd

# Default authentication type, when authentication is required...
DefaultAuthType Basic

# Web interface setting...
WebInterface Yes

# Restrict access to the server...
<Location />
  Order allow,deny
</Location>

# Restrict access to the admin pages...
<Location /admin>
  Order allow,deny
</Location>
```

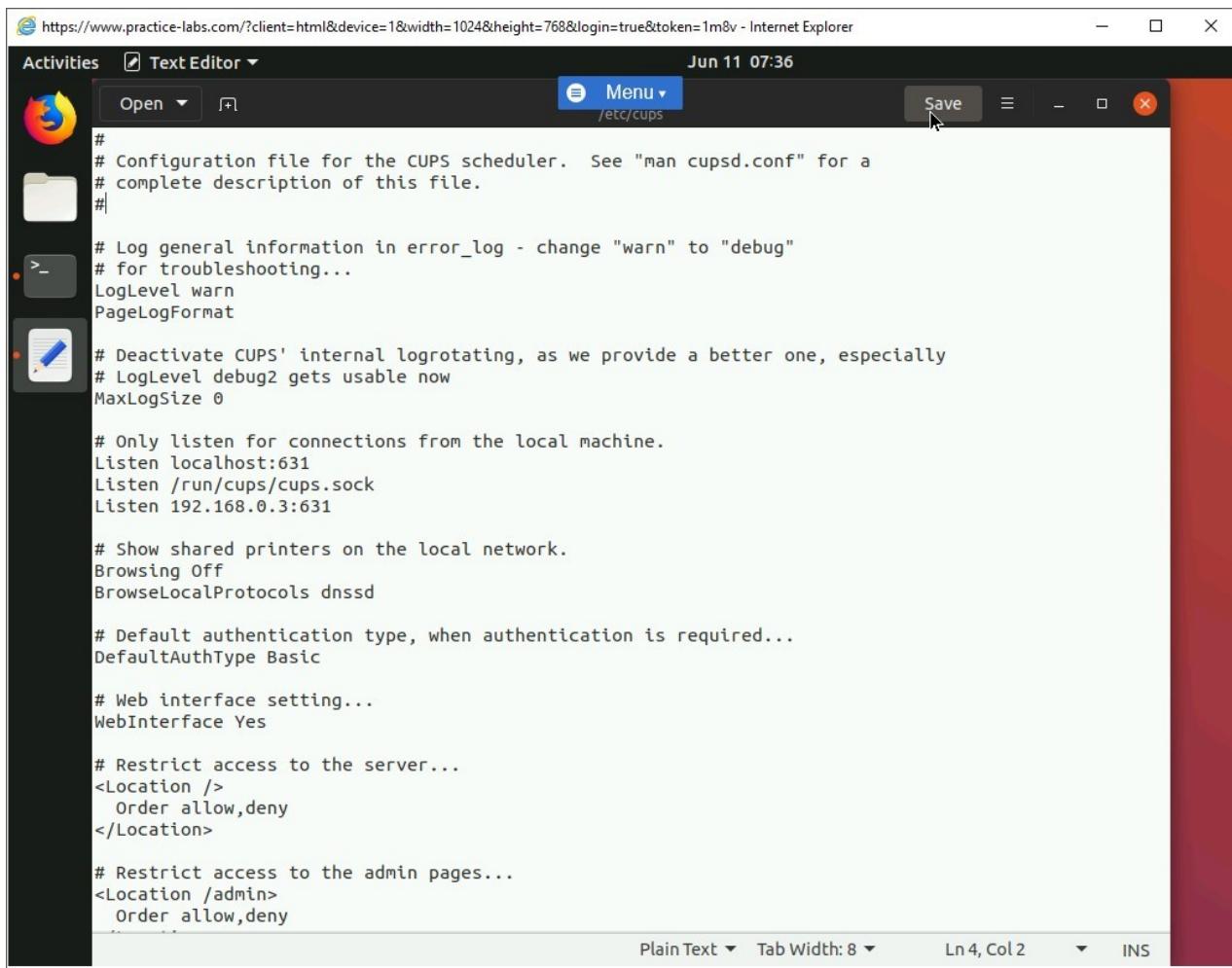
The terminal window also shows status information at the bottom: "Plain Text", "Tab Width: 8", "Ln 18, Col 23", and "INS".

Figure 1.11 Screenshot of PLABLINUXo2: Enabling the network access in the cupsd.conf file.

Step 12

From the upper right corner, click **Save**.

Then, close the file.



```
# Configuration file for the CUPS scheduler. See "man cupsd.conf" for a
# complete description of this file.
#
# Log general information in error_log - change "warn" to "debug"
# for troubleshooting...
LogLevel warn
PageLogFormat

# Deactivate CUPS' internal logrotating, as we provide a better one, especially
# LogLevel debug2 gets usable now
MaxLogSize 0

# Only listen for connections from the local machine.
Listen localhost:631
Listen /run/cups/cups.sock
Listen 192.168.0.3:631

# Show shared printers on the local network.
Browsing Off
BrowseLocalProtocols dnssd

# Default authentication type, when authentication is required...
DefaultAuthType Basic

# Web interface setting...
WebInterface Yes

# Restrict access to the server...
<Location />
  Order allow,deny
</Location>

# Restrict access to the admin pages...
<Location /admin>
  Order allow,deny
</Location>
```

Figure 1.12 Screenshot of PLABLINUXo2: Saving the cupsd.conf file in the gedit editor.

Step 13

You are back in the terminal window.

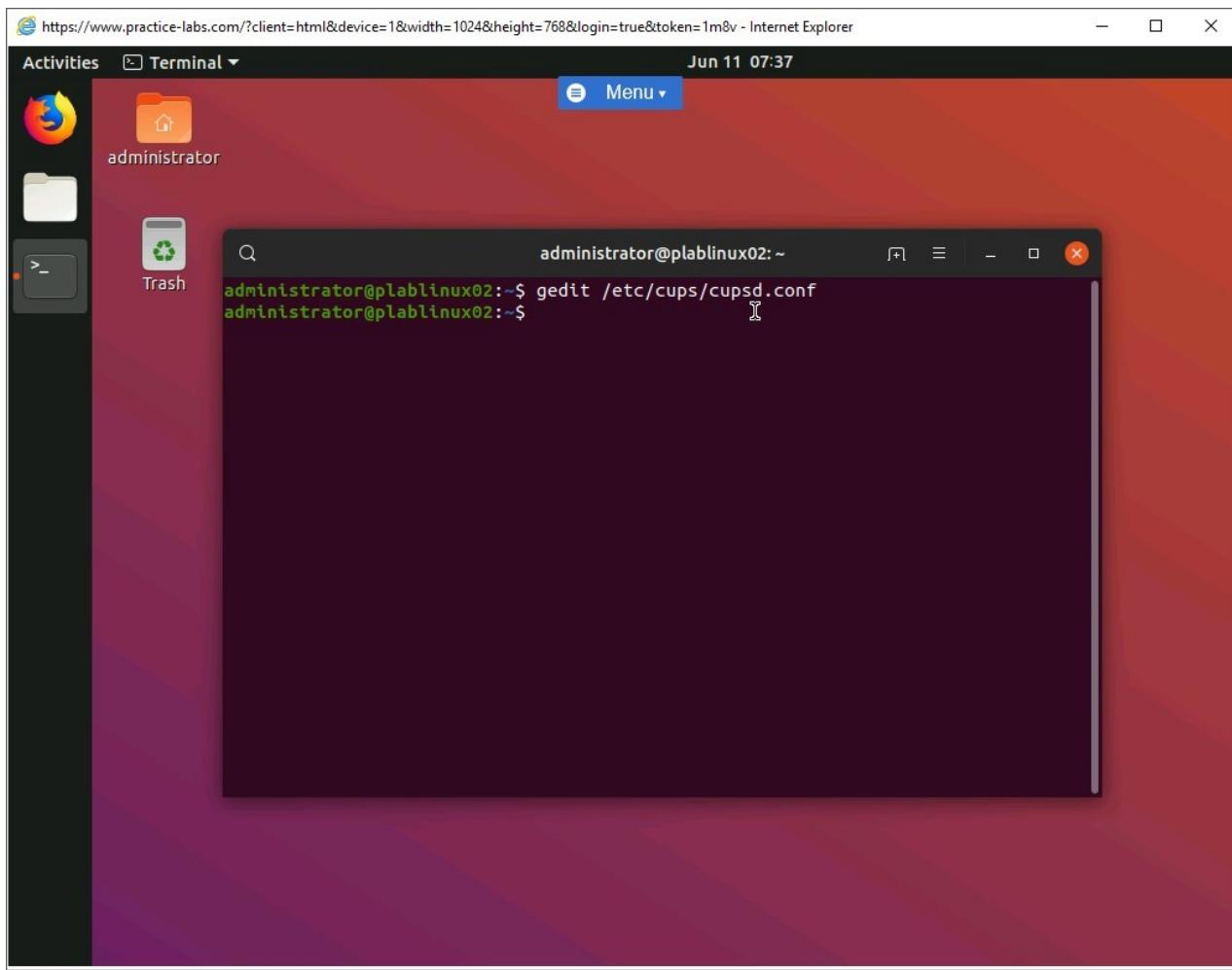


Figure 1.13 Screenshot of PLABLINUX02: Returning to the terminal window after saving and closing the cupsd.conf file.

Step 14

Clear the screen by entering the following command:

```
clear
```

To make the file read-only once again, type the following command:

```
sudo chmod 444 /etc/cups/cupsd.conf
```

Press **Enter**.

If prompted, type the following password:

Passw0rd

Press **Enter**.

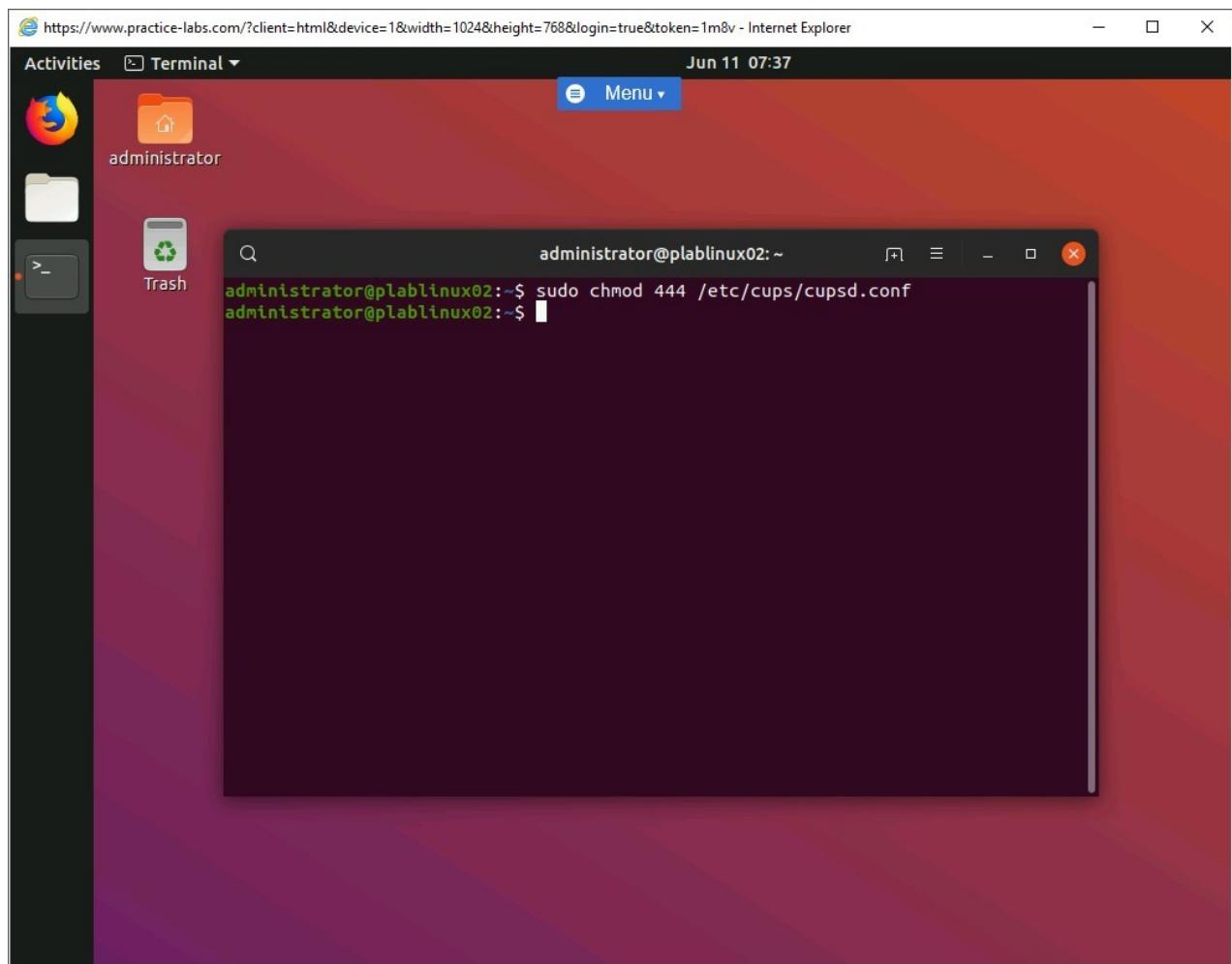


Figure 1.14 Screenshot of PLABLINUX02: Making the cupsd.conf file read-only.

Step 15

When you make a change to the configuration file, you need to restart **CUPS**. To do so, type the following command:

```
sudo service cups restart
```

Press **Enter**.

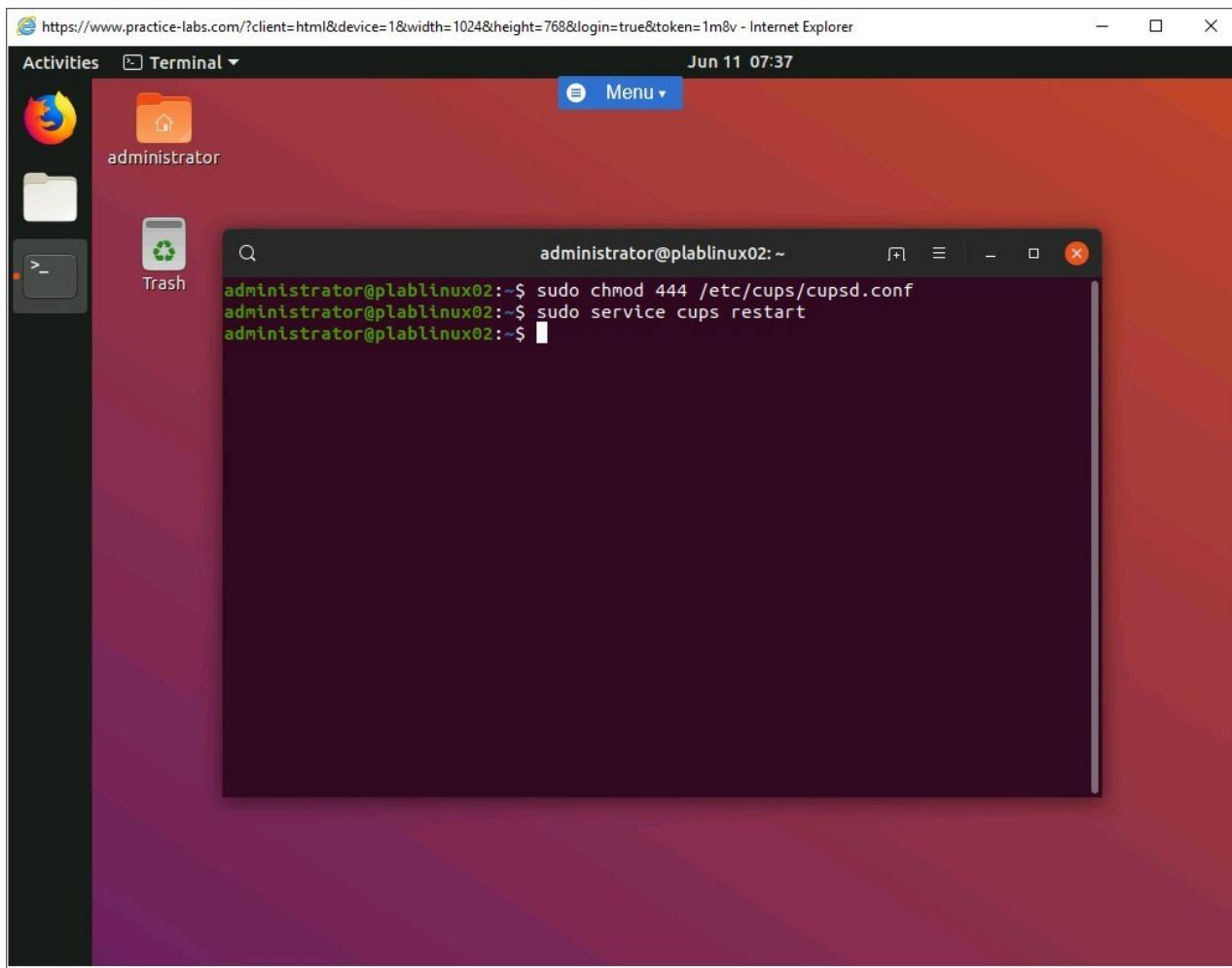


Figure 1.15 Screenshot of PLABLINUX02: Restarting the cups service.

Step 16

To perform administrative tasks using the Web interface, you must use the **root** account. An alternative is to add the user to the **lpadmin** group. Type the following command:

```
sudo usermod -aG lpadmin administrator
```

Press **Enter**.

Minimize the terminal window.

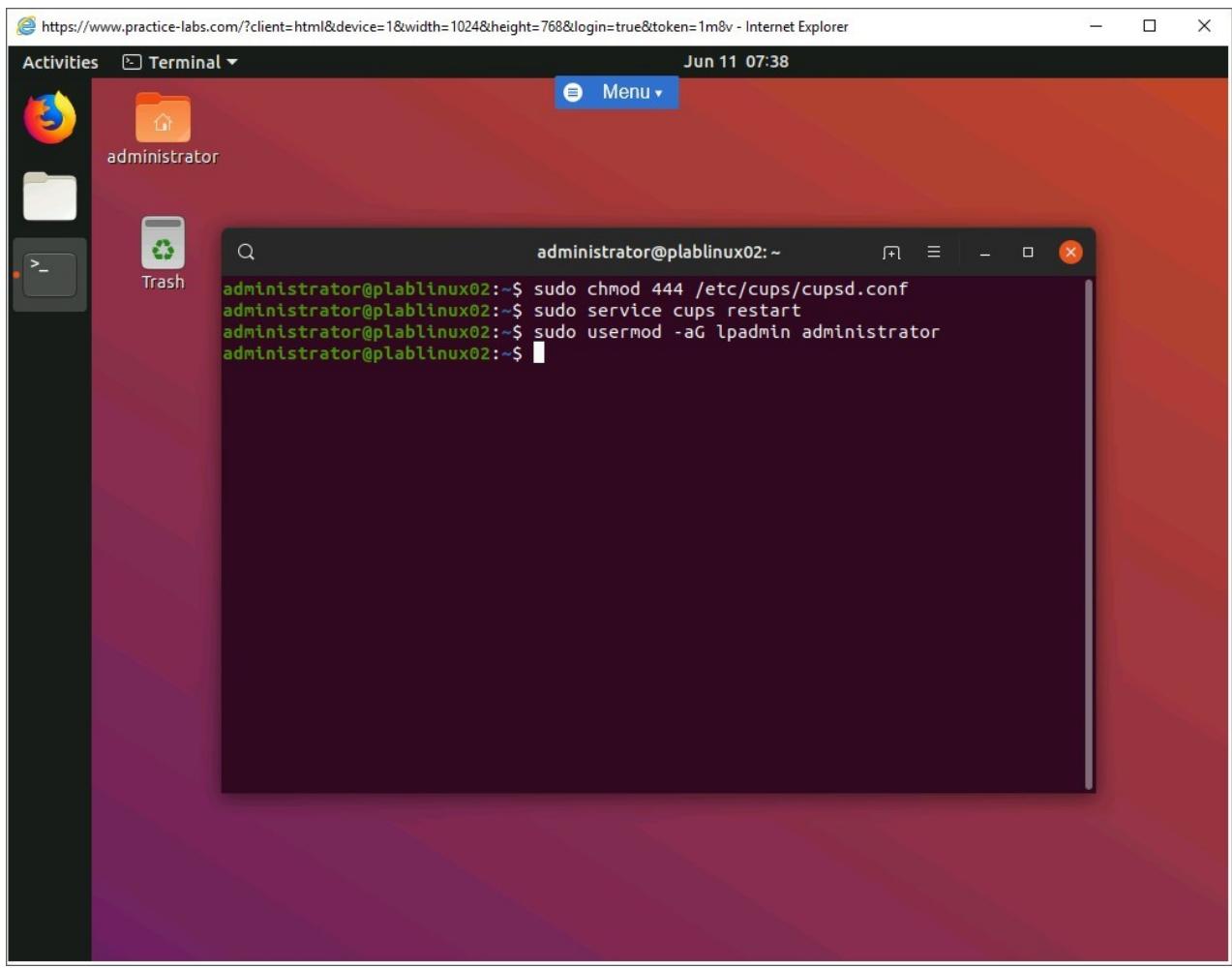


Figure 1.16 Screenshot of PLABLINUX02: Adding the administrator to the lpadmin group.

Step 17

From the left icon bar, click **Firefox Web Browser**.

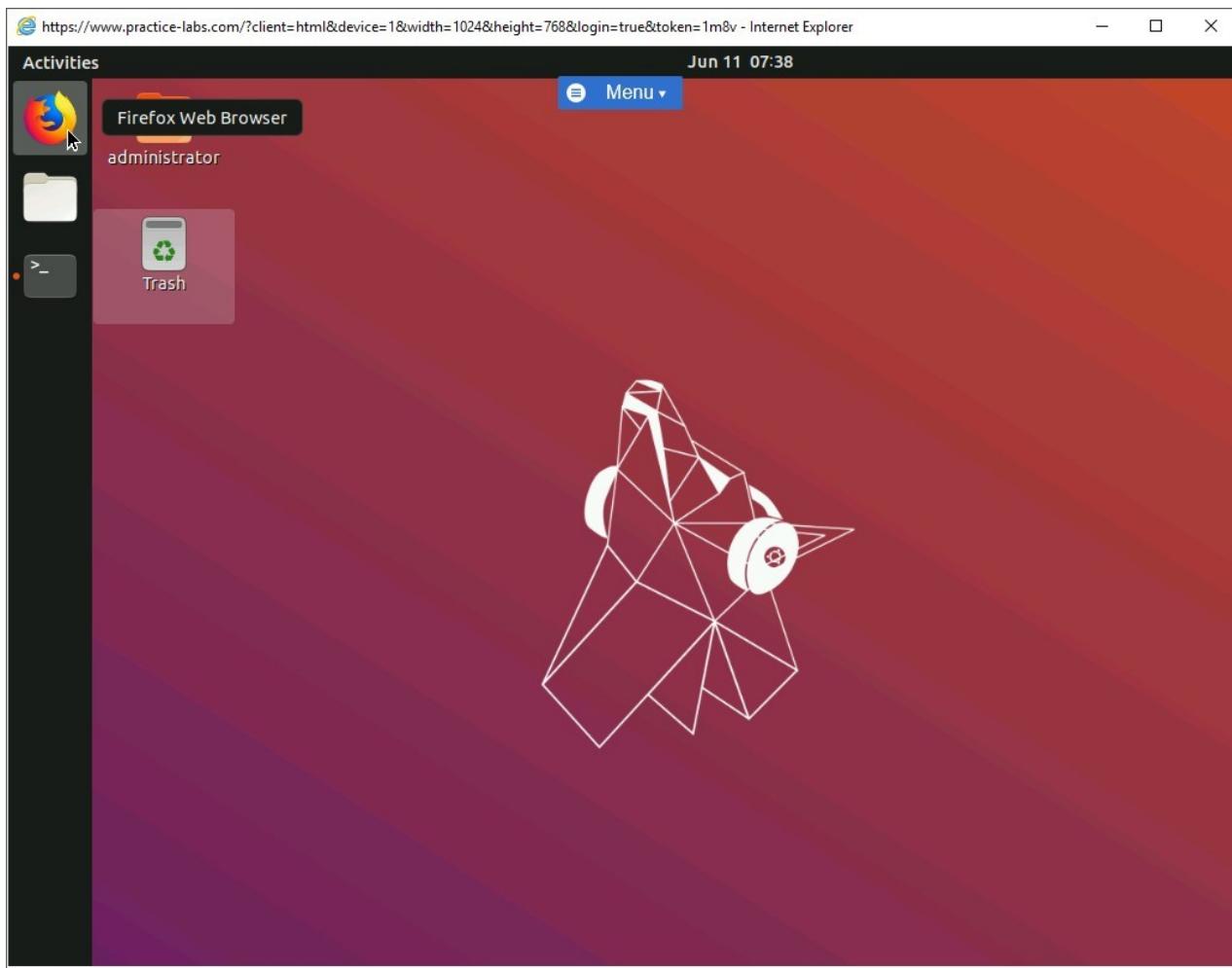


Figure 1.17 Screenshot of PLABLINUXo2: Starting the Firefox Web browser.

Step 18

The **Mozilla Firefox** window is displayed.

In the address bar, type the following address:

<http://localhost:631>

Press **Enter**.

The **CUPS** page is displayed instantly.

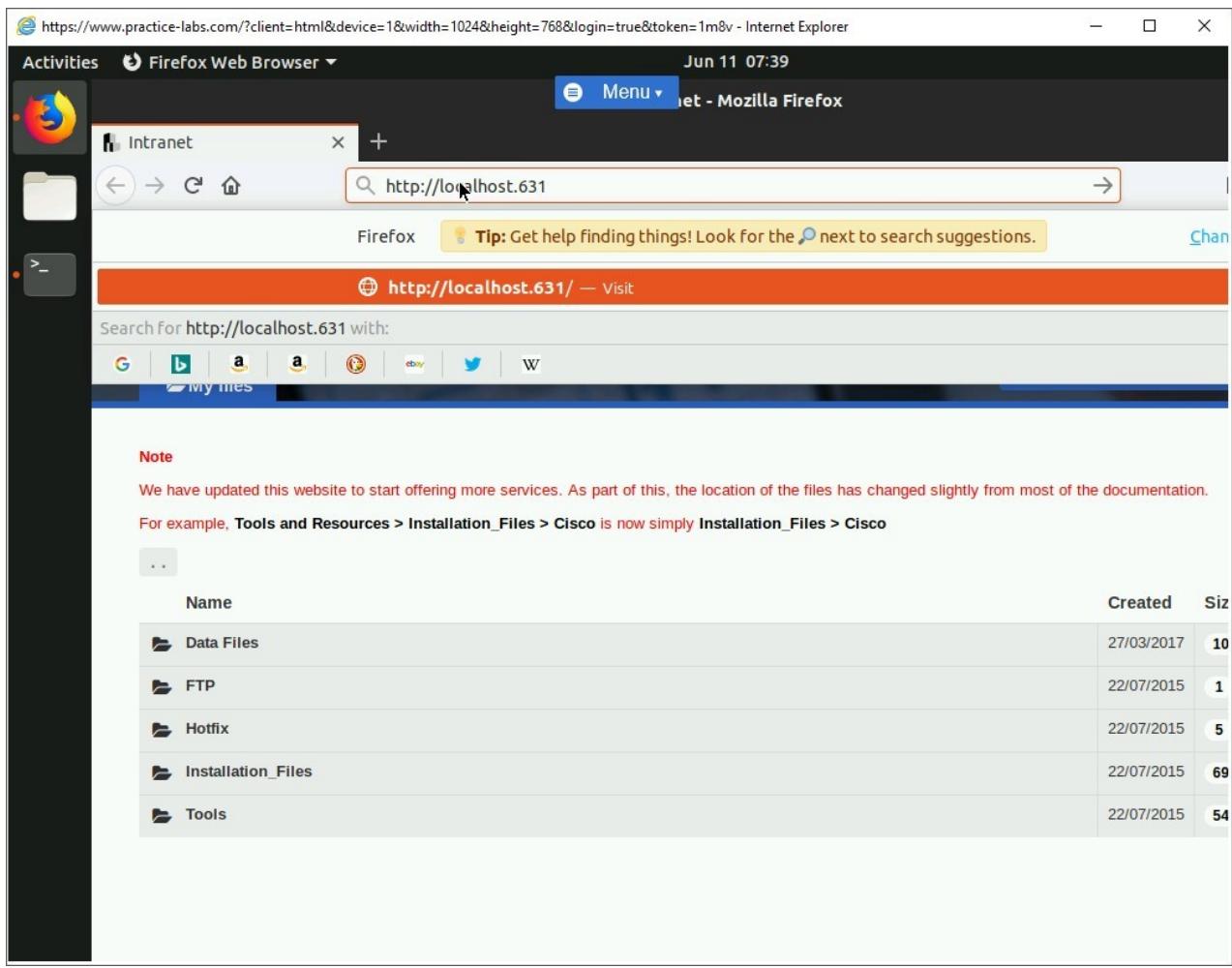


Figure 1.18 Screenshot of PLABLINUXo2: Typing the URL in the address bar of Firefox.

Step 19

Click the **Administration** tab.

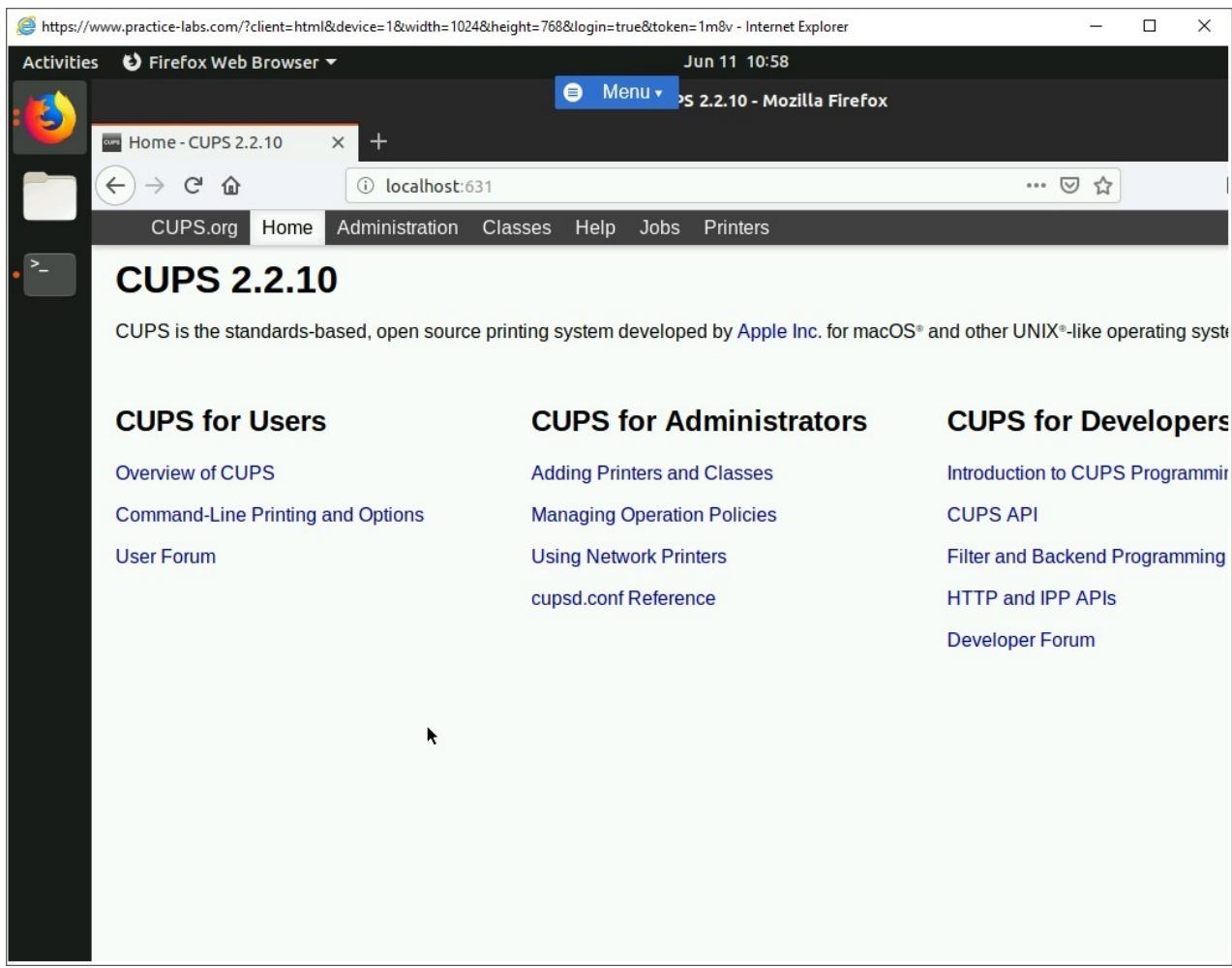


Figure 1.19 Screenshot of PLABLINUXo2: Clicking the Administration tab.

Step 20

Click **Add Printer** under the **Printers** section.

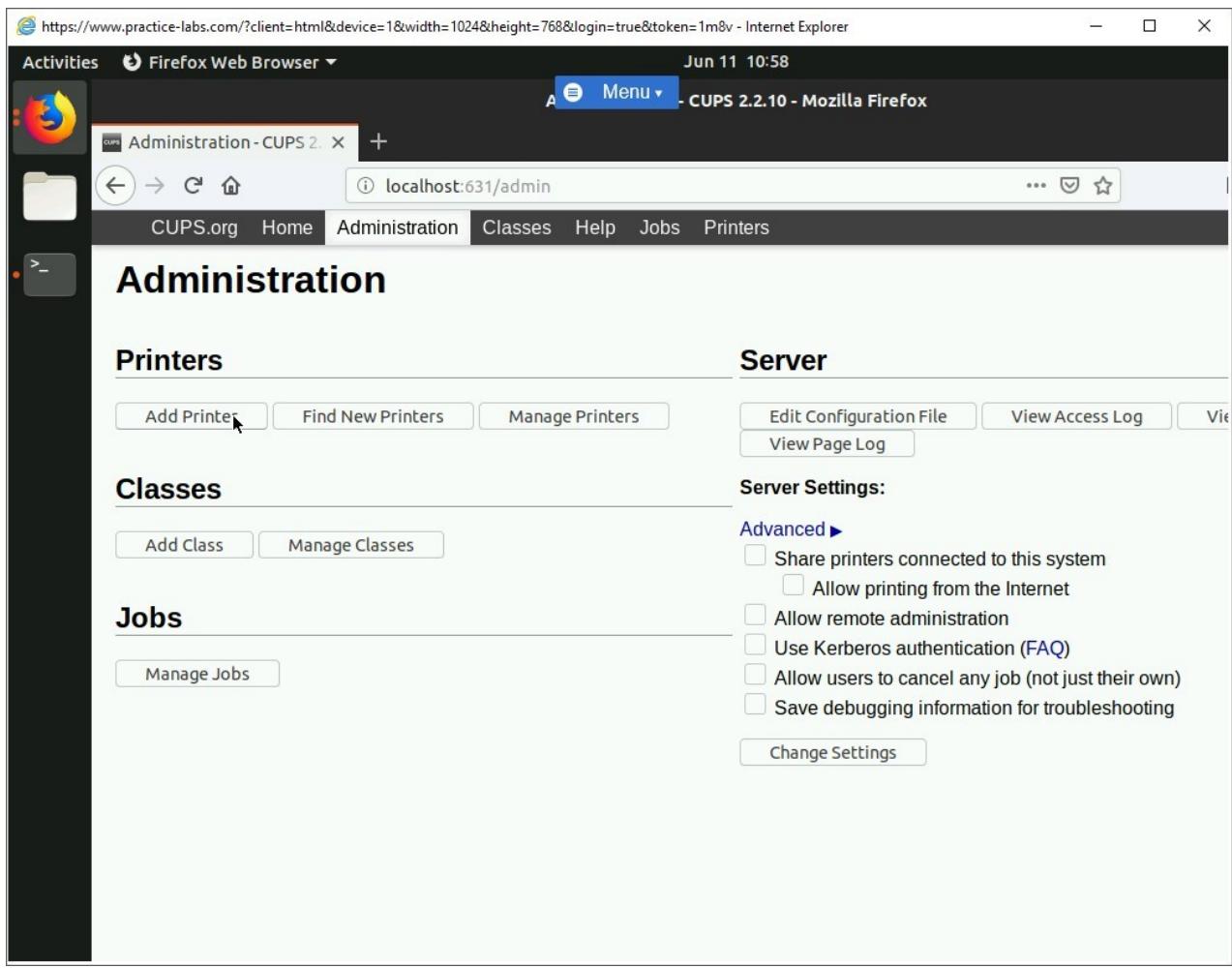


Figure 1.20 Screenshot of PLABLINUXo2: Clicking Add Printer in the Printer section.

Step 21

The **Authentication Required** dialog box is displayed.

In the **User Name** textbox, enter **administrator**. In the **Password** textbox, type the following:

Passw0rd

Click **OK**.

*Note: If prompted to remember the password, click **Remember Password**.*

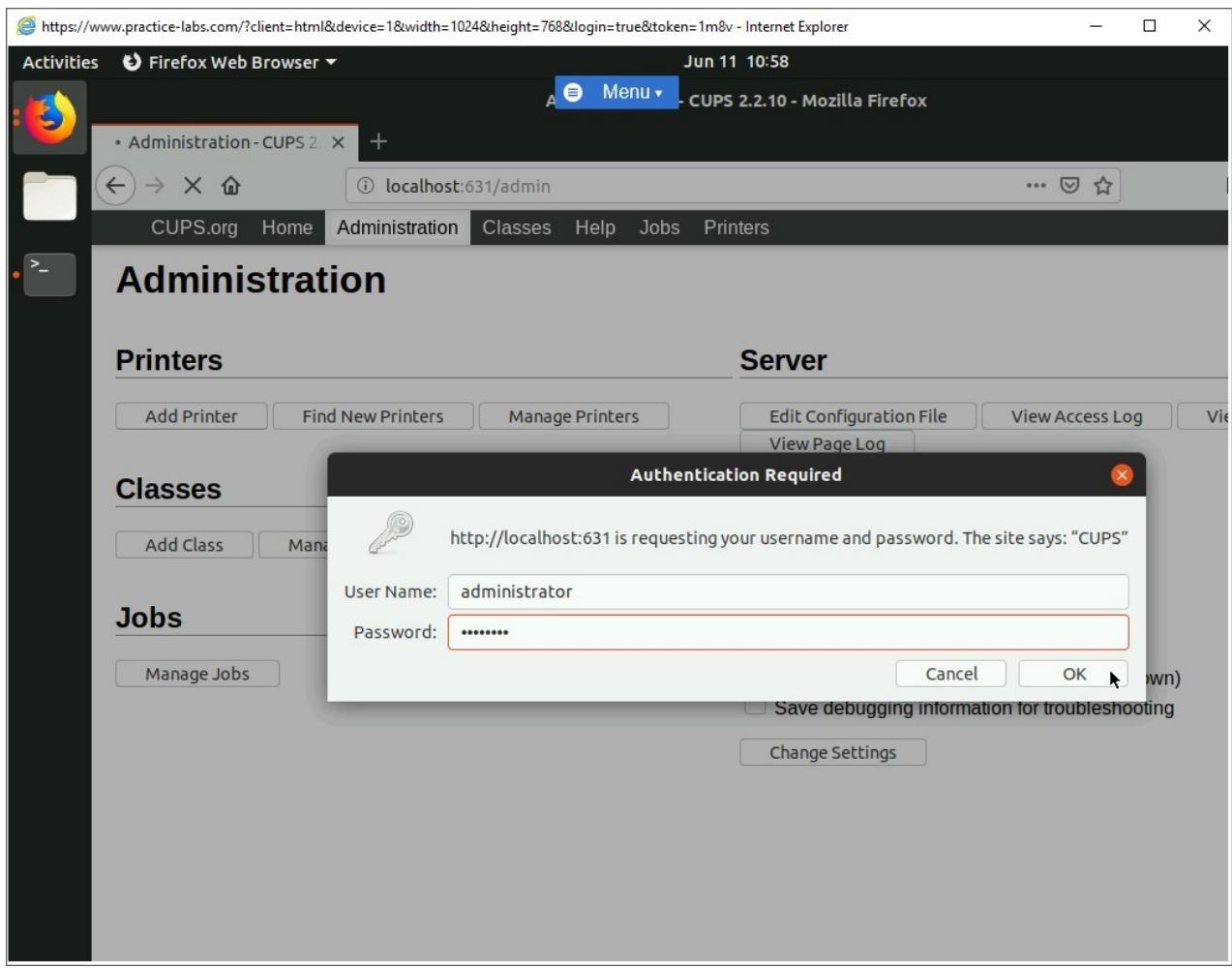


Figure 1.21 Screenshot of PLABLINUXo2: Authenticating the administrator account.

Step 22

The **Add Printer** page is displayed.

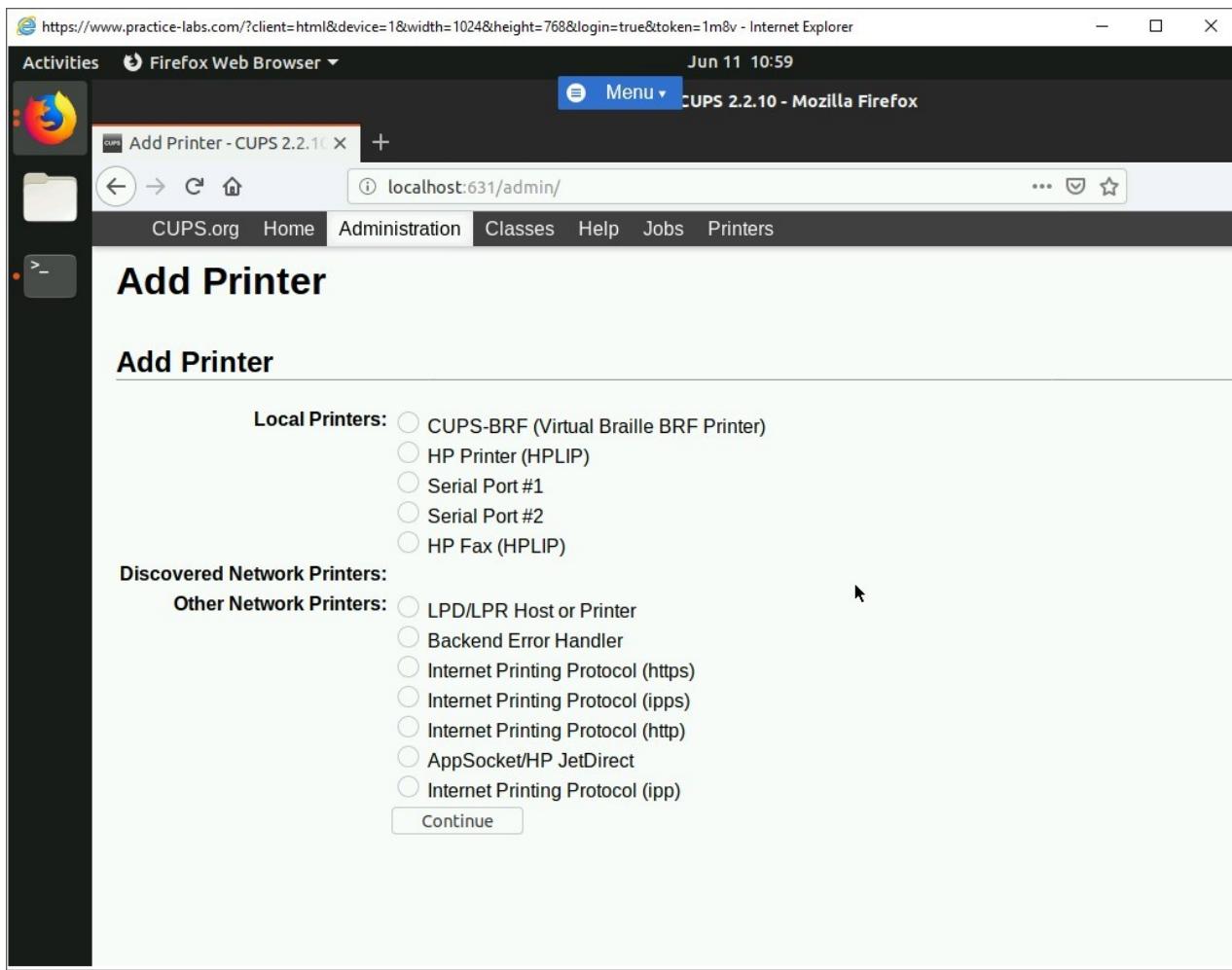


Figure 1.22 Screenshot of PLABLINUX02: Displaying the Add Printer page.

Step 23

In the **Local Printers** section, select **HP Printer (HPLIP)** and click **Continue**.

Note: You can also select a printing option from the network printers section. Steps are no different than the local printer setup steps. In this task, you will cover the local printer configuration. You can attempt to add a printer in Windows and then use one of the options in the network printers section to add it.

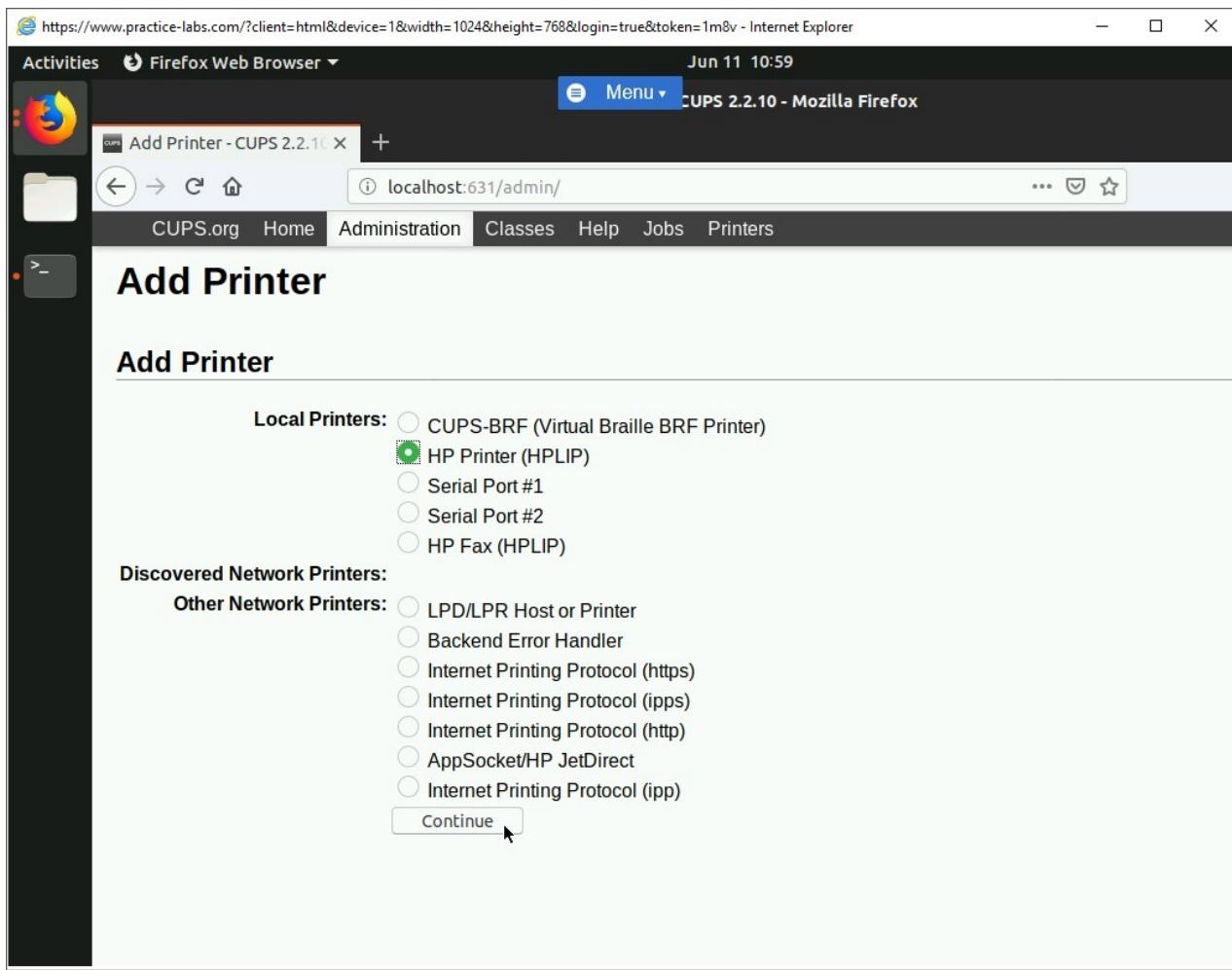


Figure 1.23 Screenshot of PLABLINUX02: Selecting the printer from the Local Printers section.

Step 24

On the next page, type the following in the **Connection** textbox:

<http://localhost:631/hp>

Click **Continue**.

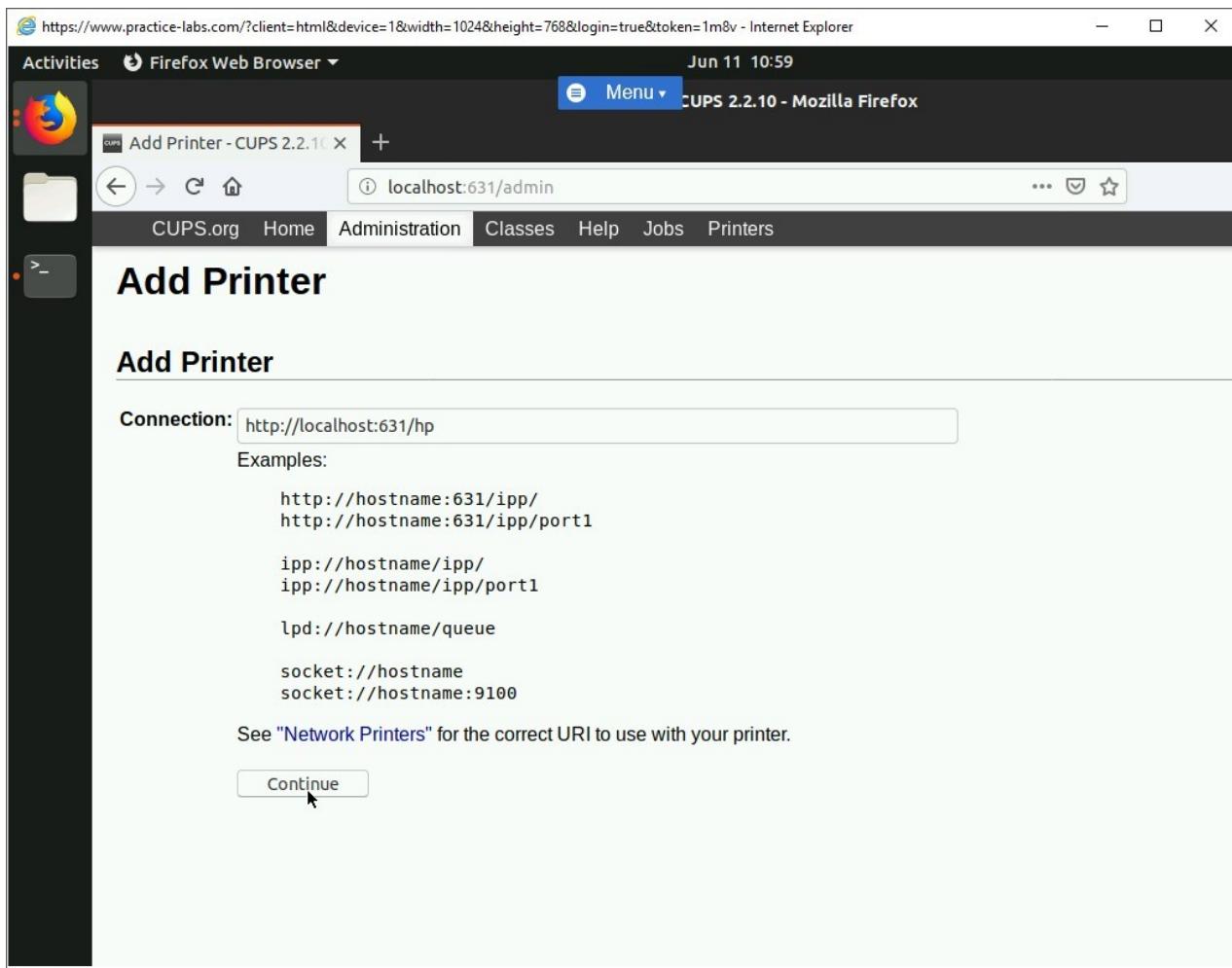


Figure 1.24 Screenshot of PLABLINUX02: Adding the printer URL in the Connection text box.

Step 25

On the next page, you will need to add the name of the printer. In the **Name** textbox, type the following:

PLABPrinter

In the **Location** textbox, type the following:

PLAB Office

Select **Share This Printer** and click **Continue**.

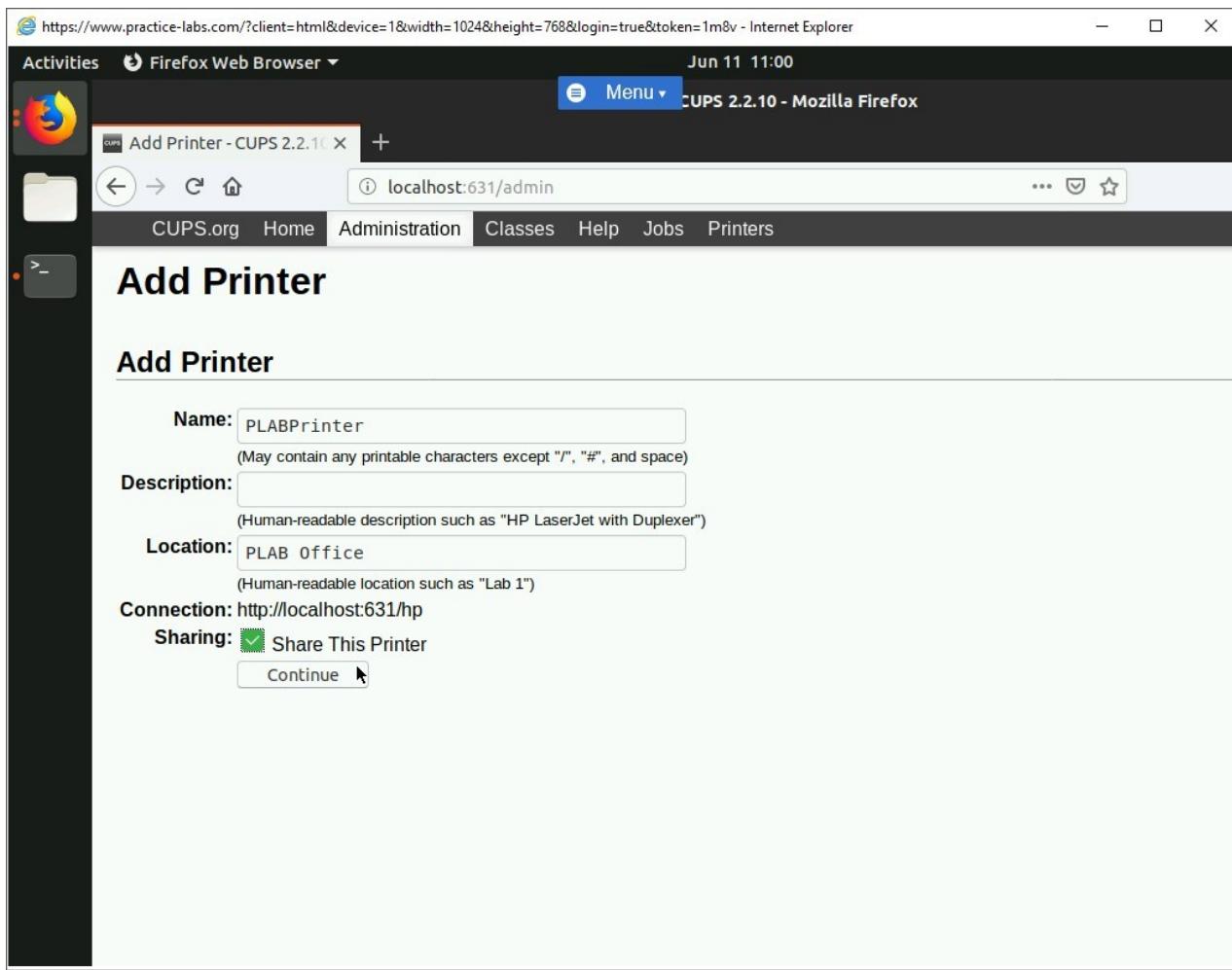


Figure 1.25 Screenshot of PLABLINUXO2: Adding the printer name and location.

Step 26

On the next page, from the **Make** list box, select **HP** and click **Continue**.

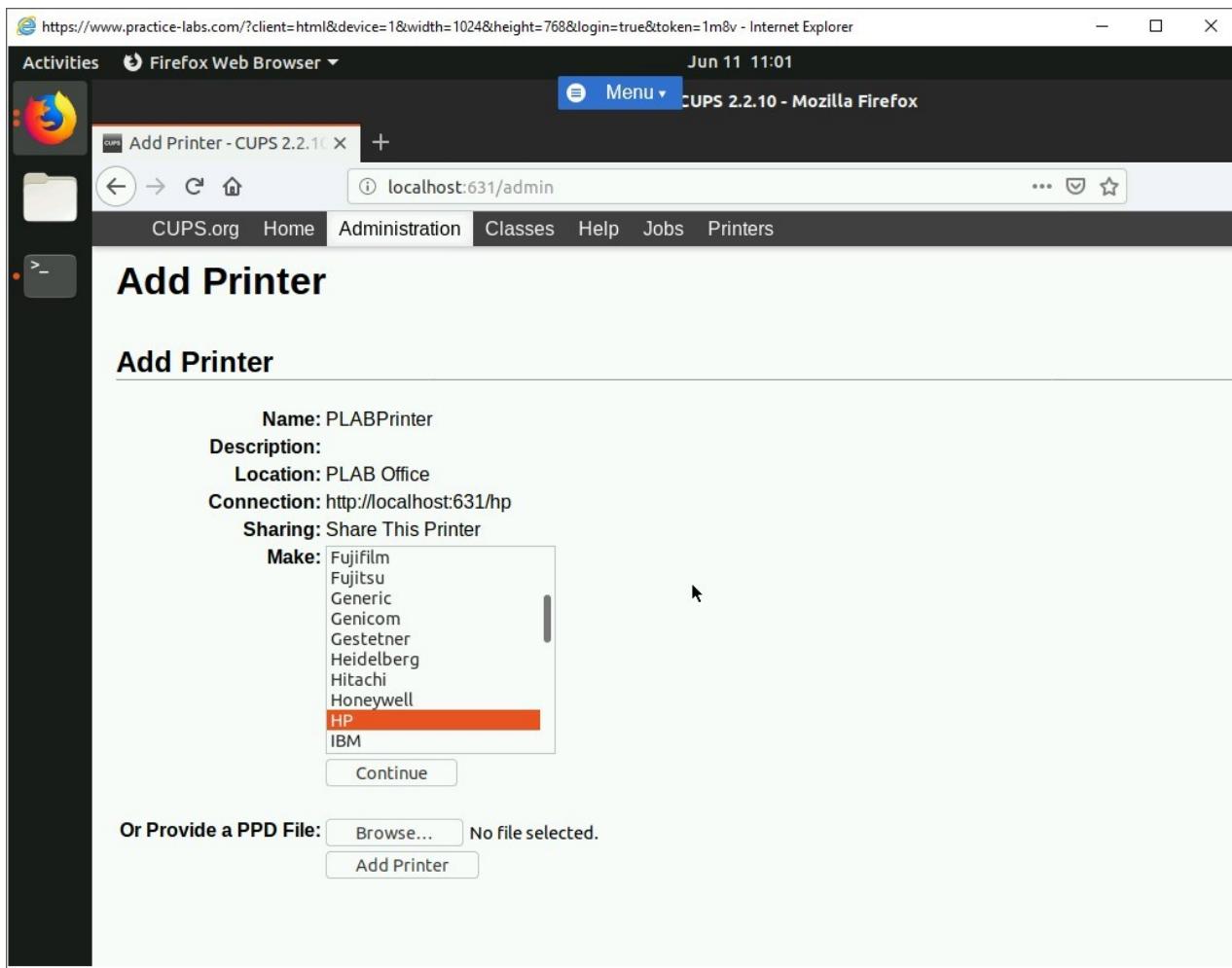


Figure 1.26 Screenshot of PLABLINUX02: Selecting the make of the printer.

Step 27

On the next page, select **HP Business Inkjet 1000** from the **Model** list box. Click **Add Printer**.

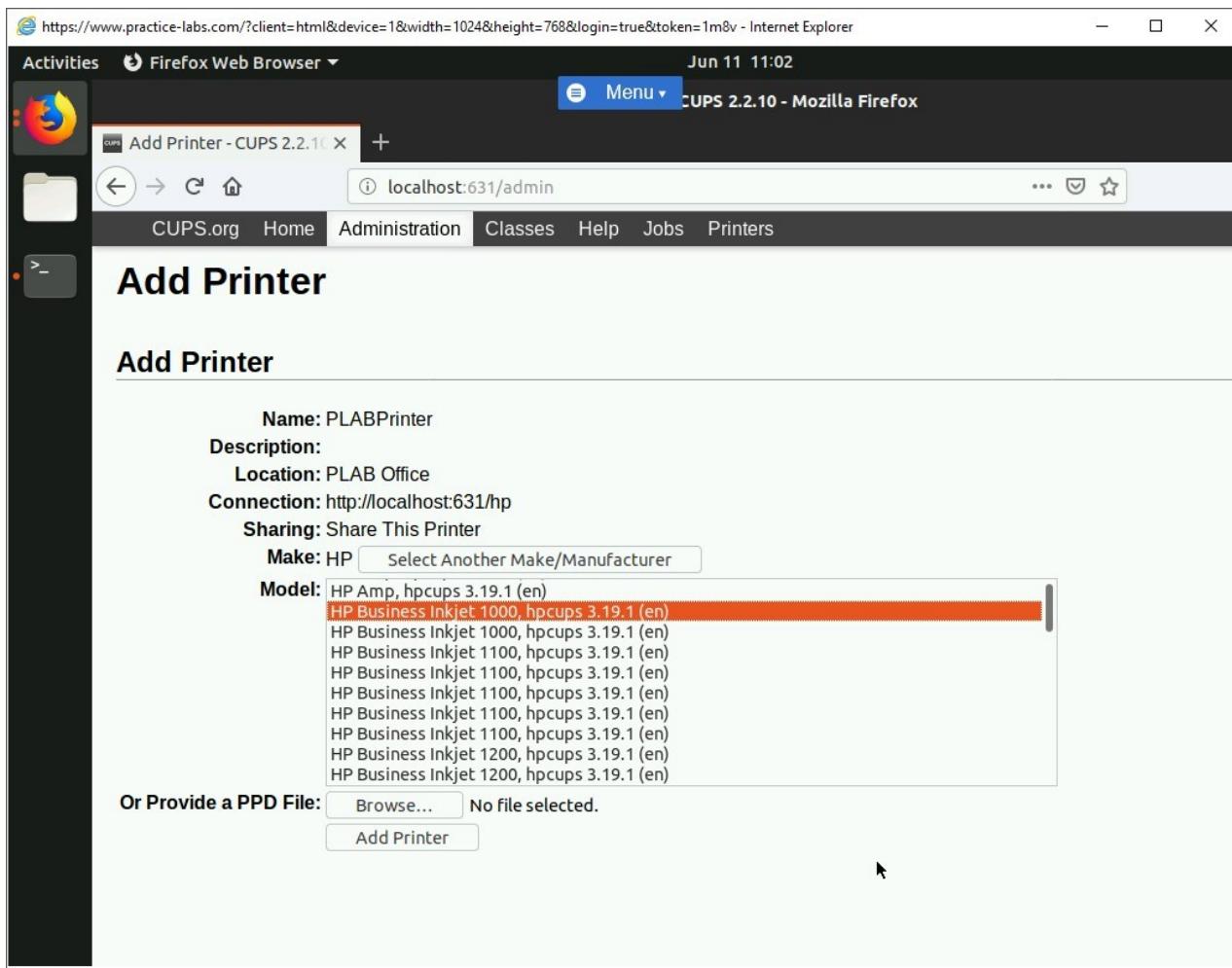


Figure 1.27 Screenshot of PLABLINUXO2: Selecting the printer model.

Step 28

The **Set Default Options for PLABPrinter** page is displayed. Keep the default options and click **Set Default Options**.

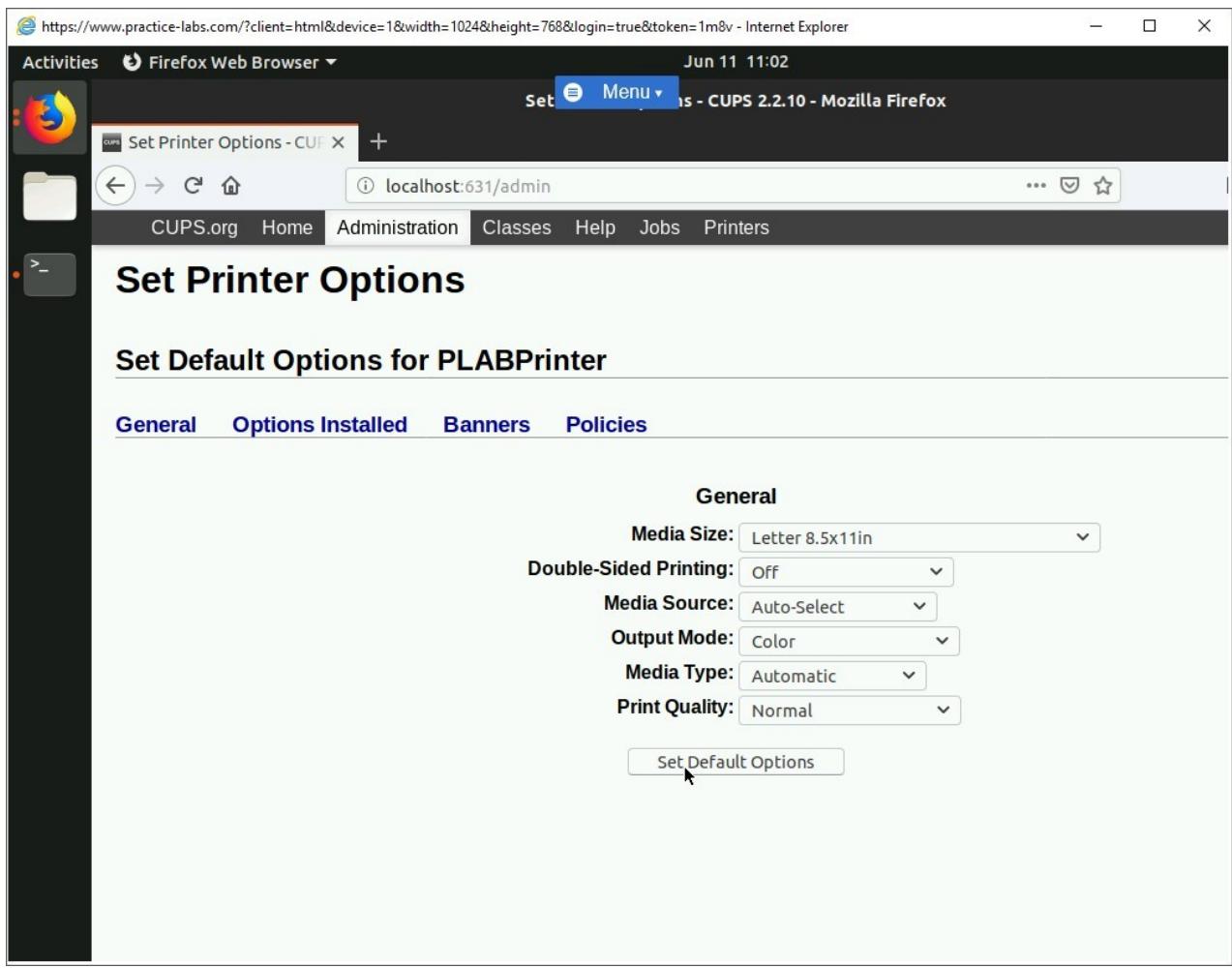


Figure 1.28 Screenshot of PLABLINUX02: Setting the default options for the printer.

Step 29

On the next page, you will receive a success message.

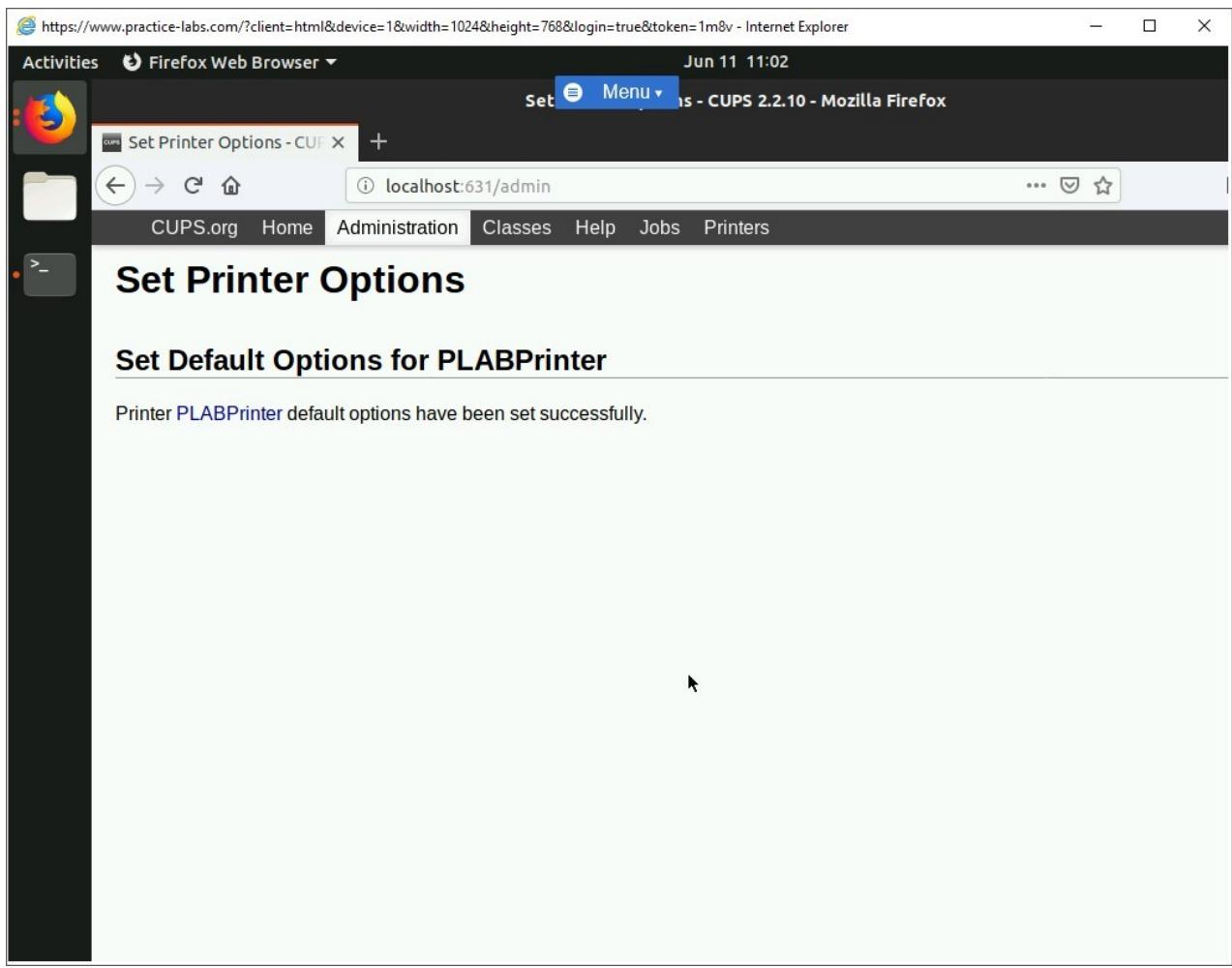


Figure 1.29 Screenshot of PLABLINUX02: Showing the success message of adding the printer.

Step 30

A new page is automatically uploaded. On this page, you can perform maintenance and administration of the printers.

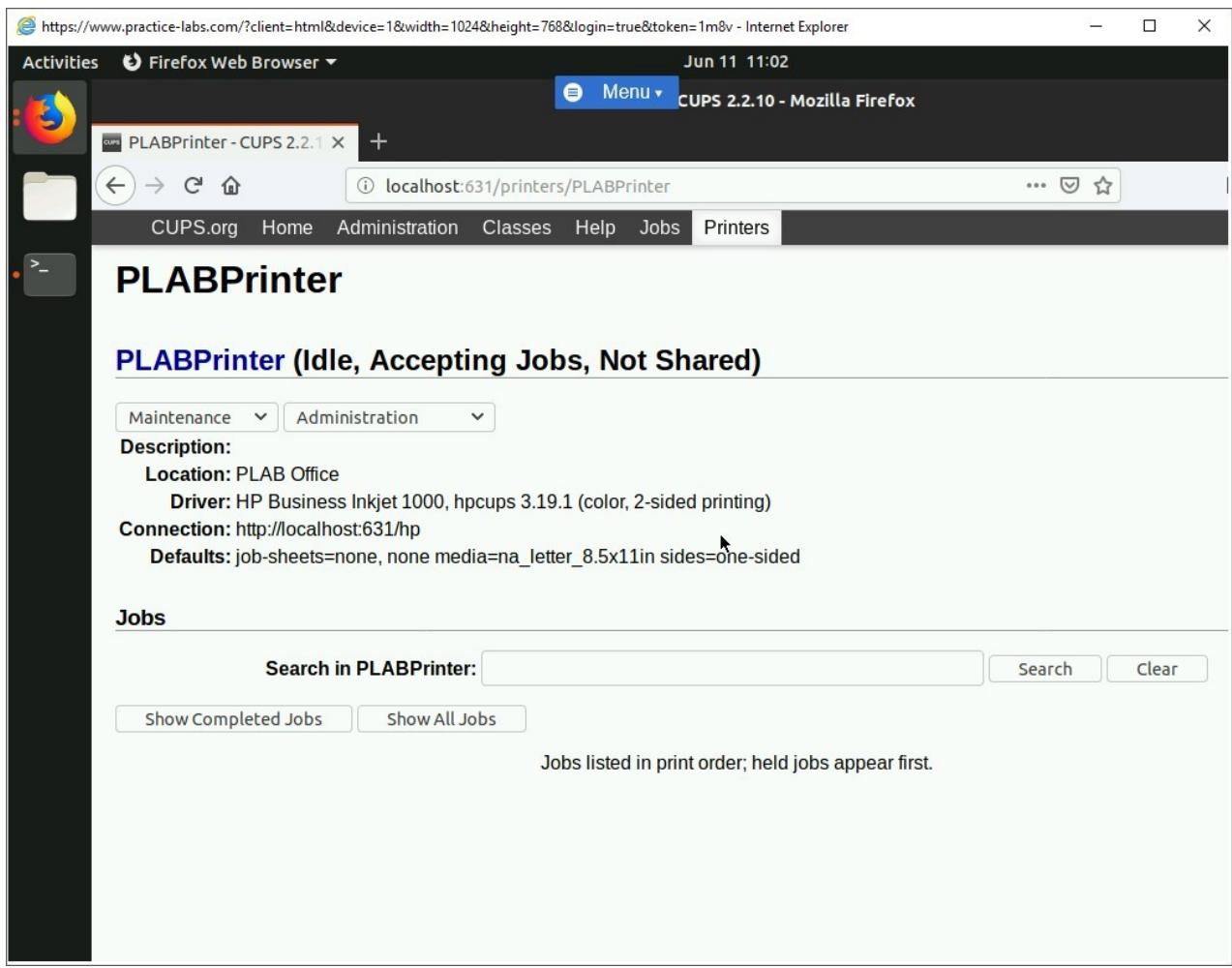


Figure 1.30 Screenshot of PLABLINUX02: Displaying the PLABPrinter maintenance and administration page.

Task 2 - Manage User Print Queues

You can print from the command line or through the graphical interface. Most of the applications provide the print option to the user so that the user can print from within the application.

You can print from the command line using the **lp** command. To manage the user print queues, perform the following steps:

Step 1

Restore the terminal window.

Clear the screen by entering the following command:

```
clear
```

To print a file, such as **/etc/cups/cupsd.conf**, type the following command:

```
lp -d PLABPrinter -o media=legal -o sides=two-sided-long-edge /etc/cups/cupsd.conf
```

Press **Enter**.

Note: The **-d** parameter defines the destination printer, which is **PLABPrinter** for this task. The **-o** parameter sets the printing options, such as paper size. The file that you want to print is mentioned at the end.

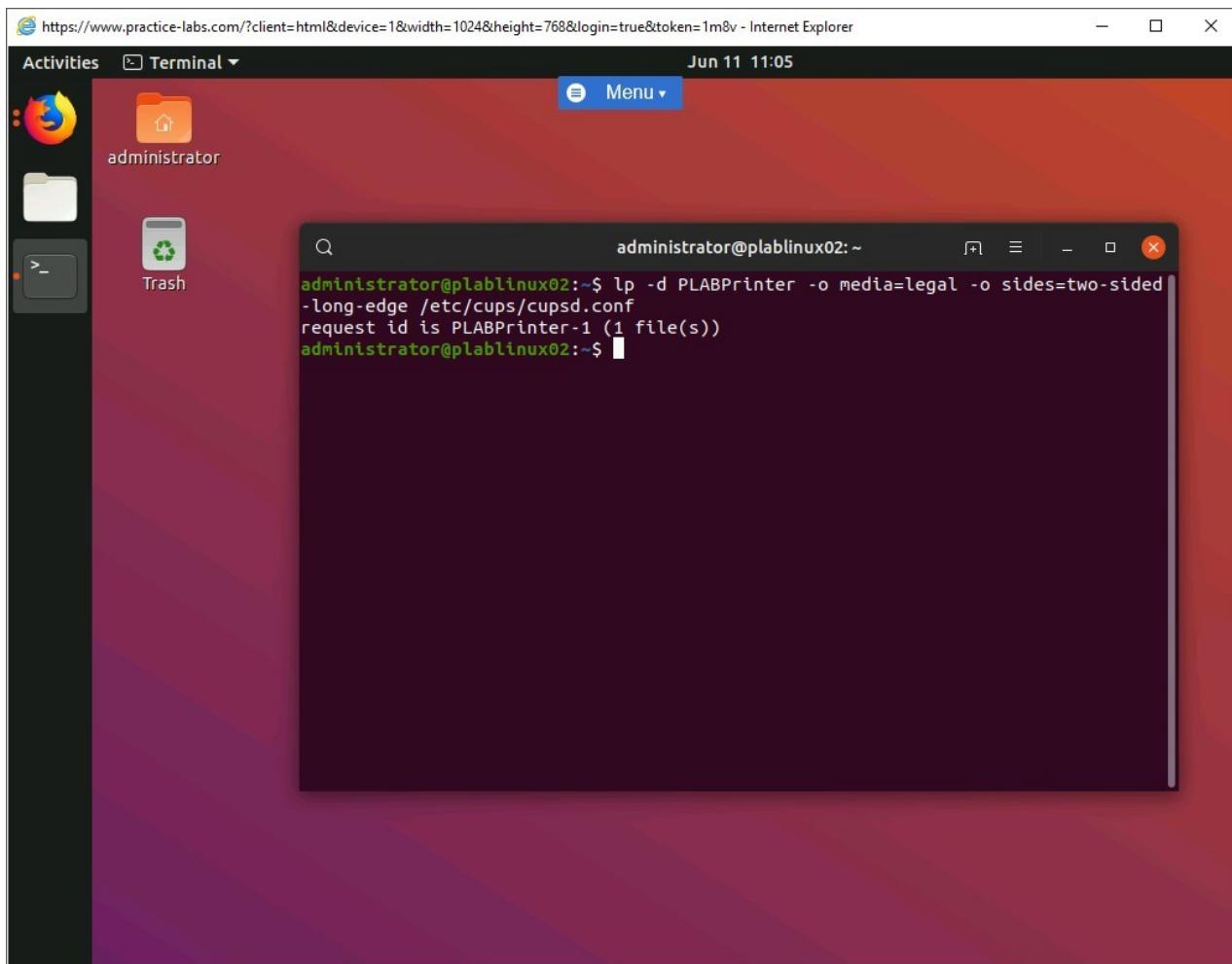


Figure 1.31 Screenshot of PLABLINUX02: Printing a file from the terminal window.

Step 2

Clear the screen by entering the following command:

```
clear
```

To monitor the print queue, type the following command:

```
lpq -P PLABPrinter administrator
```

Press **Enter**.

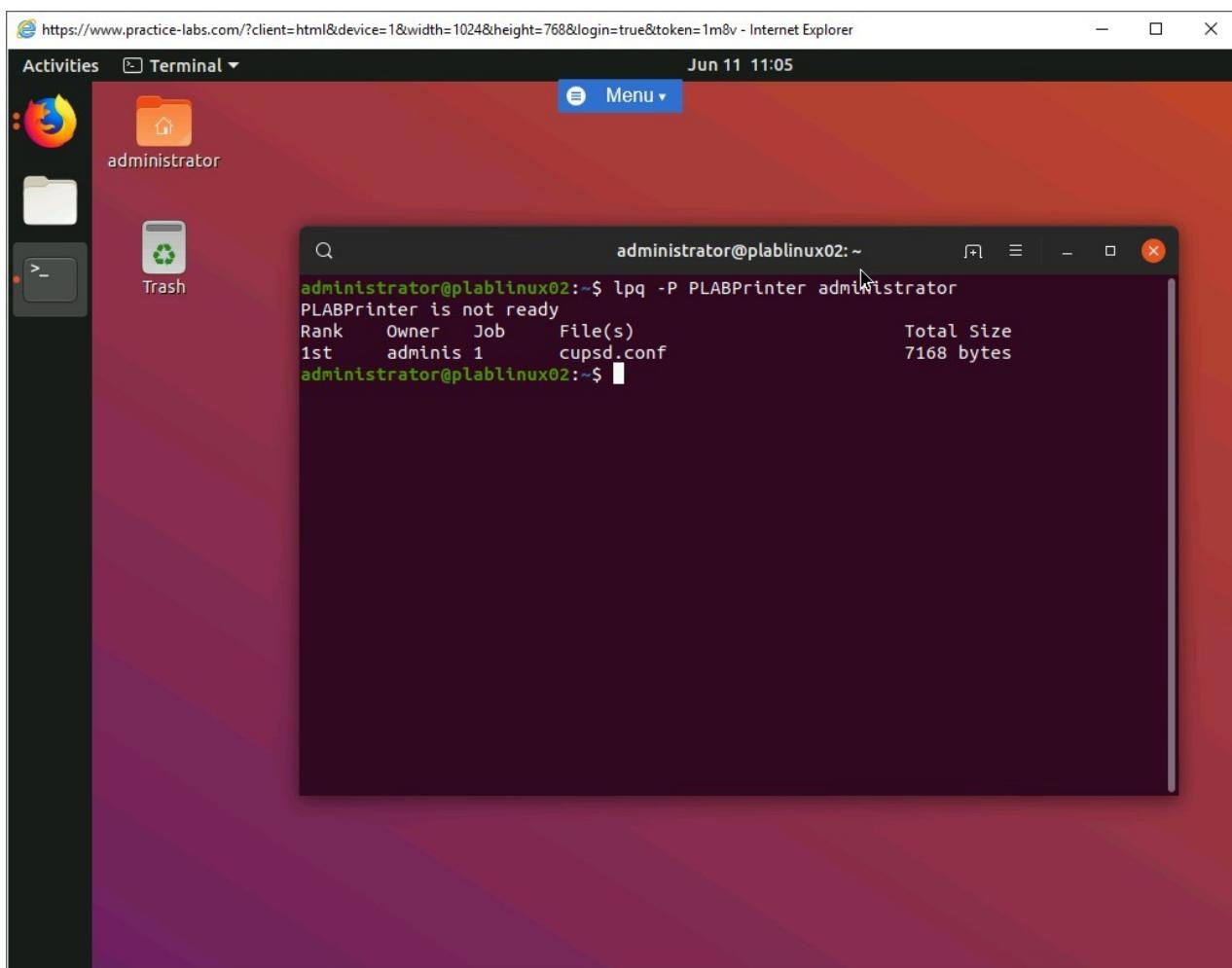


Figure 1.32 Screenshot of PLABLINUX02: Monitoring the print queue.

Step 3

To remove all jobs from a print queue, type the following command:

```
cancel -a PLABPrinter
```

Press **Enter**.

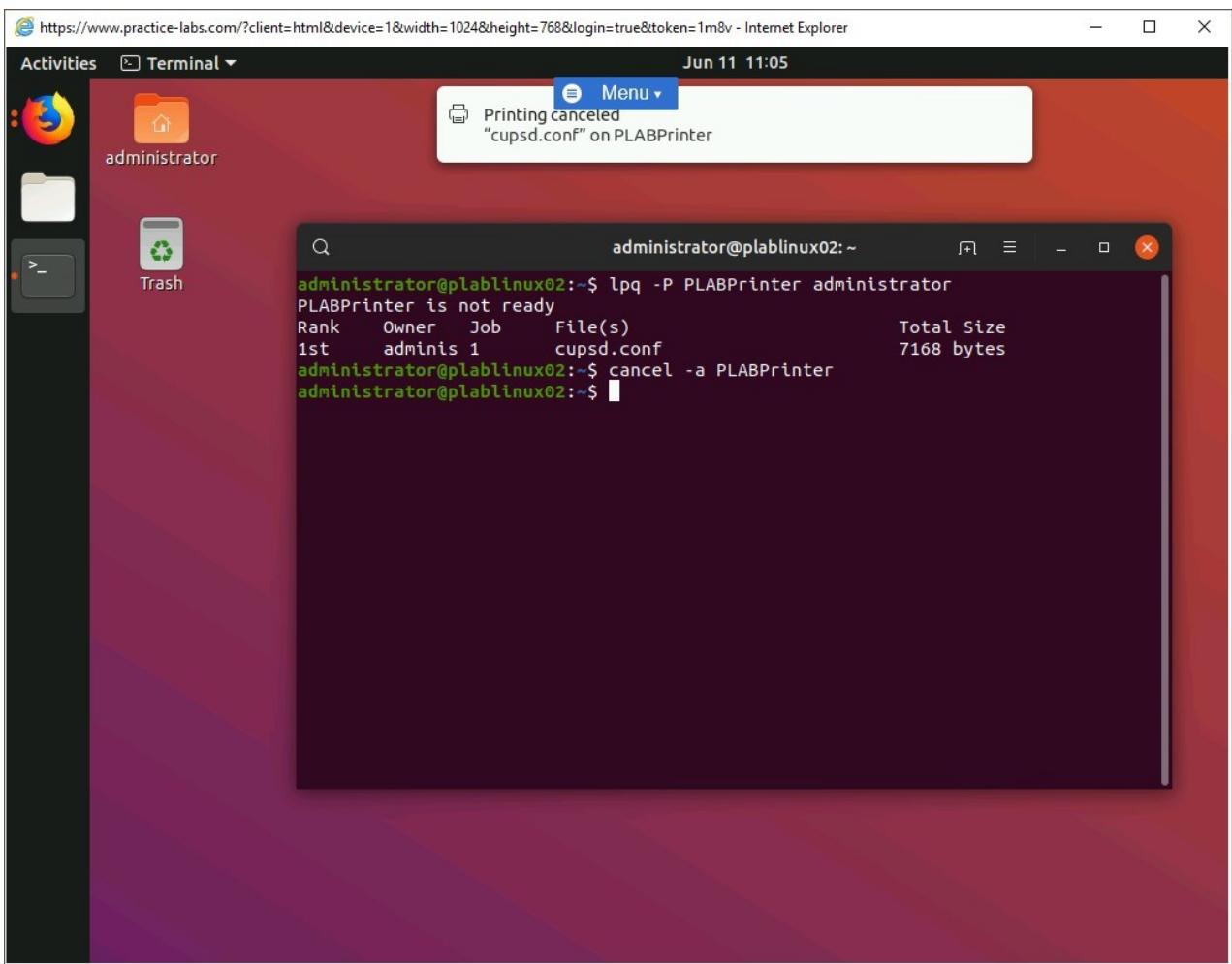


Figure 1.33 Screenshot of PLABLINUX02: Canceling all print jobs.

Step 4

To verify that the jobs have been removed, view the queue.

To view the queue, type the following command:

```
lpq -P PLABPrinter administrator
```

Press **Enter**. Note that all jobs have been removed.

Minimize the terminal window.

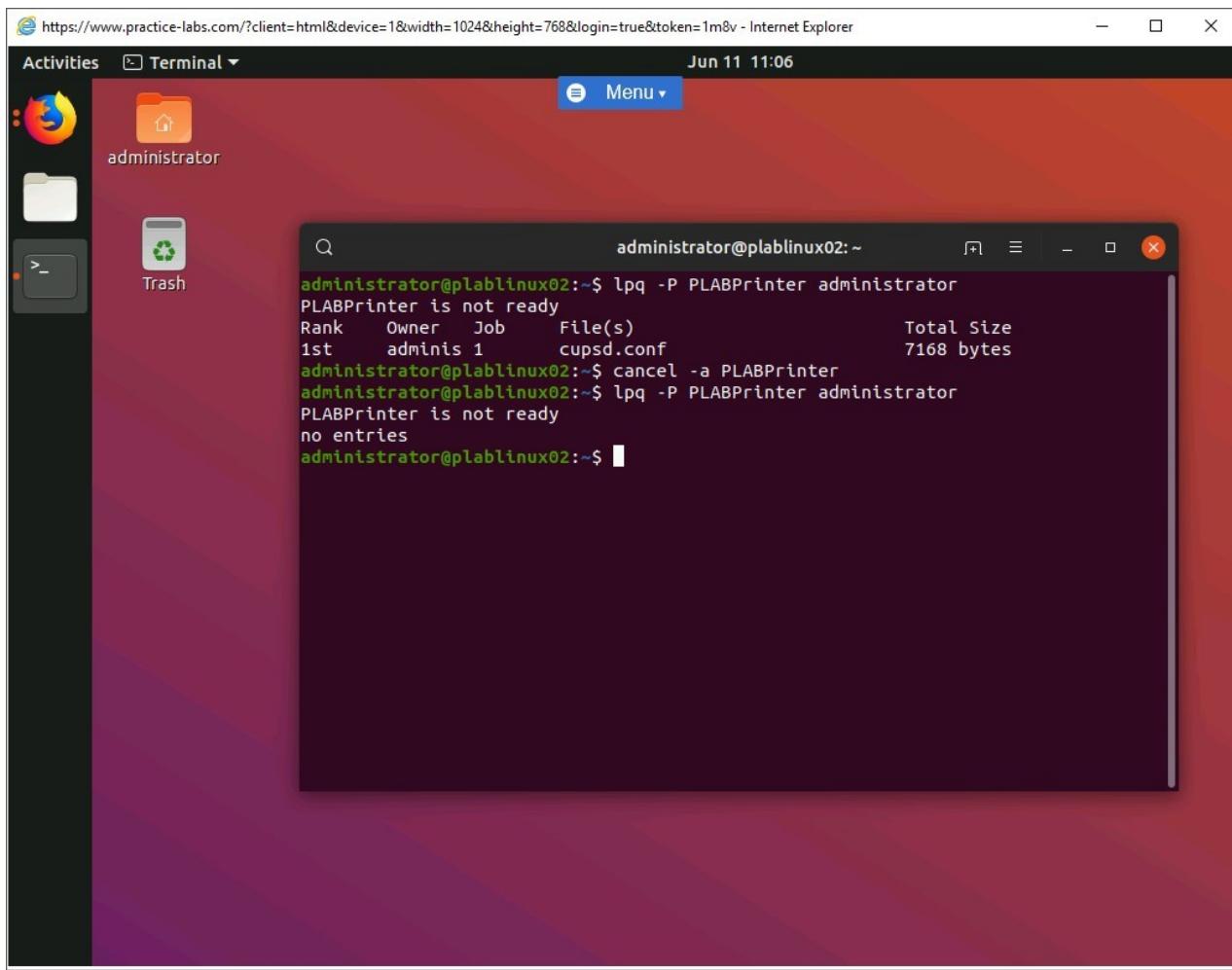


Figure 1.34 Screenshot of PLABLINUX02: Monitoring the print queue.

Step 5

Restore the **Firefox Web Browser** window. Click **Show All Jobs**.

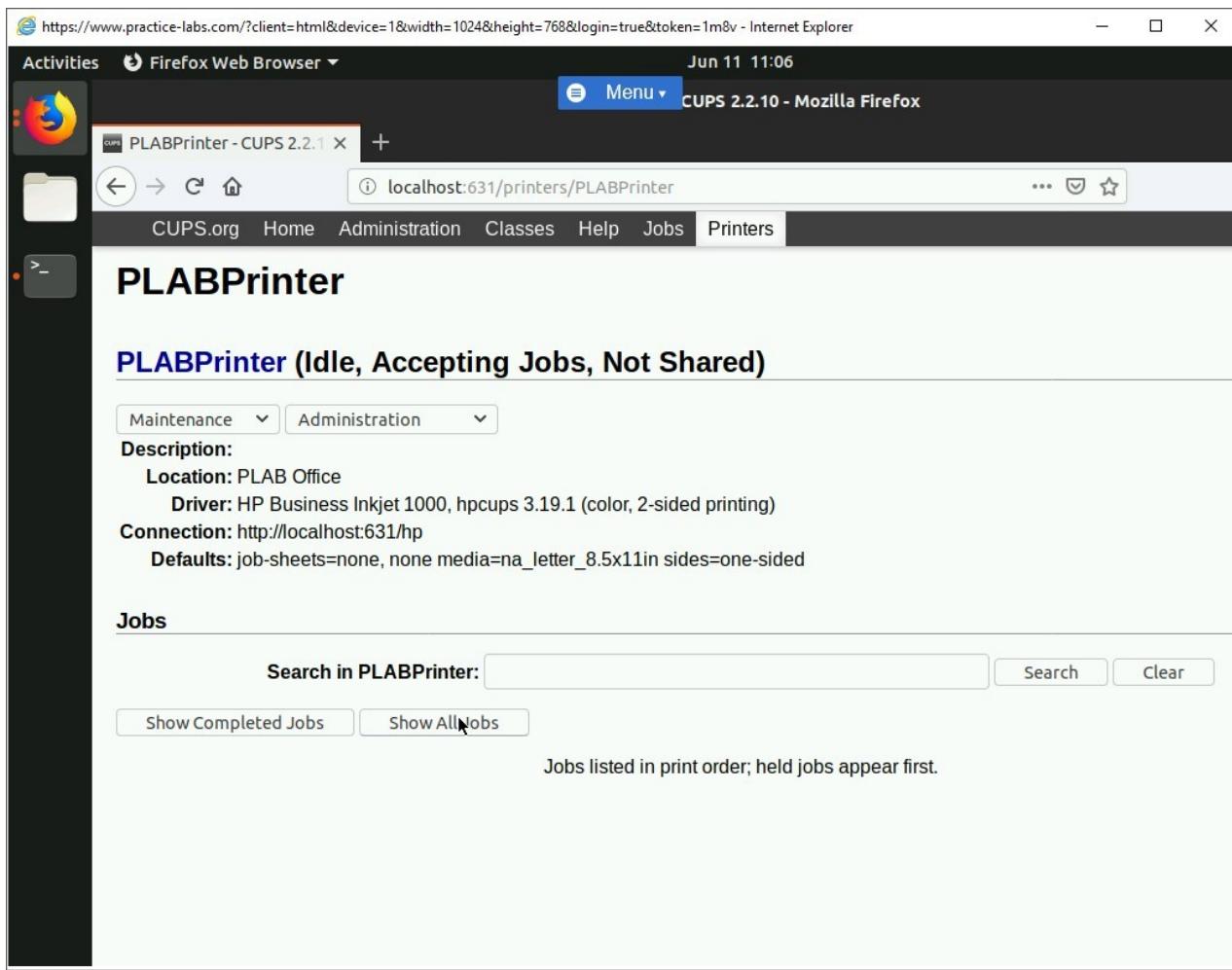


Figure 1.35 Screenshot of PLABLINUXO2: Clicking the Show All Jobs button.

Step 6

A list of jobs appears.

The screenshot shows a Firefox browser window displaying the CUPS 2.2.10 interface for the PLABPrinter. The title bar reads "PLABPrinter - CUPS 2.2.1 X". The main content area shows the printer's configuration:

- Description:**
 - Location:** PLAB Office
 - Driver:** HP Business Inkjet 1000, hpcups 3.19.1 (color, 2-sided printing)
 - Connection:** http://localhost:631/hp
 - Defaults:** job-sheets=none, none media=na_letter_8.5x11in sides=one-sided
- Jobs**
 - Search bar: Search in PLABPrinter: []
 - Buttons: Show Active Jobs, Show Completed Jobs
 - Text: Jobs listed in descending order.
 - Table:

ID	Name	User	Size	Pages	State	Control
PLABPrinter-1	Unknown	Withheld	7k	1	canceled at Tue 11 Jun 2019 11:05:50 AM EDT "The printer configuration is incorrect or the printer no longer exists."	Reprint

Figure 1.36 Screenshot of PLABLINUX02: Displaying the list of jobs.

Step 7

From the **Maintenance** drop-down, **Cancel All Jobs**.

Note that there are various options available in the drop-down. You can choose to perform the following tasks:

- Print Test Page
- Pause Printer
- Reject Jobs
- Move All Jobs
- Cancel All Jobs

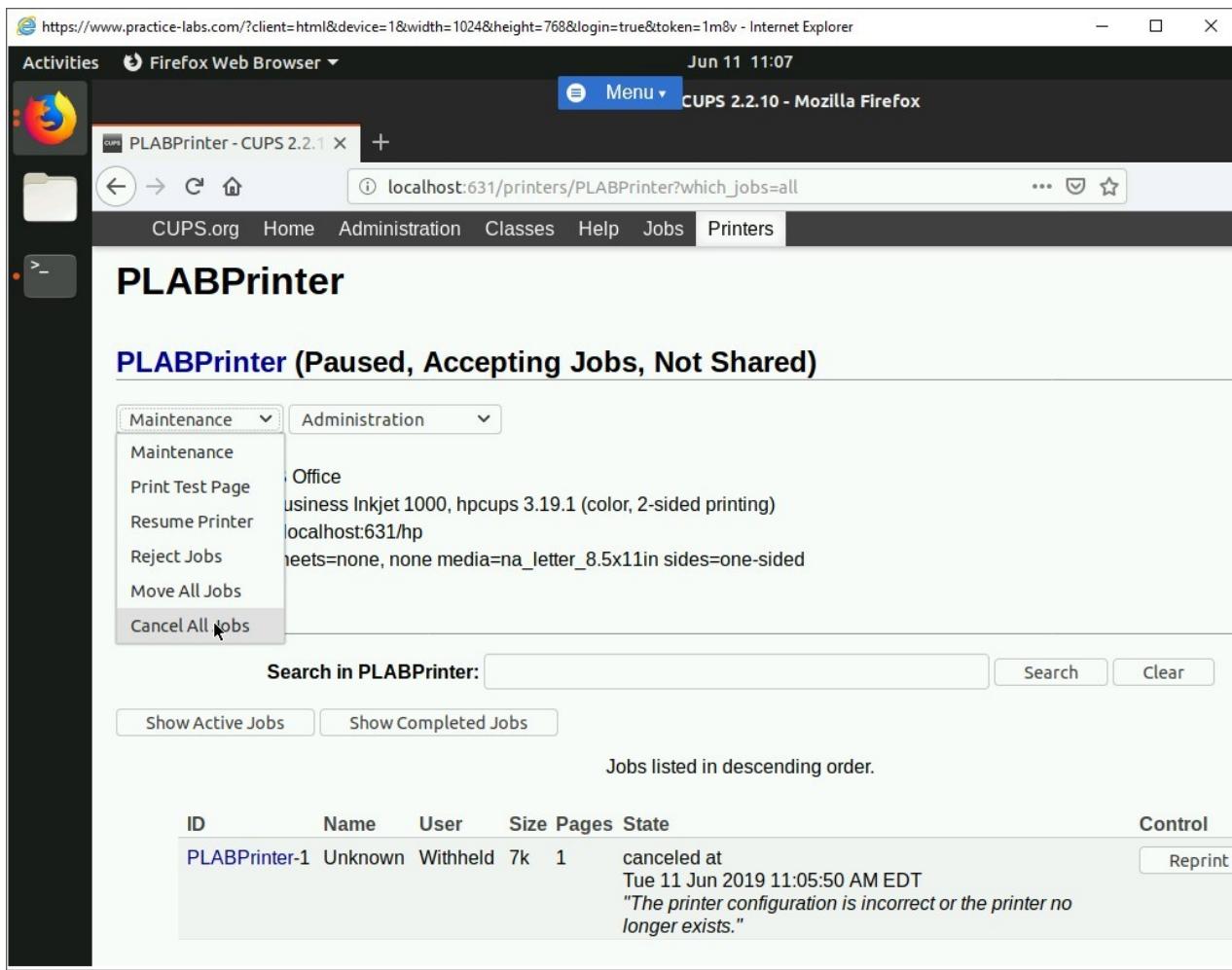


Figure 1.37 Screenshot of PLABLINUXO2: Selecting the Cancel All Jobs option.

Step 8

Notice all the jobs on **PLABPrinter** have been purged.

Minimize the **Firefox Web Browser** window.

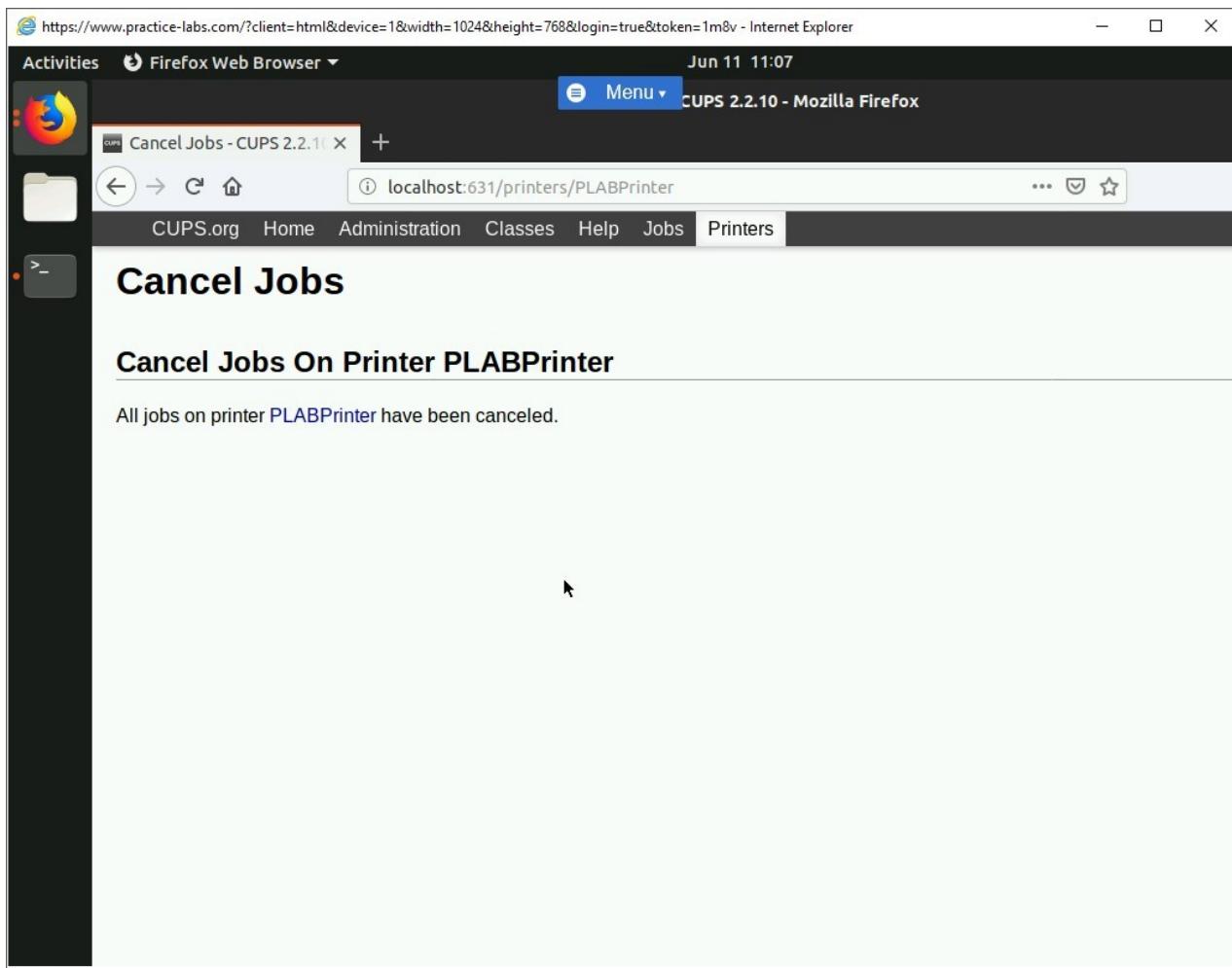


Figure 1.38 Screenshot of PLABLINUX02: Displaying the page after purging all jobs.

Task 3 - Troubleshoot General Printing Problems

There might be instances when you will need to troubleshoot a printer. You can troubleshoot from the command line as well as from the Web interface. Scheduler lists warnings and errors in the **/var/log/cups/error_log** file.

To troubleshoot general printing problems, perform the following steps:

Step 1

Restore the terminal window. Clear the screen by entering the following command:

```
clear
```

Ensure that you have logged in as administrator. To view the **/var/log/cups/error_log** file, type the following command:

```
cat /var/log/cups/error_log
```

Press **Enter**.

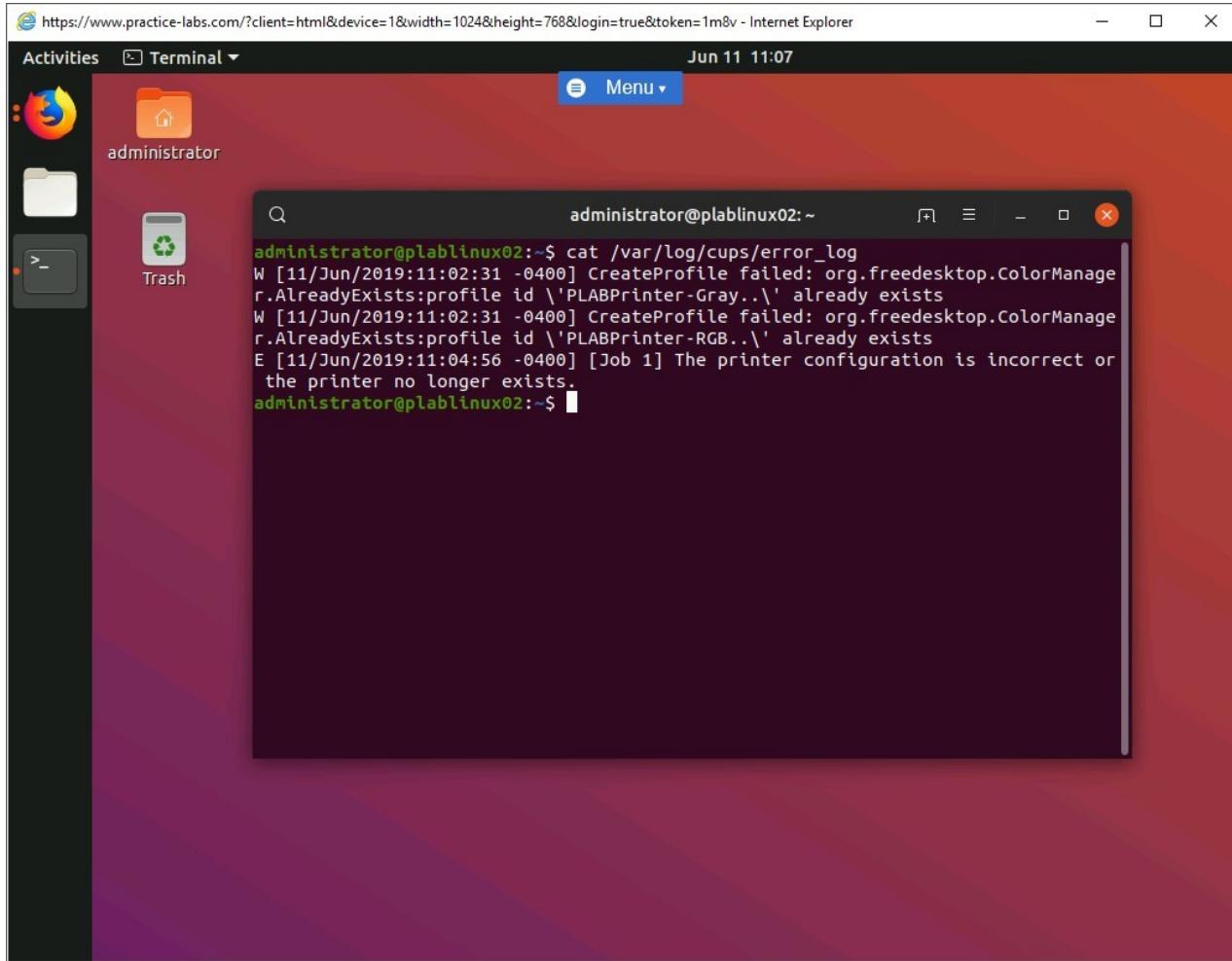


Figure 1.39 Screenshot of PLABLINUX02: Viewing the /var/log/cups/error_log file.

Step 2

You can also view the **/var/log/cups/access_log**. It contains the information on each HTTP resource that has been accessed by a Web Browser or client.

To view the **/var/log/cups/access_log** file type the following command:

```
cat /var/log/cups/access_log
```

Press **Enter**.

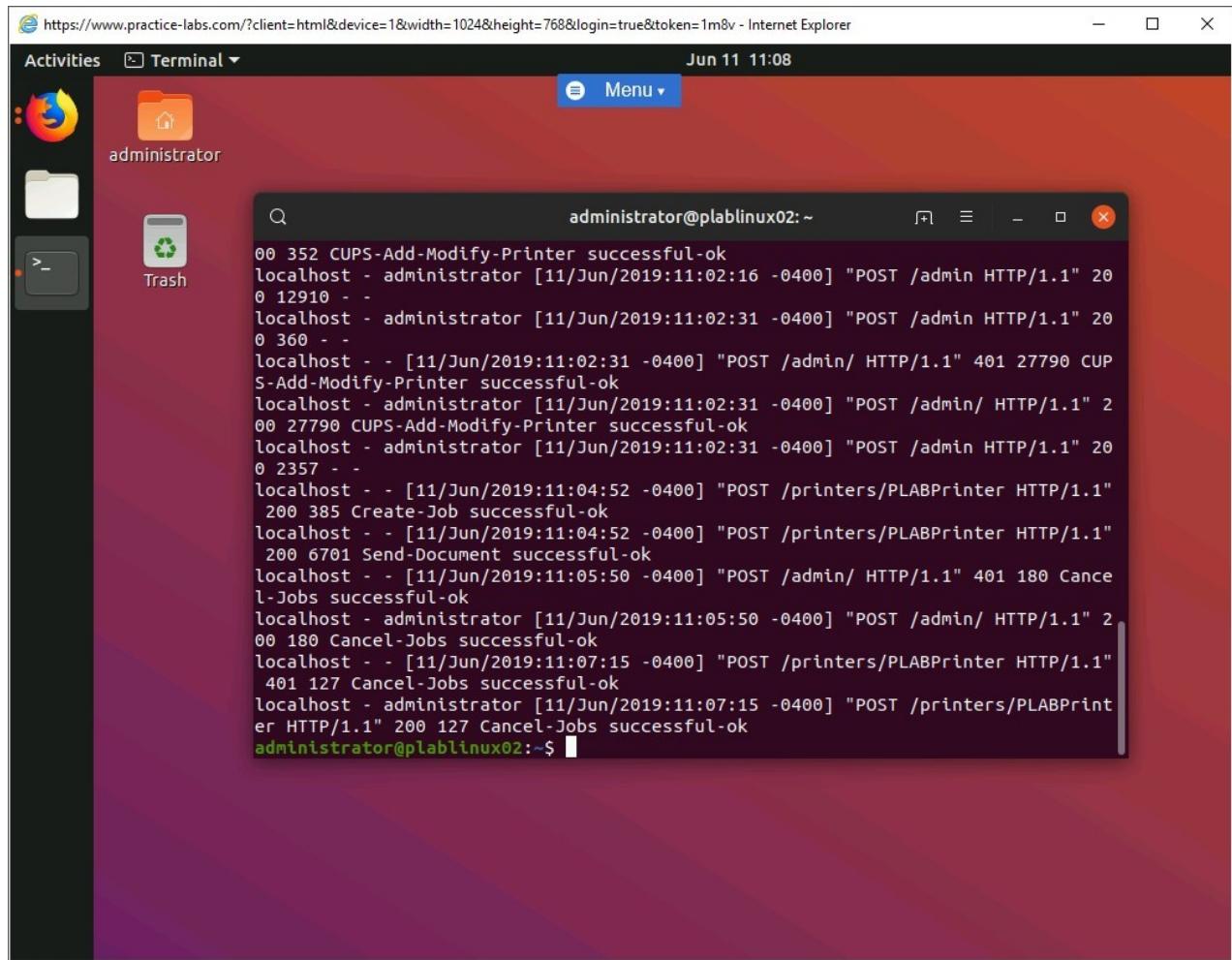


Figure 1.40 Screenshot of PLABLINUX02: view the /var/log/cups/access_log file.

Keep all devices in their current state and proceed to the next exercise.

Review

Well done, you have completed the **Manage Printers and Printing** Practice Lab.

Summary

You completed the following exercise:

- Exercise 1 - Manage Printers and Printing

You should now be able to:

- Perform basic CUPS configuration (for local and remote printers)
- Manage user print queues
- Troubleshoot general printing problems

Feedback

Shutdown all virtual machines used in this lab. Alternatively, you can log out of the lab platform.