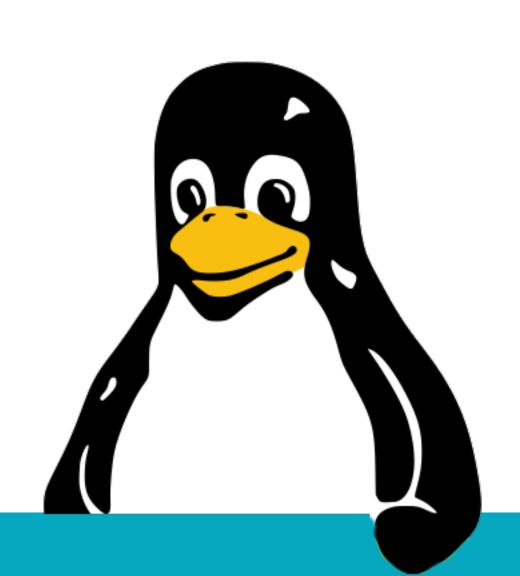
Linux, day 14





Objectives covered

Objective	Summary	Boek
2.1	Authentication	16,19
2.1	System hardening	10,16
2.3	Firewalls	18

LABS: PAM





Lab preparation!

- We will use our Ubuntu /Debian VM.
 - You will need to install PAM modules.

\$ sudo apt install -y libpam-modules-bin

Let's add tallying

- Make a backup of "/etc/pam.d/common-auth".
- Replace the complete pam_unix.so line, with

```
auth required pam_faillock.so preauth deny=3 unlock_time=60
auth sufficient pam_unix.so
auth required pam_faillock authfail deny=3 unlock_time=60
```

Let's add tallying

- Make a backup of "/etc/pam.d/common-account".
- Add this line, at the bottom:

```
account required pam_faillock.so
```

Let's add tallying

- Test with a dummy account:
 - Do three failed SSH logins block a further login?
 - Run: "sudo faillock" to check.
 - Does the block reset after 60 seconds?
 - Can you login with SSH after the 60 seconds?

Let's add password complexity

- Check that "pam_pwquality.so" is on your system.
 - If not, install it:

```
$ sudo apt install libpam-pwquality
```

Let's add password complexity

- Make a backup of "/etc/pam.d/common-password".
- Then edit the file.
 - Add this line, above password … pam_unix.so:

```
password required pam_pwquality.so minlen=10
```

Let's add password complexity

- Test with a dummy account:
 - Login with their current password.
 - Try changing the password with a 4-letter word.
 - Try other weak passwords.

LABS: What will we do??





The next three labs...

- All three labs follow the same pattern:
 - Set the firewall to block all traffic by default.
 - Start a service.
 - Prove that traffic is blocked.
 - Open the firewall.
 - Prove that traffic is now open.

LAB: Uncomplicated Firewall





Warning: prior work?

We will use the Ubuntu VM to practice UFW.

- If you already worked with iptables on this VM before,
 - IPTables will fight your UFW.
 - Results will be weird!



Lab preparation

- You will need two VMs, in the same network.
 - Ubuntu will be the server, with UFW,
 - Fedora will be the client.

Enabling UFW

• Once the Ubuntu VM is up, login. Then:

```
$ sudo ufw status
```

\$ sudo ufw enable

\$ sudo ufw app list

Allowing SSH, before closing

Let's not lock ourselves out of the VM.

```
$ sudo ufw allow openssh
```

- \$ sudo ufw default reject
- sudo ufw status verbose

Setting up a website

Here's a quick test

```
$ sudo apt install lighttpd
$ sudo systemctl start lighttpd
$ curl http://localhost:80 # This should work
```

Setting up a website

- Can you reach the site from your <u>Fedora VM</u>?
 - e.g. "curl http://ubuntu" from your Fedora VM?

- The "localhost" connection from Ubuntu should work,
 - But the external connection from Fedora shouldn't.

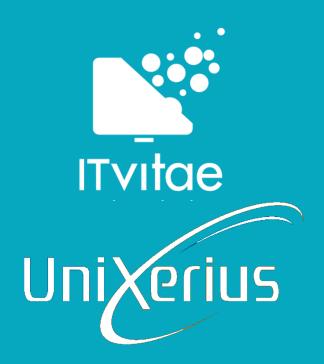
Setting up a website

• Let's open the firewall!

```
$ sudo ufw app list
$ sudo ufw allow "Lighttpd Full"
```

• Can you reach the site from the other host now?

LAB: firewalld





Lab preparation

We will work on Fedora to learn Firewalld.

- You will another VM, in the same network.
 - Fedora will be the server, with firewalld,
 - Ubuntu will be the client.

Starting the web server

After starting the server, can you reach it locally?

```
$ sudo yum install -y httpd
$ sudo systemctl start httpd
$ curl http://localhost
```

Checking on firewalld

```
$ sudo systemctl list-unit-files \
  I grep firewall
# Not running? Start it :) Then continue:
  sudo firewall-cmd --state
  sudo firewall-cmd --get-active-zones
```

Enabling some block rules

```
$ sudo firewall-cmd --set-default-zone public
$ sudo firewall-cmd --get-services
$ sudo firewall-cmd --list-services
```

Testing connections

- Can you reach the site from your <u>Ubuntu VM</u>?
 - e.g. "curl http://fedora" from your Ubuntu VM?

- The "localhost" connection from Fedora should work,
 - But the external connection from Ubuntu shouldn't.

Opening up the firewall

• Back on Fedora, open the firewall.

```
$ sudo firewall-cmd --add-service=http \
 --zone=public --permanent
 sudo firewall-cmd --reload
 sudo nft list ruleset
```

Testing remotely

• From the <u>other VM</u>:

```
$ curl http://${FedoraIP}
```

- Does it work now?
 - It should!

LAB: iptables





Setup

- We will continue on the same Fedora box.
 - And we'll use the same test host.

- Make a snapshot first!
 - Just so you can easily go back.

Disabling firewalld

IPtables and firewalld cannot co-exist.

```
$ sudo firewall-cmd --remove-service=http \
   --zone=public --permanent
$ sudo systemctl stop firewalld
```

You should now be able to reach the website.

Checking on IPTables

We should have a fresh start!

```
$ sudo iptables -L
$ sudo iptables -A INPUT -m state \
  --state ESTABLISHED -j ACCEPT
```

This rule allows all pre-established connections.

Closing things down

Again, let's allow only SSH

```
$ sudo iptables -A INPUT -p tcp --dport 22 \
-m state --state NEW,ESTABLISHED -j ACCEPT
```

- \$ sudo iptables -P INPUT DROP
- \$ sudo iptables -L

Starting the web server

• It should already be running.

```
$ sudo systemctl start httpd
$ curl http://localhost
```

• It still works locally, right?

Testing remotely

• From the <u>other VM</u>, or your <u>host OS</u>:

```
$ curl http://${FedoraIP}
```

- Test whether you can load the test-site on Fedora.
 - Again, this should not work.

Opening up the firewall

Back on Fedora, open the firewall.

```
$ sudo iptables -A INPUT -p tcp --dport 80 \
-m state --state NEW,ESTABLISHED -j ACCEPT
```

Then test again from the outside. Can you get in?

Saving your changes

• With IPtables, we need to save our current config.

```
$ sudo iptables-save | \
  sudo tee /etc/sysconfig/iptables
```

- On Fedora >20, the "*iptables*" service is not installed.
 - So on a reboot it won't load these rules.
 - For our lab, that's fine. Good enough.



What will we do today?

- Recap
- Pluggable Authentication Modules (PAM)
- Firewalls
- Security best practices
- Extra labs
- Closing: Homework and Q&A

Case 1: NTP server

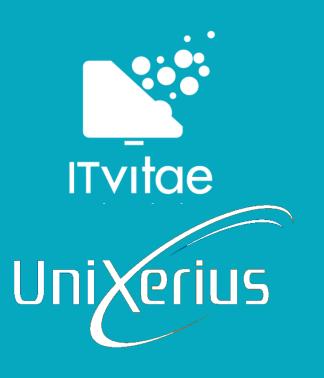


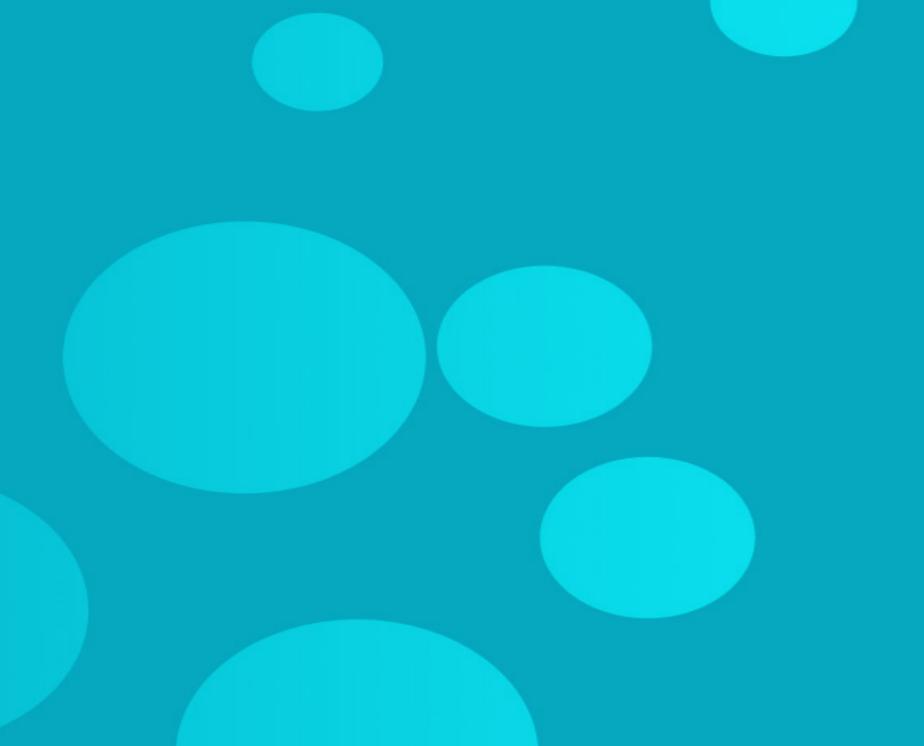


Case 1: NTP server

- Assume a company network. You're asked to build an NTP server.
- Build and configuration:
 - On RHEL-derivatives you may need Chrony instead of NTPd.
 - Assume that the NTP server uses the default NTP pool on the Internet.
 - Open the NTP server to the internal network. Also open the firewall.
- Test it as well, from another system.
 - For example "ntpq \${ServerIP}" and use the "lpeers" command.

Case 2: Time restricting SSH



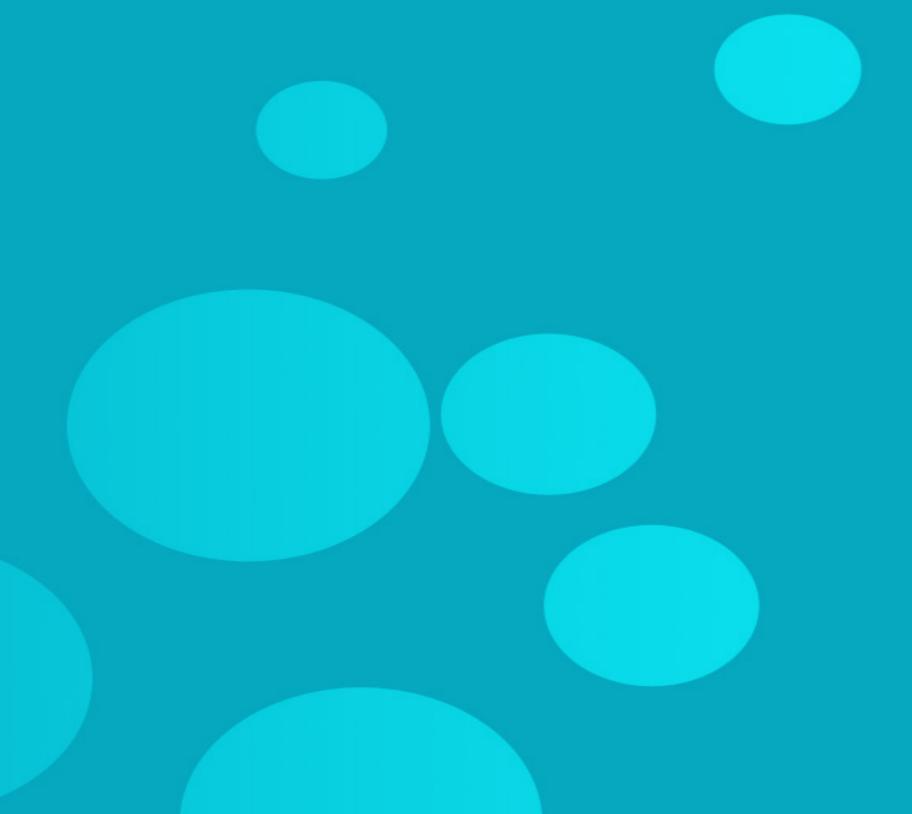


Case 2: Time restricting SSH

- Read the documentation for pam_time.so.
- Setup a dummy test account on your VM.
- Configure the SSH daemon and PAM,
 - So this dummy user can only login with SSH,
 - On Monday through Friday, between 0600 and 1700.

Closing





Homework

- Reading (some of this are repeats):
 - Chapters 7, 11, 20, 21, 24

- Go do:
 - One or more CertDepot "daily tasks".
 - Or the more advanced exercises (see day 11).

Reference materials





Resources

- RedHat's introduction to PAM
- LinuxJournal's 1997 coverage of PAM
- Using PAM, NSS and SSSD for LDAP (advanced)
- Allowing routing/forwarding with UFW