How to Hack Your Own Linux System

Ravi Saive | Last Updated: July 24, 2024 | Read Time: 5 mins | Open Source | 61 Comments

Passwords are the primary criterion for system security in most systems. When it comes to Linux, knowing the root password gives you complete control over the machine. Passwords serve as a security measure for BIOS, login, disk, applications, and more.

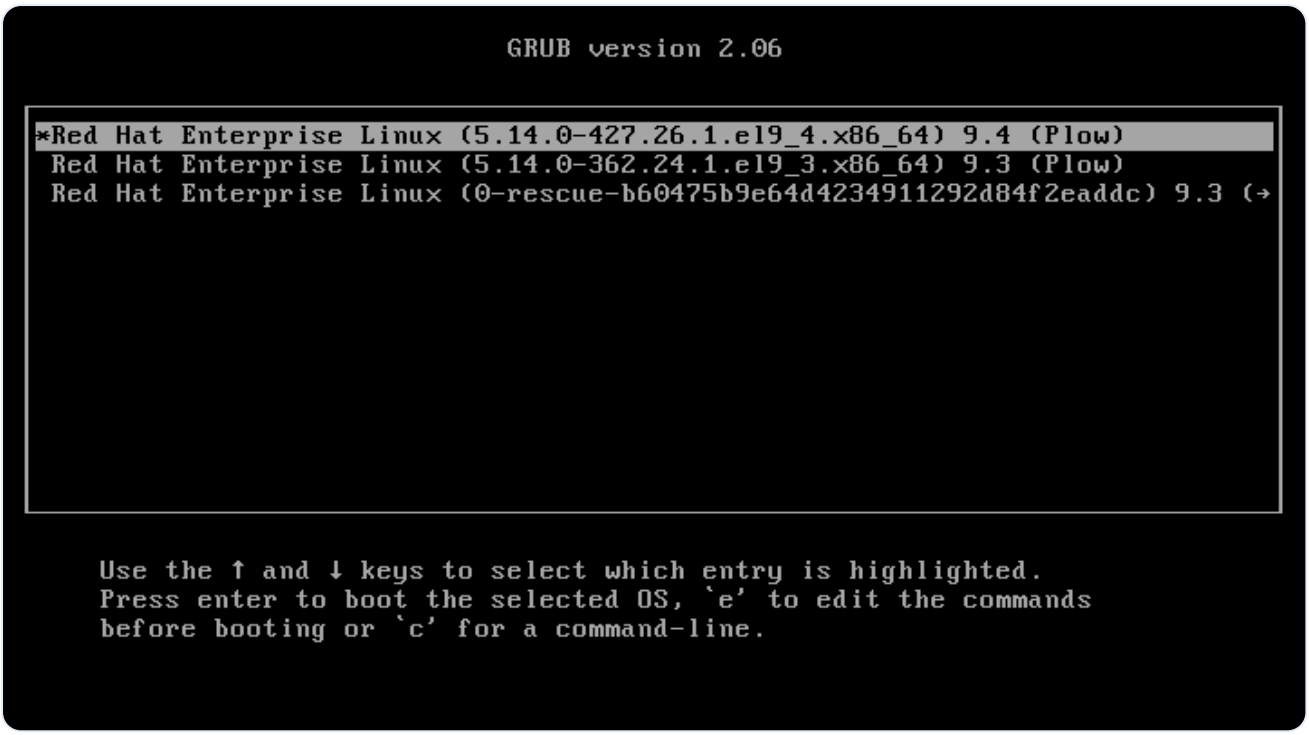
Linux is considered to be one of the most secure operating systems against hacking or cracking, and it generally is. However, we will discuss some of the vulnerabilities and exploits of a Linux system.

We will be using RHEL Linux throughout the article as an example to test and crack our own machine's security.

> **Disclaimer**: The information provided here is for educational purposes only. Unauthorized access to computer systems is illegal and unethical. Always ensure you have permission to conduct any security testing on systems.

How to Access Linux Server Without Root Access

When the Linux machine starts, press any key to interrupt the boot process, and you will see the GRUB menu.

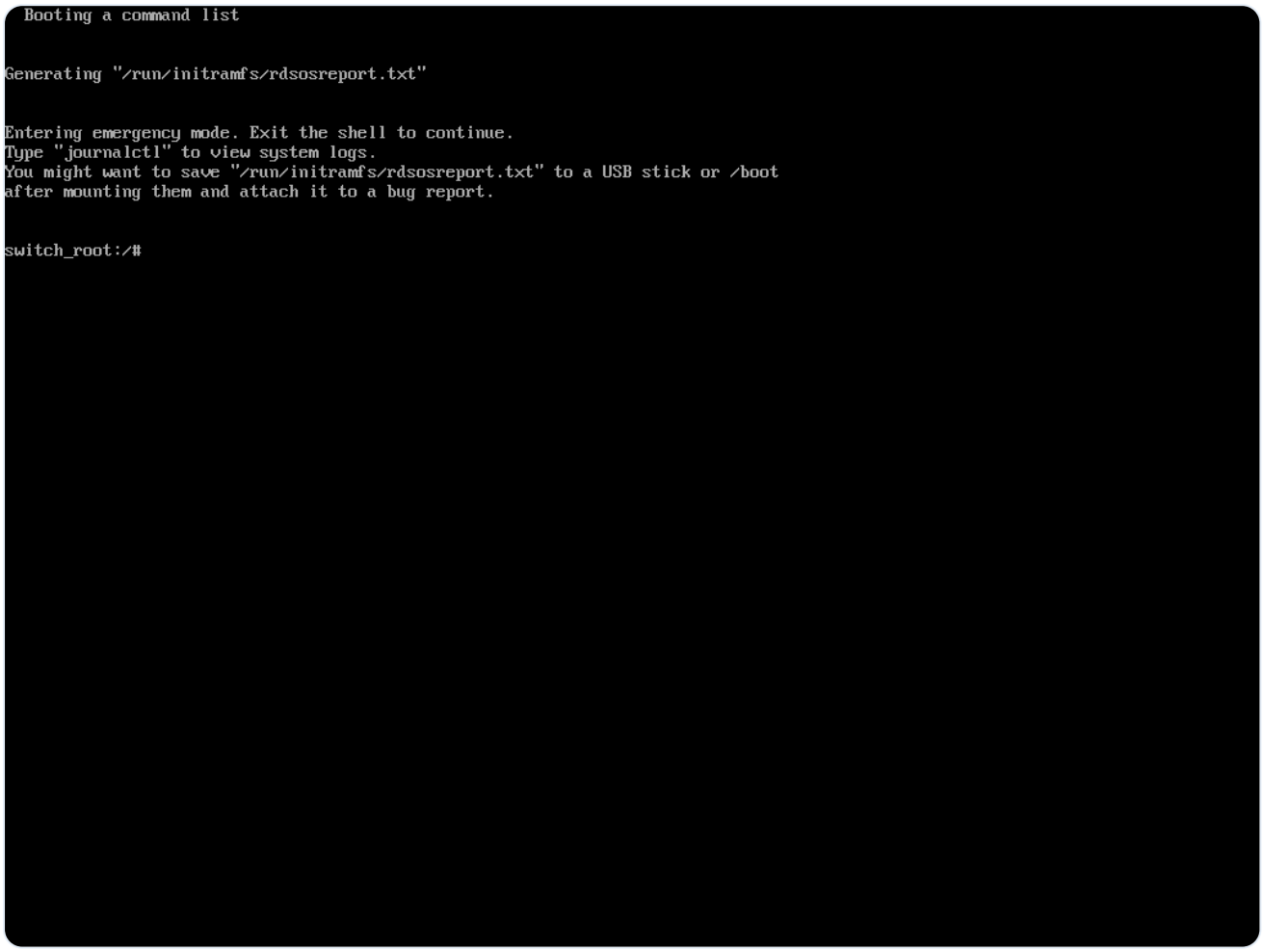


RHEL Linux Grub Menu

Press 'e' to edit and go to the line starting with kernel and add '`rd.break`' at the end of the line (after the blank space) forcing it to start in emergency user mode and thus prohibiting it from entering the default run-level.

Enable Single User Mode

After adding '`rd.break`' at the end of the line, press `Ctrl+X` or `F10` to boot with the modified kernel options into emergency user mode.



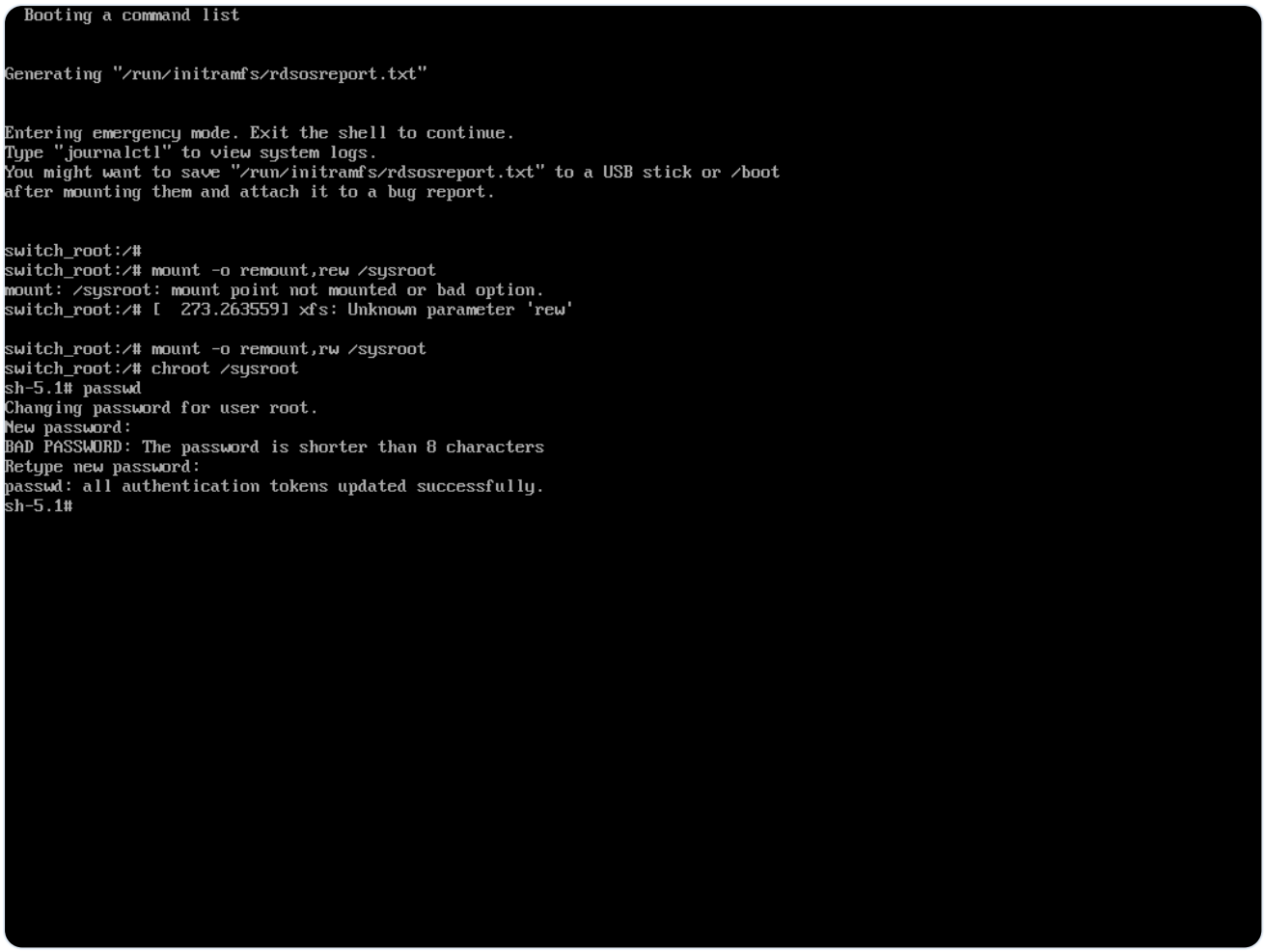
Emergency User Mode

Once in emergency user mode, you'll be dropped to a root shell prompt, where you need to remount the root filesystem in read-write mode and change into the sysroot environment.

```
mount -o remount,rw /sysroot
chroot /sysroot
```

Next, use the **passwd** command to reset and confirm the root password with the new one.

```
passwd
```



Reset Root Password

If the above '**passwd**' command doesn't work for you and you don't get any output, it means that your **SELinux** is in enforcing mode. You need to disable it first before proceeding further.

```
setenforce 0
```

Then run the '**passwd**' command to change the **root password**.

```
passwd
```

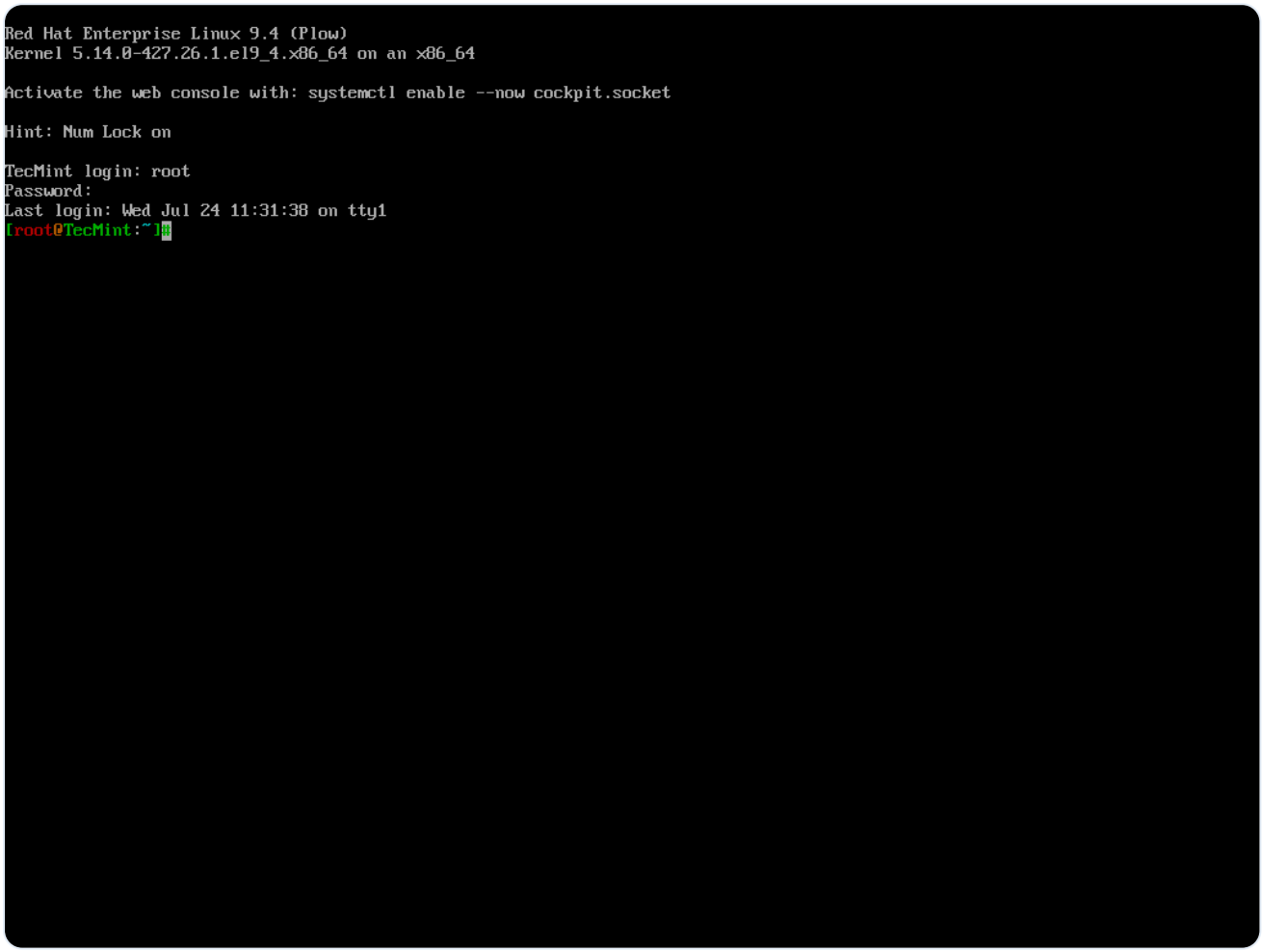
At this point, you have successfully reset your root user password. The only remaining part is to relabel all of the files with the accurate SELinux contexts.

```
touch /.autorelabel
```

Finally, type **exit** and then log out to start the **SELinux** relabelling process.

```
exit
```

This generally takes a few minutes and once done, the system will reboot and prompt you to log in as the root user with the new password.



RHEL Root Login

Hacking a **Linux box** was surprisingly easy, wasn't it? Imagine the panic if someone did this to your server. Now, let's learn how to protect our **Linux machine** from unauthorized modifications using single-user mode.

Password Protect Single User Mode in Linux

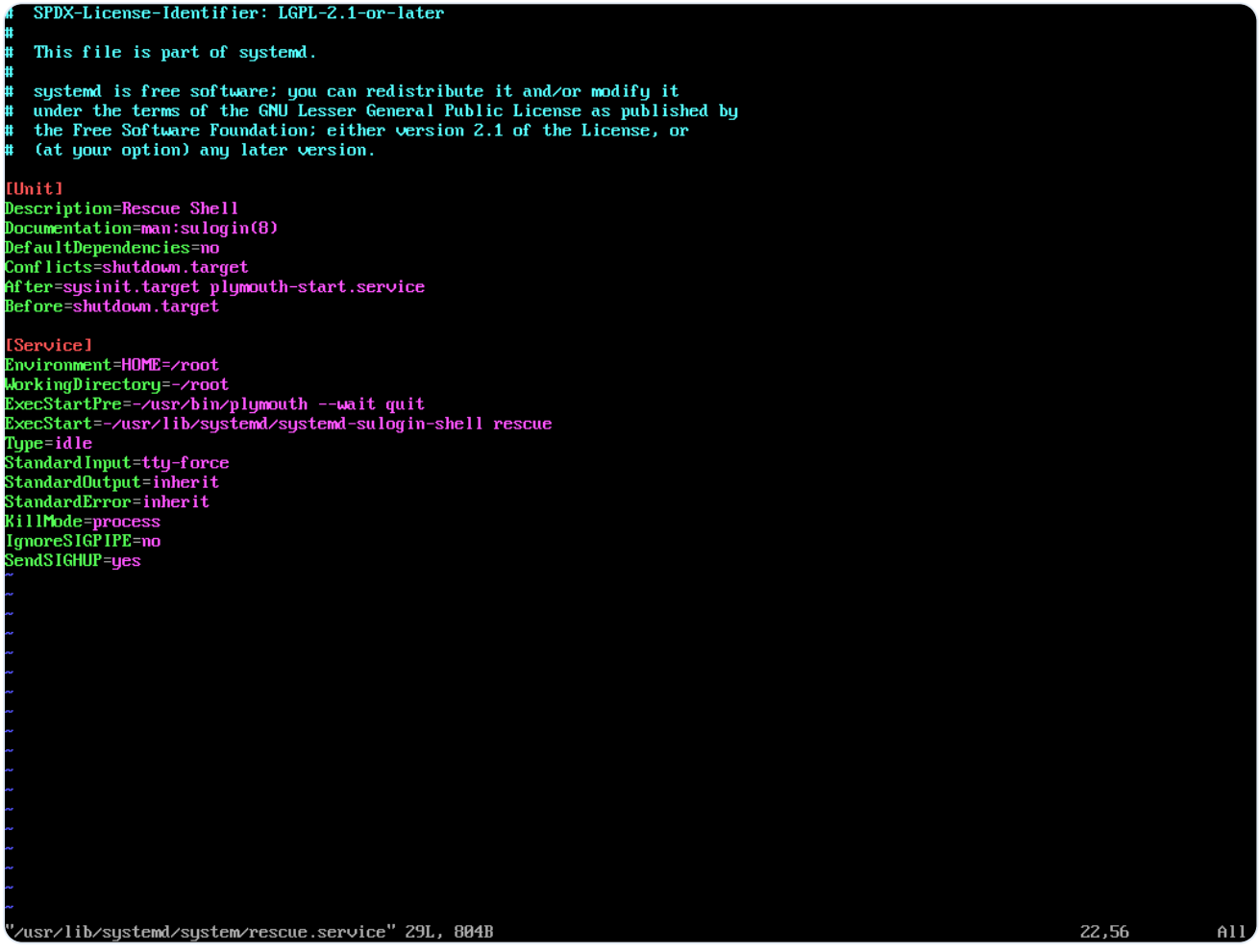
To password-protect **Single User Mode**, specific configurations need to be made to ensure that unauthorized access is prevented, which is particularly important for maintaining system security, as **Single User Mode** can provide unrestricted access to the root account.

To enforce password protection in **Single User Mode**, you need to modify the `rescue.service` file.

```
sudo vi /usr/lib/systemd/system/rescue.service
```

Look for the line that starts with `ExecStart`. If it does not include the `sulogin` command, you will need to add or modify it to look like this.

```
ExecStart=-/usr/lib/systemd/systemd-sulogin-shell rescue
```

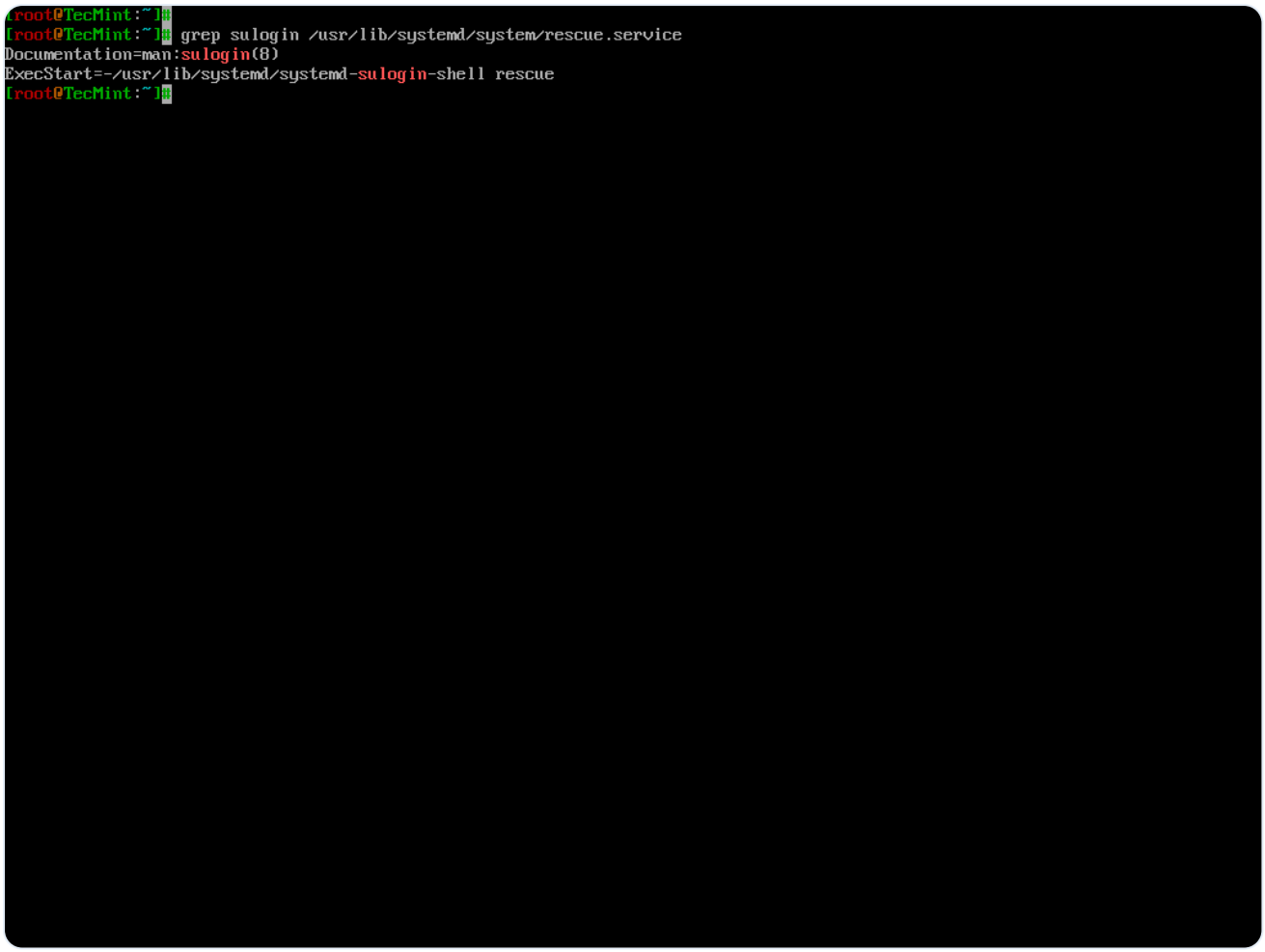


Password Protect Single User Mode

After making changes, it is essential to verify that the configuration is correctly set.

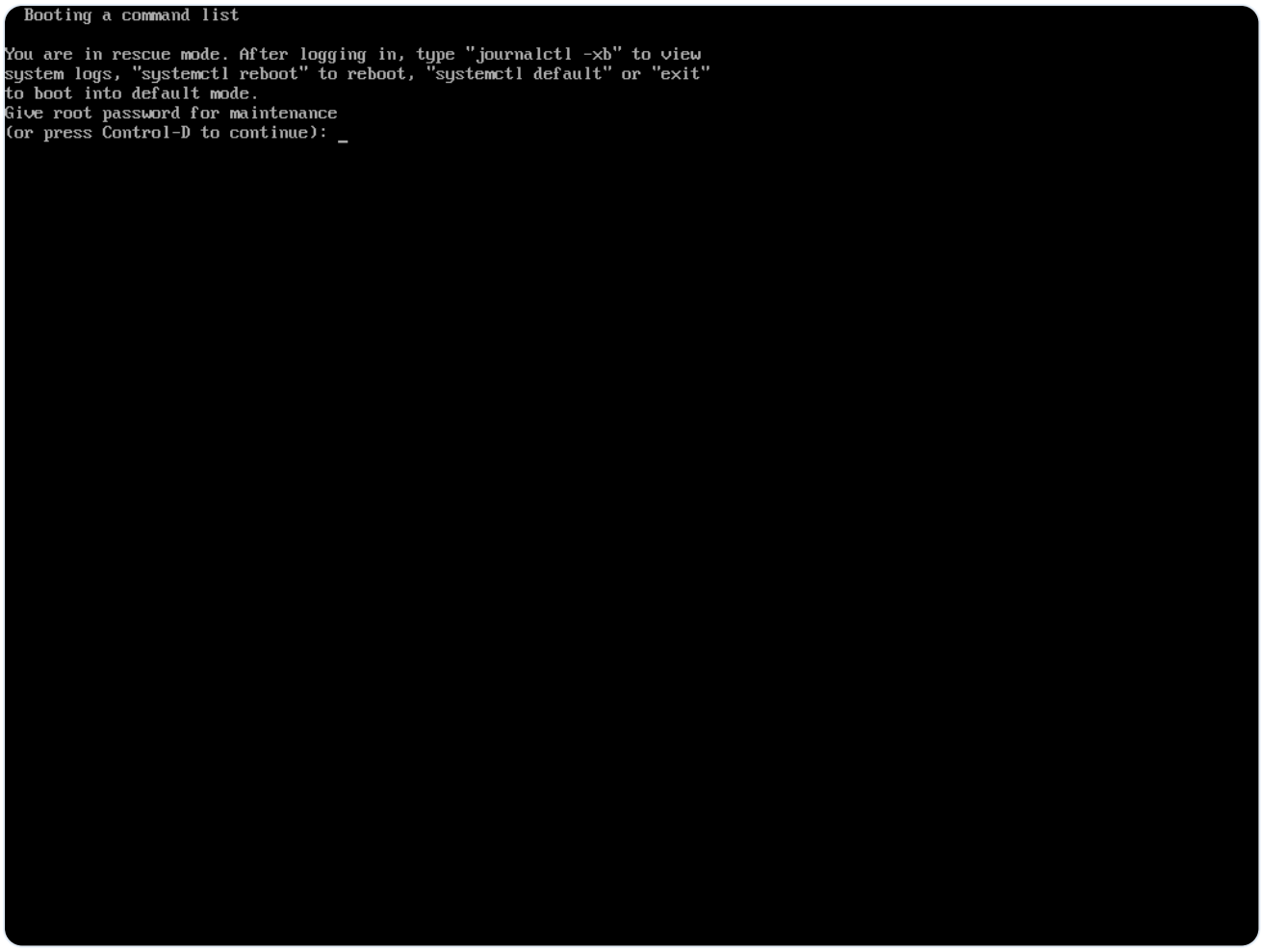
```
grep sulogin /usr/lib/systemd/system/rescue.service
```

The output should confirm that the `sulogin` command is present in the `ExecStart` line.



Confirm sulogin Command

Once the configuration is complete, **reboot** the system to apply the changes. After rebooting, attempt to enter **Single User Mode** to confirm that the password prompt appears.



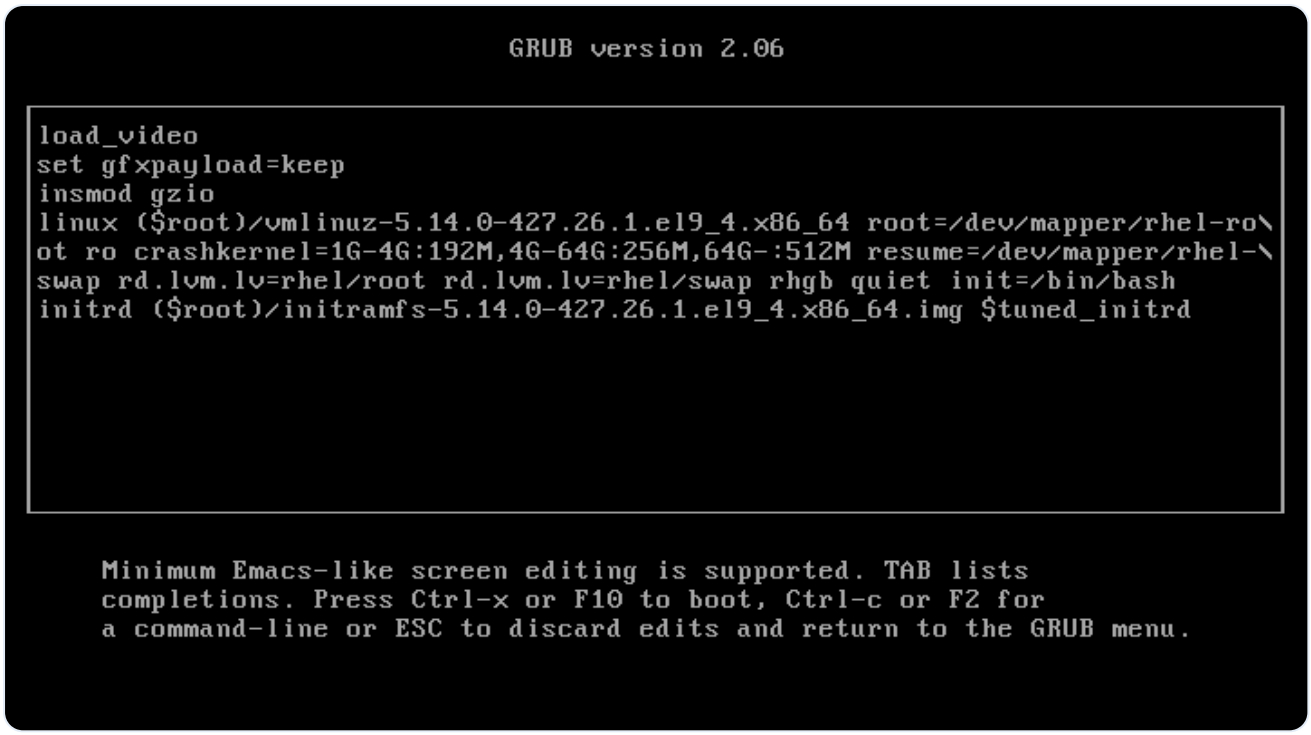
Single User Mode Password

Hack Your Linux System Without Using Single User Mode

OK, so you might be feeling better knowing your system is secure. However, this is only partially true. While it's true that your Linux box can't be easily compromised using single-user mode, there are other ways it can still be hacked.

In the previous step, we modified the kernel to enter single-user mode. This time, we'll be editing the kernel with a different parameter.

In the previous process, we added the parameter `1` to the kernel to enter single-user mode, but this time, we will add `init=/bin/bash` to boot into bash prompt directly.

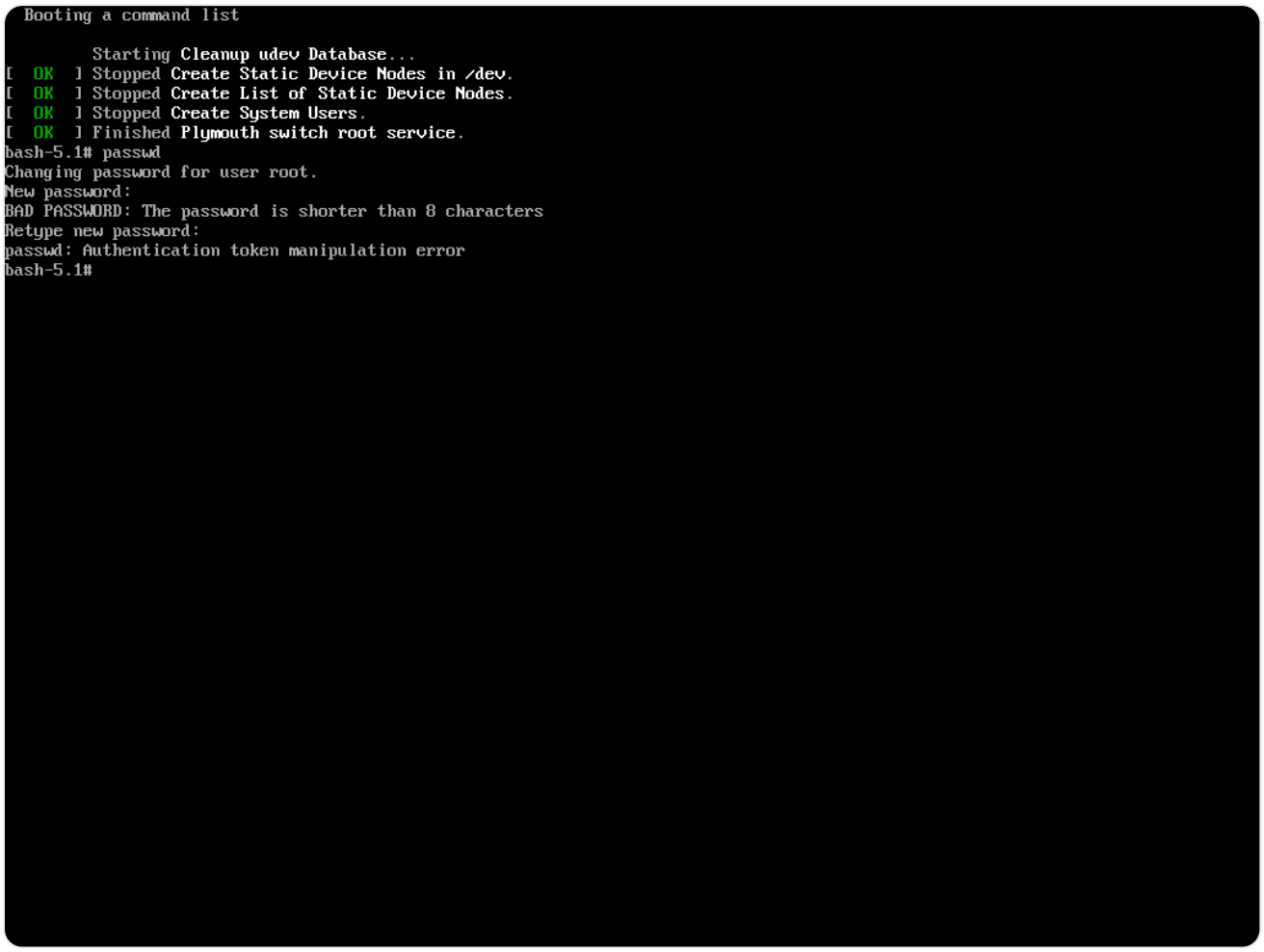


Boot Into Bash Shell

Once again, you've gained access to your system, the prompt confirms that the hack was successful.

Bash Shell Prompt

Now, when trying to change the root password using the same process as in the first method with the ‘**passwd**‘ command, we encountered the following.

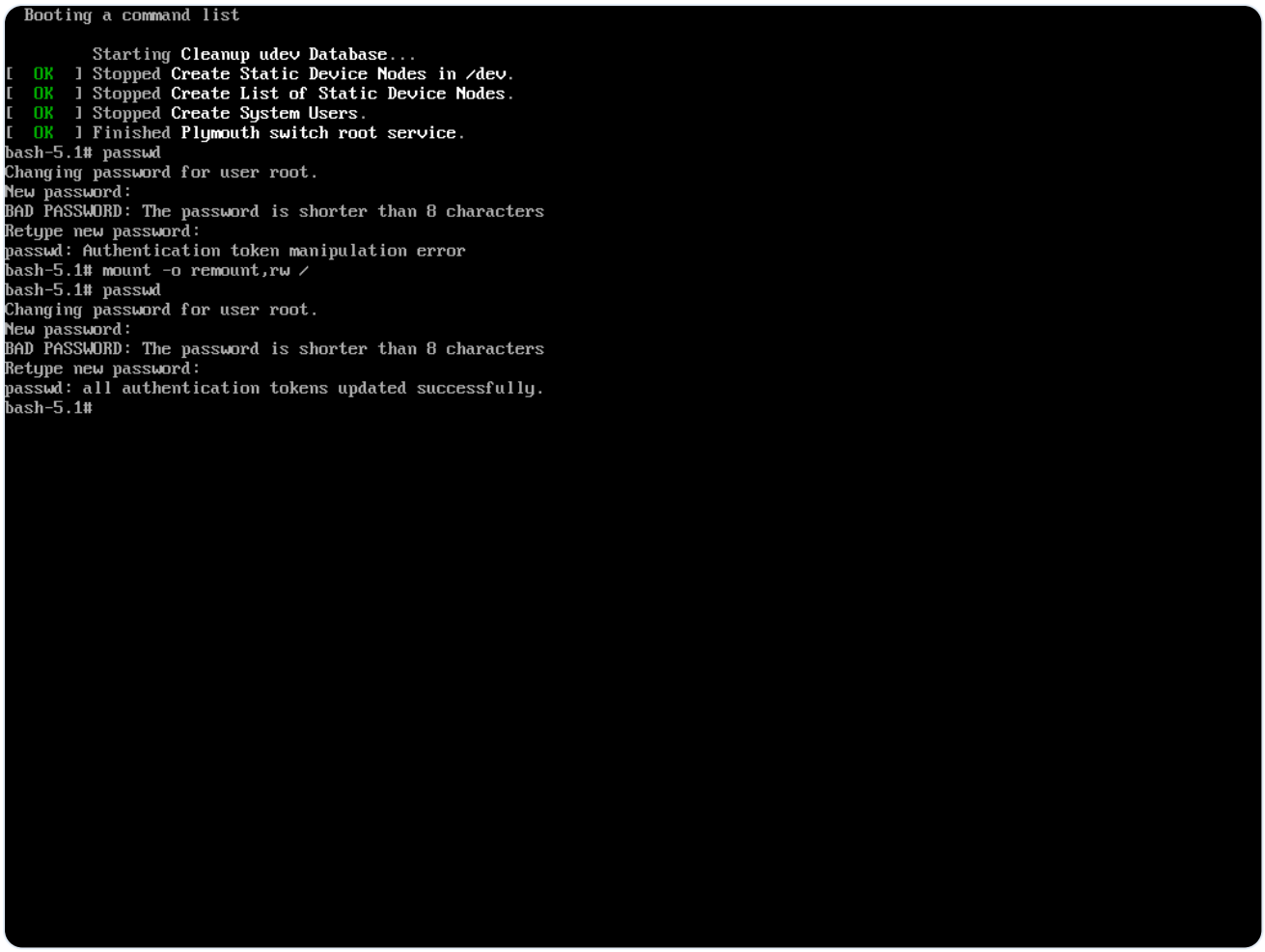


Password Reset Error

The reason is that the root `(/)` partition is mounted as read-only, so the password change could not be saved. The solution is to remount the root `(/)` partition with read-write permissions.

```
mount -o remount,rw /
passwd
```

Now again try to change the password of root using the ‘**passwd**‘ command.



Change Root Password

Hurrah! You've successfully accessed your Linux system once again. It might seem like the system is easy to exploit, but that's not the case. The key is to properly configure your system to enhance its security.

Password Protecting the GRUB Bootloader

Both of the processes described involved tweaking and passing parameters to the kernel. To enhance the security of your Linux box and make it harder to compromise, you should prevent kernel modifications at boot.

This can be achieved by setting a password for the **boot loader**, specifically **GRUB** (note that **LILO** is another boot loader for **Linux**, but it will not be covered here).

To password-protect the GRUB bootloader, you need to generate an encrypted password using the following command.

```
grub2-mkpasswd-pbkdf2
```

Generate Grub Boot Password

Next, edit the custom GRUB menu configuration file.

```
vi /etc/grub.d/40_custom
```

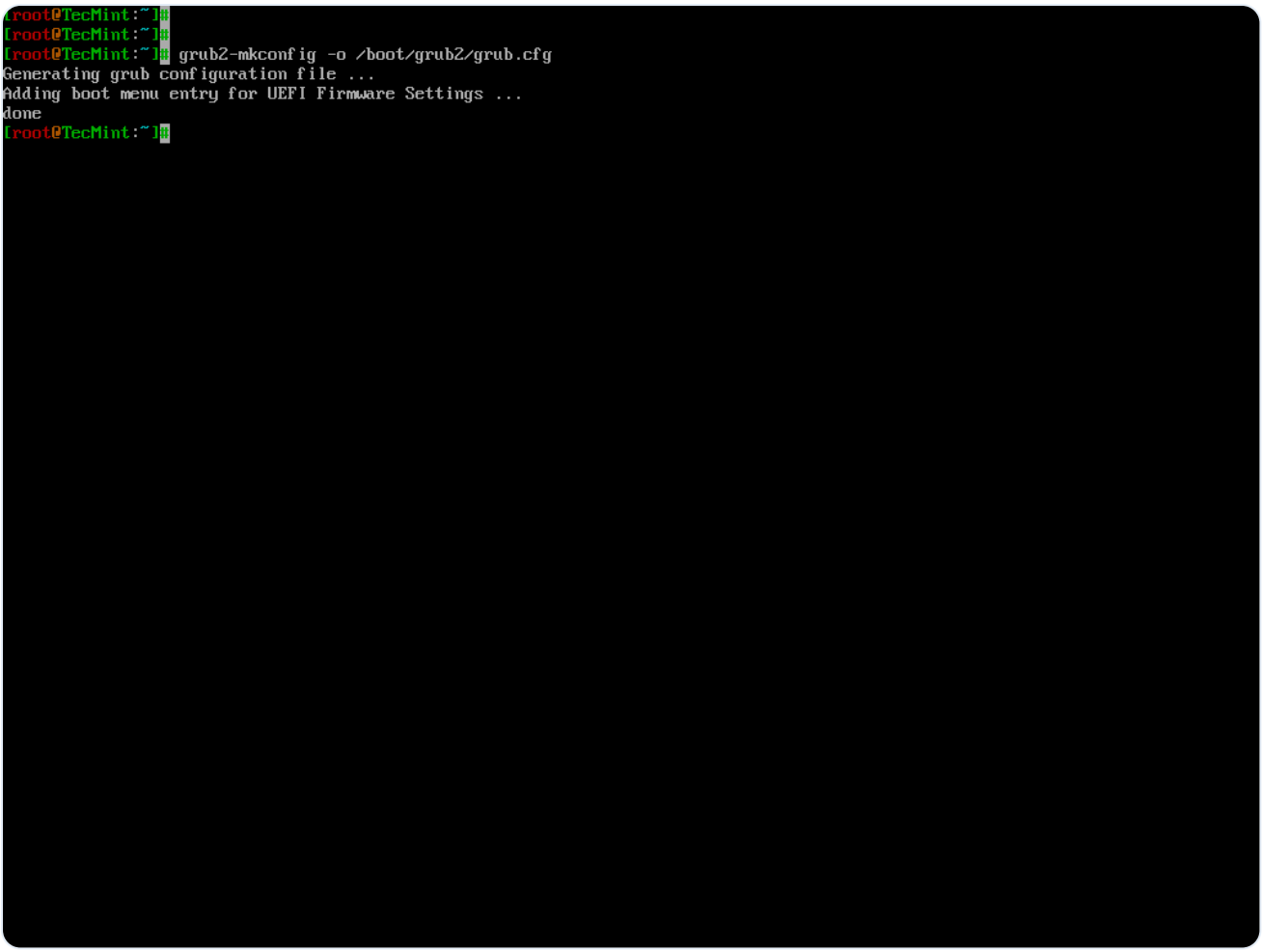
Add the following lines, replacing `&ltencrypted_password>` with the encrypted password generated in the previous step.

```
set superusers="root"
password_pbkdf2 root &ltencrypted_password>
```

Add Grub Boot Password

Update the GRUB configuration by running:

```
grub2-mkconfig -o /boot/grub2/grub.cfg
```



Generate Grub Configuration

Reboot the system and, during the boot process, press `'e'` to edit the GRUB menu. You will be prompted to enter the username (**root**) and the password you configured earlier.

Password for Editing Grub

If you enter the correct password, you will be able to proceed with editing the GRUB parameters.

RHEL Grub Boot Parameters

Now you would be breathing that your system is fully secure and not prone to hacking, however, still, the game is not over.

You better know that you can **enforce rescue mode** to **remove** and **modify** the password using a bootable image.

Just put your installation CD/DVD in your drive and select **Rescue Installed System** or use any other rescue image, you could even use a **Live Linux Distro**, mount the HDD and edit the '**40_custom**' file to remove the password line, reboot, and again you are logged in.

Conclusion

This guide was just to make you aware of facts and tell you how to secure your System. **Tecmint.com** and the **writer** of this article strongly discourage this guide as a base for exploiting other's systems.

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Ravi Saive

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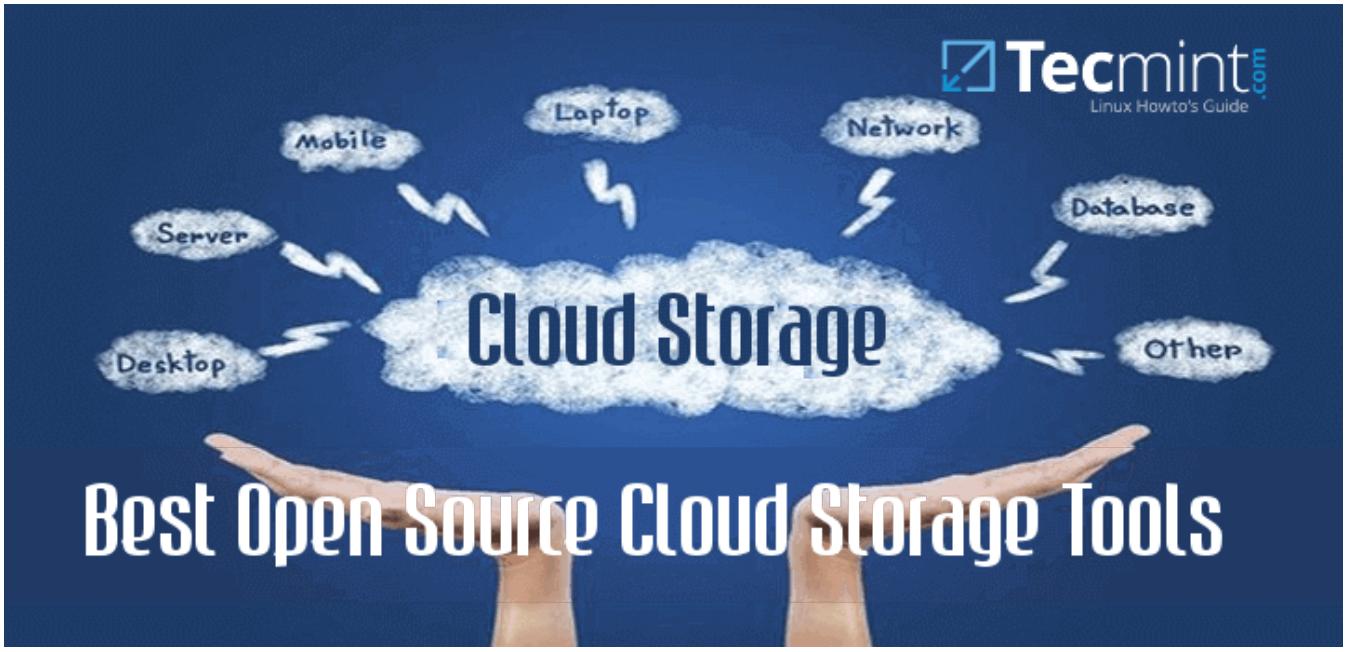

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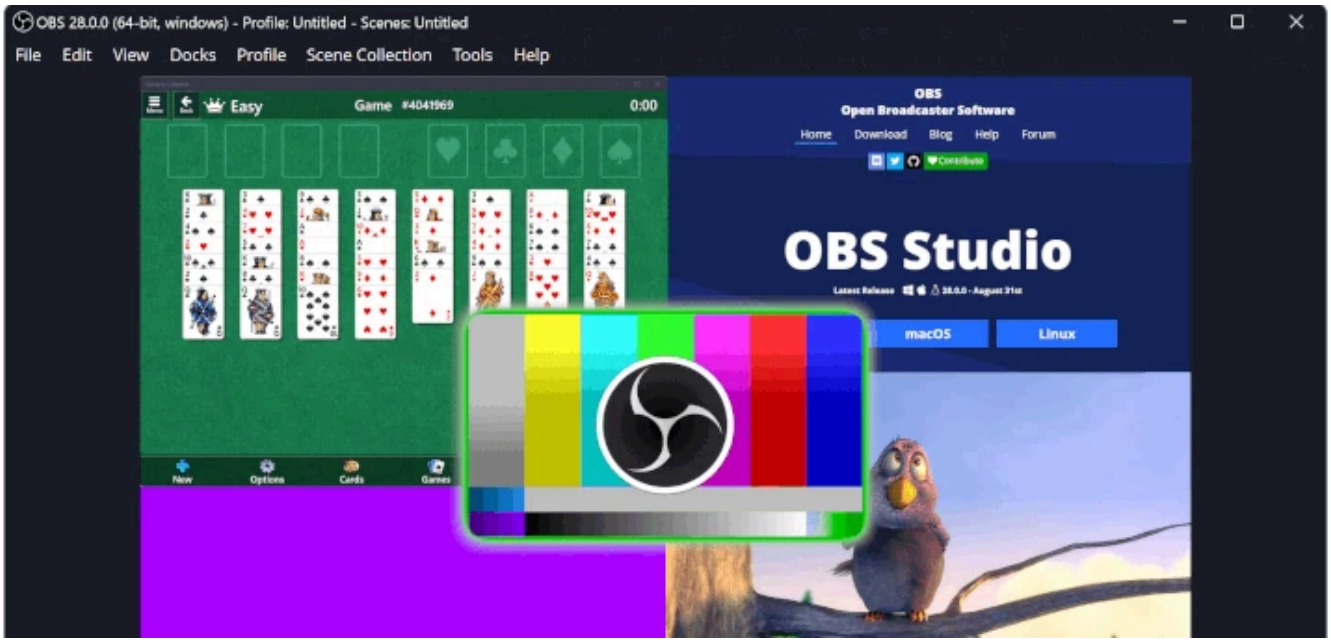

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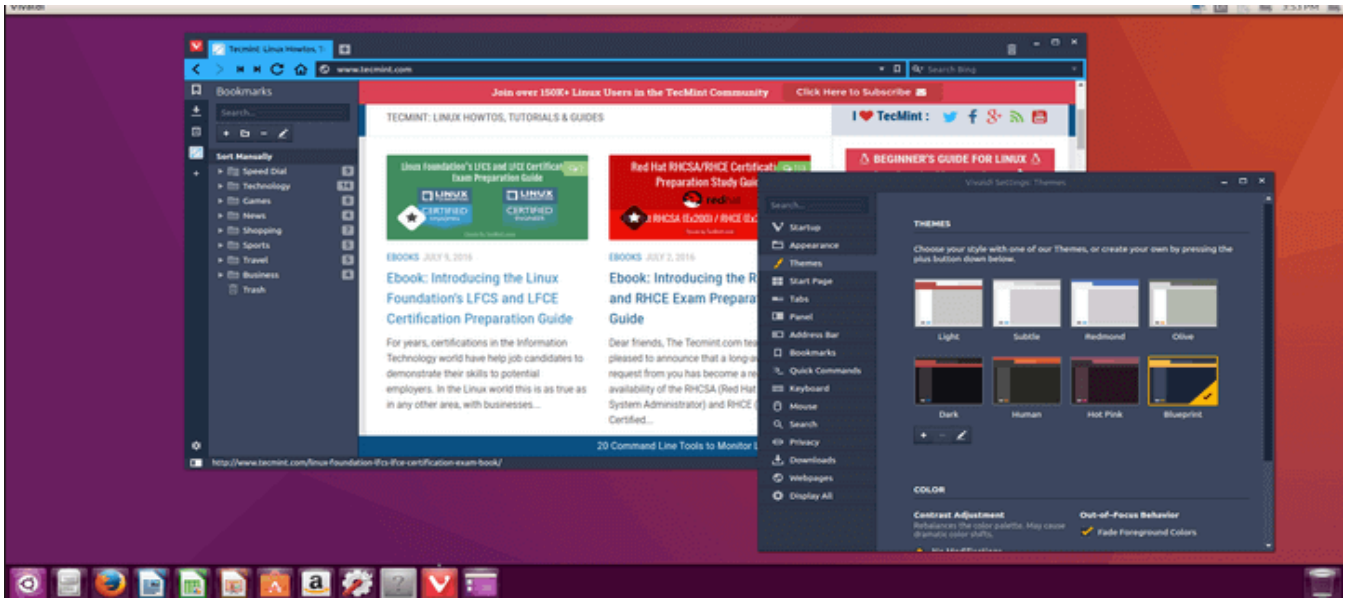

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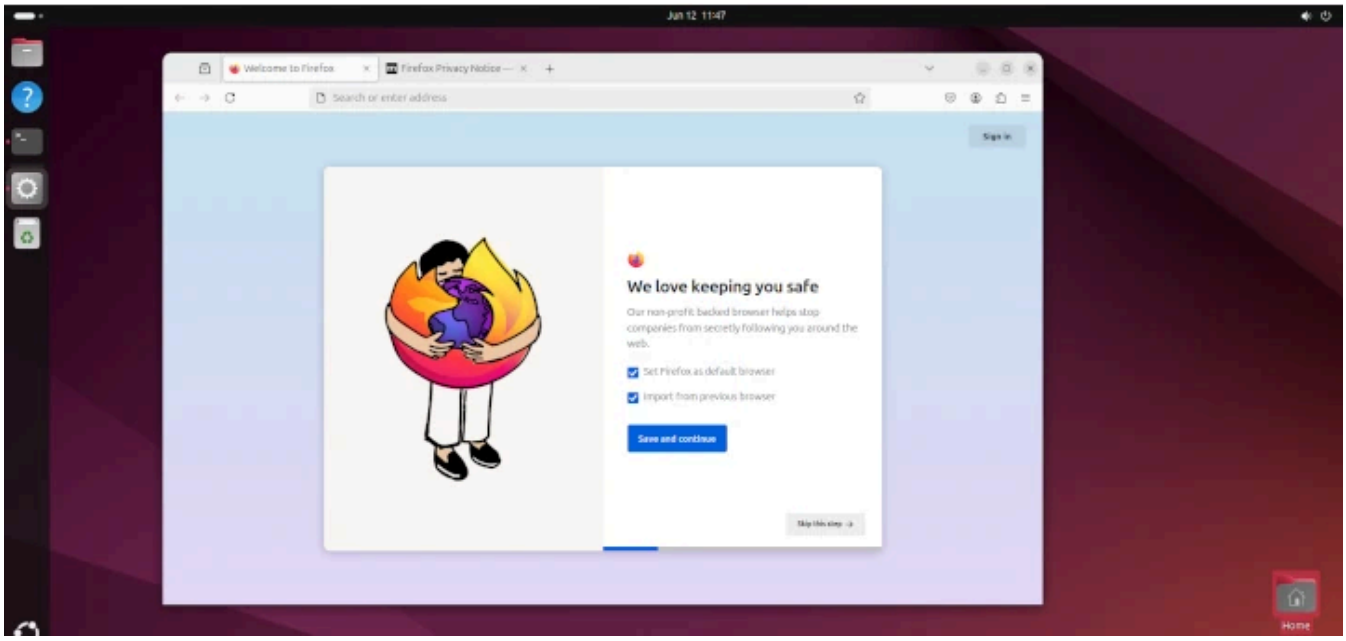

Firefox 127 on Linux: New Features, Install Guide & More

61 Comments

Leave a Reply

Michael Mueller

June 4, 2023 at 1:31 am

It is a nice and useful article to hack a Linux system. Thanks for the good work.

Reply

Kenneth Hughes

August 13, 2020 at 8:21 am

This is all assuming that you have physical access to the system. Without physical access to the system most linux systems are secure. If you have physical access to the system all of these exploits are valid.

Reply

hjskc

January 4, 2020 at 3:46 pm

to the above file. This caused an outage and also blocked any access to the mode via root or any other user. Your post really helped me to log on and then correct the changes I made, then a reboot fixed everything and I was able to get back on.

Reply

Harshavardhan Reddy

June 19, 2018 at 10:08 pm

Even if the boot order is HDD first and BIOS is locked, I can always unplug the HDD, plug in USB and boot, then plug in the HDD, right? How can one overcome this? I can think of one way.

In BIOS, do not put second boot preference at all...? But it doesn't seem great. The HDD can be connected to a portal laptop or something like that and the password be removed.

Is it possible to encrypt these files in question? If this is possible, feels like the best way to secure the PC.

Reply

Priyanshu Kumar

June 7, 2018 at 9:30 am

Best starting course in hacking and security world..

Reply

Manik Purushottam

June 6, 2018 at 12:21 pm

Very informative.

Reply

Madhu

April 13, 2018 at 4:23 pm

A very useful article to know how to hack a Linux system.

Reply

Gagan

April 23, 2017 at 8:21 pm

Here I guess It should be a /sbin/sulogin a little typo I guess

Reply

Nilesh

November 17, 2016 at 9:20 am

Well, even if we put a password for the bios, we can still crack it by resetting the CMOS, isn't it?
What can be done for that?

Reply

blak

October 28, 2016 at 10:42 pm

You really saved me today. I am not a Linux admin, but was tasked with changing /nofile value to unlimited. I ran the **ulimit -n** unlimited, but **ulimit -a** still showed the value. It didn't change. So I manually made changes to the **/etc/security/limits.conf** file by adding

```
*       soft nofile unlimited
*       hard nofile unlimited
oracle soft nofile unlimited
oracle hard nofile unlimited
```

to the above file. This caused an outage and also blocked any access the mode via root or any other user. Your post really helped me to log on and then correct the changes i made, then a reboot fixed everything and i was able to get back on.

Reply

pradeep gour

August 14, 2016 at 12:00 pm

I wish I had met you ages ago. Would have not facing TROUBLE and the Heart Burn I did. And saved me about US$1000/- REALLY...

Reply

DJ

June 8, 2016 at 12:13 am

Of course, physical access to a computer running ANY operating system is known to all security specialists to be a path to owning the machine. NOT NEWS.

Reply

Anwar

June 4, 2016 at 2:08 pm

[ask]
INIT: Id “x” respaawning too fase: desable for 5 minute

Reply

Dipesh

February 17, 2016 at 11:33 am

Awesome ...Chains of Hacking tricks :)

Reply

Abdullah

November 23, 2015 at 11:16 pm

Actually by passing the permission and re-setting the root password is a common practice, remember Linux is used to operate 24/7 as a server most of the time, hence no much of bios access.
But, if you own the machine you MUST encrypt it to protect your privacy (specially laptops), you have the encryption check-box when you install the system.
The bios is not our biggest problem but the external bootable device really.. solution is to encrypt.

I also encourage you to put a short Bios passcode, the idea of this short code is to know if someone accessed your machine, it is not a secret code, because you could easily reset it by cutting the current “the CMOS battery”.

Reply

dan

July 30, 2015 at 2:09 am

are you saying that on a standard ubuntu install with boot luks encryption and home directory encryption options checked during the install process that you can still get into the system? can both the boot and home directory passwords be bypassed easily unless i make further changes?

Reply

Avishek Kumar

July 31, 2015 at 3:57 pm

I don’t think it will work with boot LUKS encryption and home directory encryption, though i have not checked it personally.

Reply

ahmed

May 19, 2015 at 3:26 pm

i am working on the operating system that acts the best possible window as per the req of user and used the resources as per the req of user and kill the extra things secondly its also have an other feature …. its run application automatically as user login with his articifial intelligence

Reply

Pim Dennendal

January 13, 2015 at 9:33 pm

Interesting article on resetting your own root-password.

You missed one boot command-line parm which I find exceptionally usefull. It is “? init-/bin/sh”. Excellent for getting into the pre-execution environment. This is usefull for examining the boot script(s).

See ./Documents/ .

Reply

Avishek Kumar

January 16, 2015 at 12:17 pm

Yeah pim!
Thanks for the concern

Reply

KM Sitlhou

January 12, 2015 at 8:05 pm

Have gone through the article and I must say that it is an eye-opener indeed.But , to be a hacker and really being able to break the root password would be to retrieve the root password itself and not resetting it.For example , there is a remote linux server somewhere around the world.I know the ip address of the server and so I want to compromise the server.In such a scenario , a real root password hacking would be being able to break the root password remotely and then owning the system.

So , is that possible ?

Reply

Avishek Kumar

January 16, 2015 at 12:18 pm

No! Simply not.

Reply

l3thal

March 27, 2016 at 7:32 pm

Avishek: KM: Yes, it is possible. Not in the same ways described by Avishek of course, but it is possible to remotely exploit some vulnerability on the server and gain root access.

Reply

Lee Hobson

January 5, 2015 at 1:14 pm

I'm not able to get a GRUB menu, when I press any key to interrupt the boot.

Reply

Avishek Kumar

January 16, 2015 at 12:18 pm

why don't you check log files?

Reply

Khawar Nehal

July 16, 2014 at 2:33 pm

There is something called a BIOS and grub password.
If you lock the machine and put a BIOS password and a grub password then you need to physically break the lock and the cover to access the machine.
We do this to show evidence of attempts to mess with the machine.
For users who do not know the root password and keep it that way, just put a lock on the box, BIOS and GRUB.
The installation usually asks if you want a grub password.
You are showing people how to change the root password after NOT putting a boot loader grub password.

— Khawar Nehal

Reply

Avishek Kumar

July 17, 2014 at 12:04 pm

Yeah! a process of learning. May be different point of view :)

Reply

Marcel

November 29, 2013 at 3:56 pm

This is an excellent article on hardening physical security.

Well done!

Reply

Avishek Kumar

November 29, 2013 at 4:52 pm

Thanks @ Marcel, For your valueable feedback.

Reply

shrtsns

November 8, 2013 at 1:57 am

I have a vmdk file which is password protected and bootloader also protected by Password.
My question is, Is there any way to login or crack the boot password.

Please any one reply this ASAP..

Thanks for your time.

Reply

ngare

October 17, 2013 at 12:24 am

can you do this remotely?

Reply

Aqar

November 6, 2014 at 3:25 pm

Not possible unless you have a Remote Code Execution vulnerability in the server and even if thats the case that vulnerability has to be in a process that has a root privilege

Reply

Pawan Kumar Sharma

October 14, 2013 at 10:04 pm

Hi Avishek,

Good post , look like you missed to include LUKS, its provides a better way protecting your machine from these simple dorks

Reply

Gaurav Garg

October 4, 2013 at 10:44 pm

can i change the boot image and splash screen of my fedora and centos ??

Reply

Lucho Gopalanda

September 9, 2013 at 4:58 pm

I have done the last option many times (dvd or usb booting) on some customers. Sysadmin leaves the company and they dont know root pass or sysadmin forgot root pass or sometimes they got hacked and root pass was changed...

I personally believe that the info in this article is very useful for sysadmins and security people. Really brilliant article.

When taking all this info to the practice in the real world, just make sure you guys are not doing something illegal. So just practice on your own systems or make sure

that the ones asking you for help are the legitimate owners of the hacked system and it is indeed needed to be hacked.

Thanks for all this useful info on different ways to do useful things.

Reply

hzdtony

June 27, 2013 at 7:56 am

I then type the first letter of the password and I get immediately:

Quote:
Login incorrect
Give root password for maintenance
(or type Control-D to continue):

And so it goes on and on.... until i switch the machine off or reboot.
I think there is a bug here.

Reply

Josef Vybihal

June 14, 2013 at 2:08 am

What is X Windows?

Reply

Author

Ravi Saive

June 15, 2013 at 12:06 pm

The X Window known as X or X11 is a computer application system and network protocol that gives GUI (Graphical User Interface) to users.

Reply

Tamas

June 12, 2013 at 5:52 pm

You can password protect your grub configuration.

Reply

RelativePrime

June 12, 2013 at 2:13 am

The above methods still leave the system open to being accessed via a live CD, from which you can chroot to the installed system, circumventing the GRUB password. Or just re-install grub.

As others have stated 1) Physical access essentially allows any system to be owned and 2) Encrypting the drive is one of the best ways to prevent unauthorized access.

Reply

ChickenNinja

June 24, 2013 at 8:51 pm

Y'all didn't read everything do you?

* Password protect your BIOS.
* Change you Boot order to HDD first, followed by rest (cd/dvd, network, usb).

Now you can't book from a cd... Nor can you change it to boot from cd.

Reply

Boomerang

November 27, 2013 at 1:33 am

*Password protect your BIOS...
If you have physical access to the machine, take a screwdriver, unplug the computer and open it (desktop or laptop). Then you locate the battery (flat battery) on the motherboard. You removed it for at least 10 seconds, it will reset the BIOS settings and hence forget the password protecting the BIOS. Enjoy... :D

Reply

Avishek Kumar

November 28, 2013 at 5:50 pm

@ Boomerang, Actually the Organisation, for this reason only puts a physical lock on the Machine.

Reply

Raghavan alias Saravanan M

June 12, 2013 at 1:25 am

As someone said, I feel it is an eye-opener. Of course, there always pros and cons of every activity. Thanks for the interesting article Avisek.

Keep up the good work!!

Cheers,
Raghavan alias Saravanan M
Jeddah | Kingdom of Saudi Arabia.

Reply

bootux

June 11, 2013 at 8:56 pm

security starts with controlling access to the machine; without access to the console nobody could do the things you describe here
anyway, these are not hacks, I learned these when I got my rhce 10 years ago :))
and of course, these days I never install an operating system on a non-encrypted disk
cheers,

Reply

kustodian

June 11, 2013 at 1:25 pm

This has nothing to do with hacking, nor it shows how Linux is insecure. If someone has physical access to your server, the server is already theirs.

You could deny him access by encrypting your drive, but you would never encrypt a server, since you will have a performance penalty. This article should have probably been called how to change your root password if you forgot it.

If you were aiming for desktop security, than this is also insecure, since if someone took your hard drive they could still do whatever they want with it. The only way to secure a desktop PC is to encrypt the drive/partition.

Reply

Manjunath

January 11, 2015 at 1:51 am

Precisely what I thought.

These are ways provided within linux to get around the forgotten password issue and not loopholes as its discussed here..

Do you think linux developers are dumb not to fix these if they were loopholes?

These are some useful features left for admin's use. Every linux admin would know this.

Not trying to bring down the article or something. But the way you are portraying the topic is not right. As Kustodian said, this is suppose to be tips on how to reset your password..

Reply

NERD420Elite

January 14, 2015 at 3:55 am

How is this not hacking? (Serious question)

Reply

Curt Wuollet

June 11, 2013 at 9:55 am

IF someone has physical control of your box and can take it down, reboot, etc. they still own you. For example I can take a bootable cd, boot it, mount your partition and edit out all those changes. That's why all the smart linux folks haven't bothered to plug those holes. Encrypting your filesystems would make it much more difficult.

Reply

Avishek Kumar

November 28, 2013 at 6:03 pm

@ curt Wuollet, I agree encryption is better idea.

Reply

Richard Steven Hack

June 11, 2013 at 8:38 am

One of the main rules of information security: If the hacker has physical access to your machine – it's no longer your machine.

Reply

Avishek Kumar

November 28, 2013 at 6:02 pm

yes! True @ Richard Steven Hack.

Reply

ep0xcc

June 11, 2013 at 6:55 am

Haha, the `init` parameter hack is interesting! Anyway, the best way to protect your data is encrypt the disk, and use special mechanisms to prevent cold boot attack. This prevents the attackers who control your device physically, including installing your HDD on another computer and access the data.

Reply

Avishek Kumar

November 28, 2013 at 6:01 pm

Thanks @ ep0xcc, for your Valueable Feedback

Reply

f2069980@rmqkr.net
June 11, 2013 at 5:13 am

good tutorial. There is a typo here:

passwor –md5 1t8JvC1$8buXiBsfANd79/X3elp9G1

password is missing the last “d”

Reply

Avishek Kumar
November 28, 2013 at 6:00 pm

Yeah! sorry @ f2069980@rmqkr.net,
going to fix it.

Reply

x321x321
June 11, 2013 at 4:59 am

if you use full disk encryption then you can prevent these problems though the boot loader can be compromised for an evil maid attack if the attacker is determined so you may need to have that initial bootable partition an a portable stick that is always with you

Reply

Avishek Kumar

November 28, 2013 at 5:59 pm

@ x321x321, That's a good idea but still system can be compromised and it happens daily.

Reply

Tonto

June 10, 2013 at 5:29 pm

This has been a very eye opening tutorial – I'll have to test it out. Obviously the hacker would have to have access to my machine to run these exploits right? If the machine is secure then these hacks would be impossible to run over the network – or am I missing something. Great read – keep up the good work...
Chow
Tonto

Reply

Avishek Kumar

November 28, 2013 at 5:57 pm

Thanks @ Tonto for your feedback.

Reply

Tyler Maginnis
January 13, 2015 at 8:08 pm

These aren't exploits. These are password recovery methods.

Reply

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