
Práctica 3

Monitorización, Automatización y "Profiling"

Ingeniería de Servidores
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Introducción

En esta práctica vamos a trabajar con Zabbix, un sistema de monitorización de redes, y se documentarán los distintos pasos necesarios hasta completar la práctica, abarcando desde su instalación y configuración, hasta la monitorización de la máquina virtual.

En Zabbix se necesita un servidor para albergar el sistema de monitorización y un agente que permite la comunicación entre el sistema que se quiere monitorizar y el servidor. Se va a instalar el servidor en Ubuntu Server; el agente se va a instalar en RockyCentOS y en Ubuntu Server.

1.Instalación de Zabbix en Ubuntu Server

Lo primero que hacemos es descargarnos el repositorio de Zabbix, versión 5.0, y la distribución Focal para Ubuntu.

Descomprimos el paquete, usando el comando **dpkg** con la opción **-i** para instalar el paquete en el directorio de paquetes e instalamos Zabbix Server en Ubuntu.

```
carmengr@ubuntu:~$ wget https://repo.zabbix.com/zabbix/5.0/ubuntu/pool/main/z/zabbix-release/zabbix-release_5.0-2%2Bubuntu22.04_all.deb
--2022-11-12 17:34:53-- https://repo.zabbix.com/zabbix/5.0/ubuntu/pool/main/z/zabbix-release/zabbix-release_5.0-2%2Bubuntu22.04_all.deb
Resolving repo.zabbix.com (repo.zabbix.com)... 178.128.6.101, 2604:a880:2:d0::2062:d001
Connecting to repo.zabbix.com (repo.zabbix.com)[178.128.6.101]:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 4296 (4.2K) [application/octet-stream]
Saving to: 'zabbix-release_5.0-2+ubuntu22.04_all.deb'

zabbix-release_5.0-2+ubu 100%[=====>] 4.20K --.-KB/s in 0s

2022-11-12 17:34:54 (1.29 GB/s) - 'zabbix-release_5.0-2+ubuntu22.04_all.deb' saved [4296/4296]

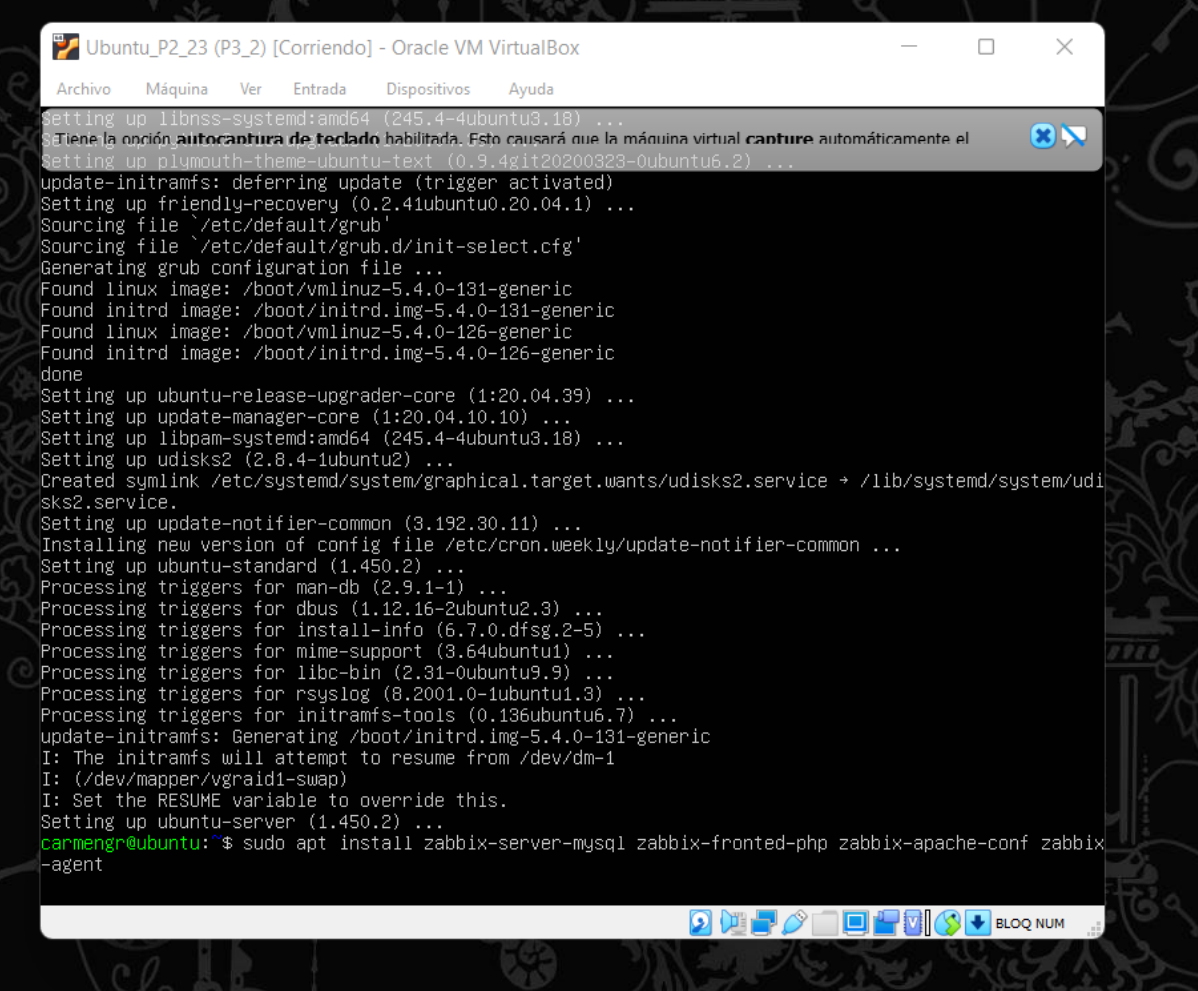
carmengr@ubuntu:~$ dpkg -i zabbix-release_5.0-2+ubuntu22.04_all.deb
dpkg: error: requested operation requires superuser privilege
carmengr@ubuntu:~$ sudo dpkg -i zabbix-release_5.0-2+ubuntu22.04_all.deb
[sudo] password for carmengr:
Selecting previously unselected package zabbix-release.
(Reading database ... 71743 files and directories currently installed.)
Preparing to unpack zabbix-release_5.0-2+ubuntu22.04_all.deb ...
Unpacking zabbix-release (1:5.0-2+ubuntu22.04) ...
Setting up zabbix-release (1:5.0-2+ubuntu22.04) ...
carmengr@ubuntu:~$
```

Por último actualizamos la lista de paquetes con el comando: **sudo apt update**.

Instalación de servicios

Instalamos los servicios de zabbix necesarios para la práctica:

- **zabbix-server-mysql**: para el soporte de MySQL
- **zabbix-frontend-php**: el frontend
- **zabbix-apache-conf**
- **zabbix-agent**: para poder monitorizar el servidor



```
Ubuntu_P2_23 (P3_2) [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
Setting up libnss-systemd:amd64 (245.4-4ubuntu3.18) ...
$ Tiene la opción autocaptura de teclado habilitada. Esto causará que la máquina virtual capture automáticamente el
Setting up plymouth-theme-ubuntu-text (0.9.4git20200323-0ubuntu6.2) ...
update-initramfs: deferring update (trigger activated)
Setting up friendly-recovery (0.2.41ubuntu0.20.04.1) ...
Sourcing file /etc/default/grub
Sourcing file /etc/default/grub.d/init-select.cfg
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-5.4.0-131-generic
Found initrd image: /boot/initrd.img-5.4.0-131-generic
Found linux image: /boot/vmlinuz-5.4.0-126-generic
Found initrd image: /boot/initrd.img-5.4.0-126-generic
done
Setting up ubuntu-release-upgrader-core (1:20.04.39) ...
Setting up update-manager-core (1:20.04.10.10) ...
Setting up libpam-systemd:amd64 (245.4-4ubuntu3.18) ...
Setting up udisks2 (2.8.4-1ubuntu2) ...
Created symlink /etc/systemd/system/graphical.target.wants/udisks2.service → /lib/systemd/system/udisks2.service.
Setting up update-notifier-common (3.192.30.11) ...
Installing new version of config file /etc/cron.weekly/update-notifier-common ...
Setting up ubuntu-standard (1.450.2) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for dbus (1.12.16-2ubuntu2.3) ...
Processing triggers for install-info (6.7.0.dfsg.2-5) ...
Processing triggers for mime-support (3.64ubuntu1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.9) ...
Processing triggers for rsyslog (8.2001.0-1ubuntu1.3) ...
Processing triggers for initramfs-tools (0.136ubuntu6.7) ...
update-initramfs: Generating /boot/initrd.img-5.4.0-131-generic
I: The initramfs will attempt to resume from /dev/dm-1
I: (/dev/mapper/vgraid1-swap)
I: Set the RESUME variable to override this.
Setting up ubuntu-server (1.450.2) ...
carmengr@ubuntu:~$ sudo apt install zabbix-server-mysql zabbix-frontend-php zabbix-apache-conf zabbix-agent
```

Nota**: Corrección de errata → zabbix-frontend-php***

Configuración de la base de datos Zabbix Server

Entramos a la base de datos MySQL como root y creamos la base de datos para Zabbix (zabbix), además creamos un usuario (zabbix), le damos una contraseña(zabbix) y le concedemos todos los permisos.

```
carmengr@ubuntu:~$ sudo mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 26
Server version: 8.0.31-0ubuntu0.20.04.1 (Ubuntu)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> create database zabbix character set utf8 collate utf8_bin;
Query OK, 1 row affected, 2 warnings (0.01 sec)

mysql> create user zabbix@localhost identified by 'zabbix';
Query OK, 0 rows affected (0.02 sec)

mysql> grant all privileges on zabbix.* to zabbix@localhost;
Query OK, 0 rows affected (0.01 sec)

mysql> quit;_
```

****Nota:** Cabe recordar que usar el mismo nombre para todo es una mala práctica, pero para facilitar el desarrollo de esta práctica se ha hecho así.

Importamos el esquema y los datos iniciales

```
carmengr@ubuntu:~$ sudo zcat /usr/share/doc/zabbix-server-mysql*/create.sql.gz | mysql -u zabbix -p
zabbix
Enter password:
```

Configurar la base de datos para el servidor Zabbix

Para ello editamos el fichero /etc/zabbix/zabbix_server.conf, configuramos el usuario y su contraseña.

```
### Option: DBUser
#       Database user.
#
# Mandatory: no
# Default:
# DBUser=

DBUser=zabbix

### Option: DBPassword
#       Database password.
#       Comment this line if no password is used.
#
# Mandatory: no
# Default:
DBPassword=zabbix_

### Option: DBSocket
#       Path to MySQL socket.
#
# Mandatory: no
# Default:
# DBSocket=

### Option: DBPort
#       Database port when not using local socket.
#
# Mandatory: no
-- INSERT --
```

Configurar PHP para la interfaz de Zabbix

Configuramos PH para zabbix frontend en el fichero `/etc/zabbix/apache.conf`; solo tenemos que descomentar la zona horaria de Europa, y cambiando la opción que viene por defecto por Madrid.

```
# Define /zabbix alias, this is the default
<IfModule mod_alias.c>
    Alias /zabbix /usr/share/zabbix
</IfModule>

<Directory "/usr/share/zabbix">
    Options FollowSymLinks
    AllowOverride None
    Order allow,deny
    Allow from all

    <IfModule mod_php5.c>
        php_value max_execution_time 300
        php_value memory_limit 128M
        php_value post_max_size 16M
        php_value upload_max_filesize 2M
        php_value max_input_time 300
        php_value max_input_vars 10000
        php_value always_populate_raw_post_data -1
        php_value date.timezone Europe/Madrid
    </IfModule>
    <IfModule mod_php7.c>
        php_value max_execution_time 300
        php_value memory_limit 128M
        php_value post_max_size 16M
        php_value upload_max_filesize 2M
        php_value max_input_time 300
        php_value max_input_vars 10000
        php_value always_populate_raw_post_data -1
        php_value date.timezone Europe/Madrid
    </IfModule>
</Directory>

<Directory "/usr/share/zabbix/conf">
    Order deny,allow
    Deny from all
</Directory>

"/etc/zabbix/apache.conf" 77L, 1835C
```

30,45

Comienzo

Reiniciamos y habilitamos los servicios

```
carmengr@ubuntu:~$ sudo systemctl restart zabbix-server zabbix-agent apache2
carmengr@ubuntu:~$ sudo systemctl enable zabbix-server zabbix-agent apache2
Unknown operation enable.
carmengr@ubuntu:~$ sudo systemctl enable zabbix-server zabbix-agent apache2
Synchronizing state of zabbix-server.service with SysV service script with /lib/systemd/systemd-sysv-
install.
Executing: /lib/systemd/systemd-sysv-install enable zabbix-server
Synchronizing state of zabbix-agent.service with SysV service script with /lib/systemd/systemd-sysv-
install.
Executing: /lib/systemd/systemd-sysv-install enable zabbix-agent
Synchronizing state of apache2.service with SysV service script with /lib/systemd/systemd-sysv-insta
ll.
Executing: /lib/systemd/systemd-sysv-install enable apache2
Created symlink /etc/systemd/system/multi-user.target.wants/zabbix-server.service → /lib/systemd/sys
tem/zabbix-server.service.
carmengr@ubuntu:~$
```

Comprobamos sus estados

- Server

```
• zabbix-server.service - Zabbix Server
  Loaded: loaded (/lib/systemd/system/zabbix-server.service; enabled; vendor preset: enabled)
  Active: active (running) since Wed 2022-11-16 11:56:28 UTC; 2min 56s ago
  Main PID: 15254 (zabbix_server)
  Tasks: 38 (limit: 1066)
  Memory: 29.9M
  CGroup: /system.slice/zabbix-server.service
          └─15254 /usr/sbin/zabbix_server -c /etc/zabbix/zabbix_server.conf
          └─15255 /usr/sbin/zabbix_server: configuration syncer [synced configuration in 0.02634s]
          └─15256 /usr/sbin/zabbix_server: alert manager #1 [sent 0, failed 0 alerts, idle 5.004s]
          └─15257 /usr/sbin/zabbix_server: alerter #1 started
          └─15258 /usr/sbin/zabbix_server: alerter #2 started
          └─15259 /usr/sbin/zabbix_server: alerter #3 started
          └─15260 /usr/sbin/zabbix_server: preprocessing manager #1 [queued 0, processed 5 values]
          └─15261 /usr/sbin/zabbix_server: preprocessing worker #1 started
          └─15262 /usr/sbin/zabbix_server: preprocessing worker #2 started
          └─15263 /usr/sbin/zabbix_server: preprocessing worker #3 started
          └─15264 /usr/sbin/zabbix_server: lld manager #1 [processed 0 LLD rules, idle 5.006177s]
```

- Agent

```
carmengr@ubuntu:~$ sudo systemctl status zabbix-agent
• zabbix-agent.service - Zabbix Agent
  Loaded: loaded (/lib/systemd/system/zabbix-agent.service; enabled; vendor preset: enabled)
  Active: active (running) since Wed 2022-11-16 11:56:28 UTC; 3min 16s ago
  Main PID: 15246 (zabbix_agentd)
  Tasks: 6 (limit: 1066)
  Memory: 7.2M
  CGroup: /system.slice/zabbix-agent.service
          └─15246 /usr/sbin/zabbix_agentd -c /etc/zabbix/zabbix_agentd.conf
          └─15247 /usr/sbin/zabbix_agentd: collector [idle 1 sec]
          └─15248 /usr/sbin/zabbix_agentd: listener #1 [waiting for connection]
          └─15249 /usr/sbin/zabbix_agentd: listener #2 [waiting for connection]
          └─15250 /usr/sbin/zabbix_agentd: listener #3 [waiting for connection]
          └─15251 /usr/sbin/zabbix_agentd: active checks #1 [idle 1 sec]

Nov 16 11:56:28 ubuntu systemd[1]: zabbix-agent.service: Succeeded.
Nov 16 11:56:28 ubuntu systemd[1]: Stopped Zabbix Agent.
Nov 16 11:56:28 ubuntu systemd[1]: Starting Zabbix Agent...
Nov 16 11:56:28 ubuntu systemd[1]: Started Zabbix Agent.
```

- Apache

```
carmengr@ubuntu:~$ sudo systemctl status apache2
• apache2.service - The Apache HTTP Server
  Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
  Active: active (running) since Wed 2022-11-16 11:56:28 UTC; 3min 44s ago
  Docs: https://httpd.apache.org/docs/2.4/
  Main PID: 15314 (apache2)
  Tasks: 6 (limit: 1066)
  Memory: 13.1M
  CGroup: /system.slice/apache2.service
          └─15314 /usr/sbin/apache2 -k start
          └─15315 /usr/sbin/apache2 -k start
          └─15316 /usr/sbin/apache2 -k start
          └─15317 /usr/sbin/apache2 -k start
          └─15318 /usr/sbin/apache2 -k start
          └─15319 /usr/sbin/apache2 -k start

Nov 16 11:56:28 ubuntu systemd[1]: Starting The Apache HTTP Server...
Nov 16 11:56:28 ubuntu apachectl[15313]: AH00558: apache2: Could not reliably determine the server's
Nov 16 11:56:28 ubuntu systemd[1]: Started The Apache HTTP Server.
lines 1-18/18 (END)
```

Habilitamos el puerto

Habilitamos los puertos 80 y 10050, siendo este último el que usa Zabbix por defecto.

```
carmengr@ubuntu:~$ sudo ufw allow 80/tcp
Rule added
Rule added (v6)
carmengr@ubuntu:~$ sudo ufw allow 10050/tcp
Rule added
Rule added (v6)
carmengr@ubuntu:~$ _
```

Configuramos del agente

Accediendo al archivo `/etc/zabbix/zabbix_agentd.conf`, aquí indicamos la ip del servidor, por defecto tendrá la del localhost, modificamos **Server** y **ServerActive**; esto nos permitirá monitorizar fuera del servidor Ubuntu.

```
### Option: Server
# List of comma delimited IP addresses, optionally in CIDR notation, or DNS names of Zabbix servers and Zabbix proxies.
# Incoming connections will be accepted only from the hosts listed here.
# If IPv6 support is enabled then '127.0.0.1', ':::127.0.0.1', '::ffff:127.0.0.1' are treated equally
# and ':::/0' will allow any IPv4 or IPv6 address.
# '0.0.0.0/0' can be used to allow any IPv4 address.
# Example: Server=127.0.0.1,192.168.1.0/24,:::1,2001:db8::/32,zabbix.example.com
# Mandatory: yes, if StartAgents is not explicitly set to 0
# Default:
# Server=

Server=192.168.56.105
```

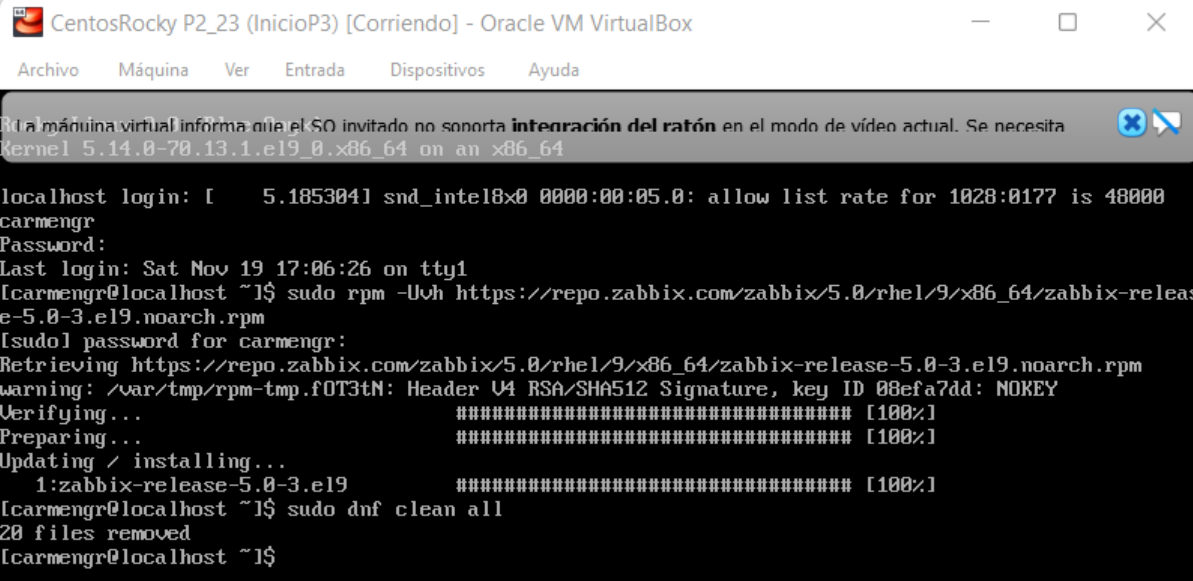
```
# If this parameter is not specified, active checks are disabled.
# Example: ServerActive=127.0.0.1:20051,zabbix.example.com,[::1]:30051,:::1,[12fc::1]
#
# Mandatory: no
# Default:
# ServerActive=

ServerActive=192.168.56.105

### Option: Hostname
# Unique, case sensitive hostname.
# Required for active checks and must match hostname as configured on the server.
# Value is acquired from HostnameItem if undefined.
#
# Mandatory: no
# Default:
# Hostname=
```

2.Instalación y configuración del agente. CentosRocky

Descargamos el paquete zabbix del repositorio



```
CentosRocky P2_23 (InicioP3) [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda

La máquina virtual informa que el SO invitado no soporta integración del ratón en el modo de vídeo actual. Se necesita
Kernel 5.14.0-70.13.1.el9_0.x86_64 on an x86_64

localhost login: [ 5.185304] snd_intel8x0 0000:00:05.0: allow list rate for 1028:0177 is 48000
carmengr
Password:
Last login: Sat Nov 19 17:06:26 on tty1
[carmengr@localhost ~]$ sudo rpm -Uvh https://repo.zabbix.com/zabbix/5.0/rhel/9/x86_64/zabbix-release-5.0-3.el9.noarch.rpm
[sudo] password for carmengr:
Retrieving https://repo.zabbix.com/zabbix/5.0/rhel/9/x86_64/zabbix-release-5.0-3.el9.noarch.rpm
warning: /var/tmp/rpm-tmp.fOT3tN: Header V4 RSA/SHA512 Signature, key ID 08efa7dd: NOKEY
Verifying...
Preparing...
Updating / installing...
 1:zabbix-release-5.0-3.el9
[carmengr@localhost ~]$ sudo dnf clean all
20 files removed
[carmengr@localhost ~]$
```


Instalamos solo el agente Zabbix

```
Verifying      : libsss_nss_idmap-2.6.2-4.el9_0.x86_64 17/23
Verifying      : libsss_nss_idmap-2.6.2-4.el9_0.x86_64 15/23
Verifying      : libsss_idmap-2.6.2-4.el9_0.1.x86_64 16/23
Verifying      : libsss_idmap-2.6.2-4.el9_0.x86_64 17/23
Verifying      : libsss_certmap-2.6.2-4.el9_0.1.x86_64 18/23
Verifying      : libsss_certmap-2.6.2-4.el9_0.x86_64 19/23
Verifying      : libcurl-7.76.1-14.el9_0.5.x86_64 20/23
Verifying      : libcurl-7.76.1-14.el9_0.x86_64 21/23
Verifying      : openldap-2.6.2-1.el9_0.x86_64 22/23
Verifying      : openldap-2.4.59-4.el9_0.x86_64 23/23

Upgraded:
  gnupg2-2.3.3-2.el9_0.x86_64          libcurl-7.76.1-14.el9_0.5.x86_64
  libsss_certmap-2.6.2-4.el9_0.1.x86_64 libsss_idmap-2.6.2-4.el9_0.1.x86_64
  libsss_nss_idmap-2.6.2-4.el9_0.1.x86_64 libsss_sudo-2.6.2-4.el9_0.1.x86_64
  openldap-2.6.2-1.el9_0.x86_64         sssd-client-2.6.2-4.el9_0.1.x86_64
  sssd-common-2.6.2-4.el9_0.1.x86_64     sssd-kcm-2.6.2-4.el9_0.1.x86_64

Installed:
  libevent-2.1.12-6.el9.x86_64          openldap-compat-2.6.2-1.el9_0.x86_64
  zabbix-agent-5.0.29-1.el9.x86_64

Complete!
[carmengr@localhost ~]$ sudo dnf install zabbix-agent
```

Iniciamos el agente de Zabbix

```
[carmengr@localhost ~]$ sudo systemctl enable zabbix-agent.service
Created symlink /etc/systemd/system/multi-user.target.wants/zabbix-agent.service → /usr/lib/systemd/system/zabbix-agent.service.
[ 423.404029] systemd-rc-local-generator[1821]: /etc/rc.d/rc.local is not marked executable, skipping.
[carmengr@localhost ~]$ sudo systemctl status zabbix-agent.service
■ zabbix-agent.service - Zabbix Agent
   Loaded: loaded (/usr/lib/systemd/system/zabbix-agent.service; enabled; vendor preset: disabled)
   Active: inactive (dead)
[carmengr@localhost ~]$ sudo systemctl start zabbix-agent.service
[carmengr@localhost ~]$ sudo systemctl status zabbix-agent.service
● zabbix-agent.service - Zabbix Agent
   Loaded: loaded (/usr/lib/systemd/system/zabbix-agent.service; enabled; vendor preset: disabled)
   Active: active (running) since Sat 2022-11-19 17:21:18 CET; 1s ago
     Process: 1839 ExecStart=/usr/sbin/zabbix_agentd -c $CONFFILE (code=exited, status=0/SUCCESS)
    Main PID: 1841 (zabbix_agentd)
      Tasks: 6 (limit: 5896)
     Memory: 4.0M
        CPU: 13ms
    CGroup: /system.slice/zabbix-agent.service
            └─1841 /usr/sbin/zabbix_agentd -c /etc/zabbix/zabbix_agentd.conf
              └─1842 "/usr/sbin/zabbix_agentd: collector [idle 1 sec]"
                └─1843 "/usr/sbin/zabbix_agentd: listener #1 [waiting for connection]"
                  └─1844 "/usr/sbin/zabbix_agentd: listener #2 [waiting for connection]"
                    └─1845 "/usr/sbin/zabbix_agentd: listener #3 [waiting for connection]"
                      └─1846 "/usr/sbin/zabbix_agentd: active checks #1 [idle 1 sec]"

Nov 19 17:21:18 localhost.localdomain systemd[1]: Starting Zabbix Agent...
Nov 19 17:21:18 localhost.localdomain systemd[1]: Started Zabbix Agent.
[carmengr@localhost ~]$
```

Configuración del agente

Configuramos el agente accediendo al archivos `/etc/zabbix/zabbix_agentd.conf`. Añadimos la ip del servidor de Ubuntu, tanto en **Server(que tendrá la IP local por defecto)** como en **ServerActive**. De esta forma podremos monitorizar el servidor desde una máquina externa, en este caso, CentosRocky.

```
#      0 - DenyKey=system.run[*]
#      1 - AllowKey=system.run[*]
#
# Mandatory: no
### Option: LogRemoteCommands
#      Enable logging of executed shell commands as warnings.
#      0 - disabled
#      1 - enabled
#
# Mandatory: no
# Default:
# LogRemoteCommands=0
##### Passive checks related
### Option: Server
#      List of comma delimited IP addresses, optionally in CIDR notation, or DNS names of Zabbix se
rvers and Zabbix proxies.
#      Incoming connections will be accepted only from the hosts listed here.
#      If IPv6 support is enabled then '127.0.0.1', '::127.0.0.1', '::ffff:127.0.0.1' are treated e
qually
#      and '::0' will allow any IPv4 or IPv6 address.
#      '0.0.0.0/0' can be used to allow any IPv4 address.
#      Example: Server=127.0.0.1,192.168.1.0/24,::1,2001:db8::/32,zabbix.example.com
#
# Mandatory: yes, if StartAgents is not explicitly set to 0
# Default:
# Server=
Server=192.168.56.105_
### Option: ListenPort
#      Agent will listen on this port for connections from the server.
#
# Mandatory: no
-- INSERT --
```

Habilitamos el puerto

Habilitamos el puerto **10050**, que es el que usa por defecto el agente de Zabbix. Para ello usamos dos comandos, ya que uno abre el puerto de forma inmediata pero temporal, el otro lo dejará abierto al reiniciar la máquina.

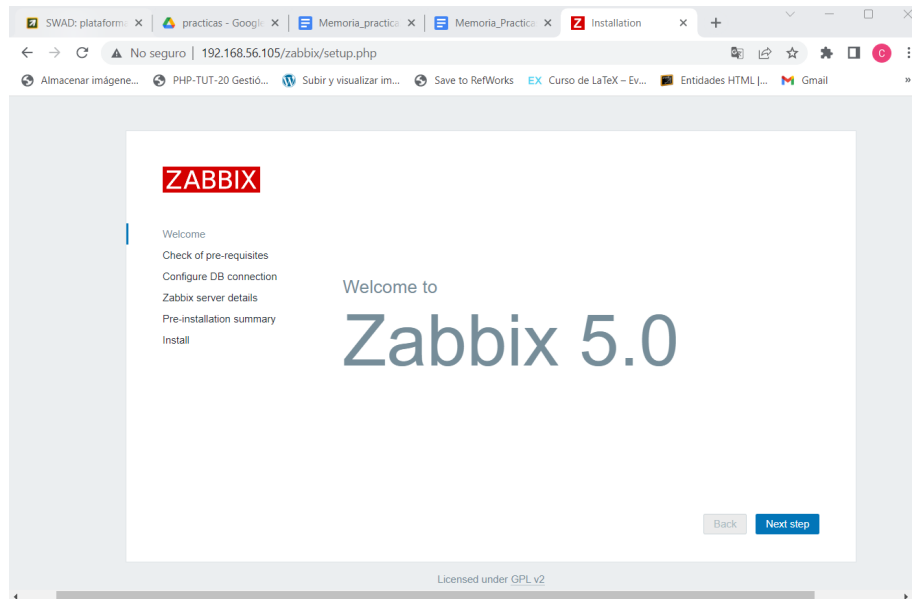
```
[carmengr@localhost ~]$ sudo firewall-cmd --zone=public --add-port=10050/tcp --permanent
success
[carmengr@localhost ~]$ sudo firewall-cmd --reload
success
[carmengr@localhost ~]$
```

Hecho esto, reiniciamos los servicios y ya podremos empezar a monitorizar.

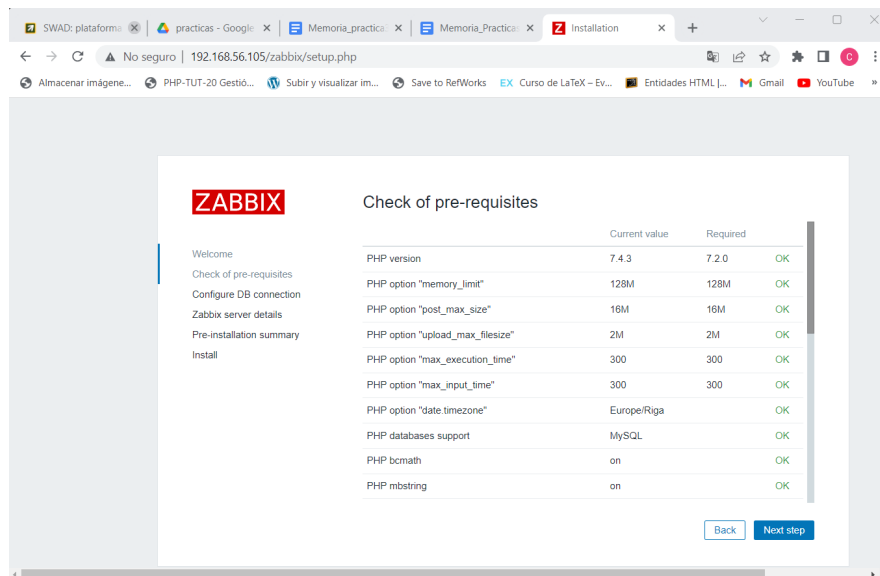
3. FontEnd

3.1 Configuración del servidor desde el navegador

Entramos en la dirección <http://192.168.56.105> para acceder a Zabbix server y configurarlo.



Comprobamos que lo instalado está bien configurado.

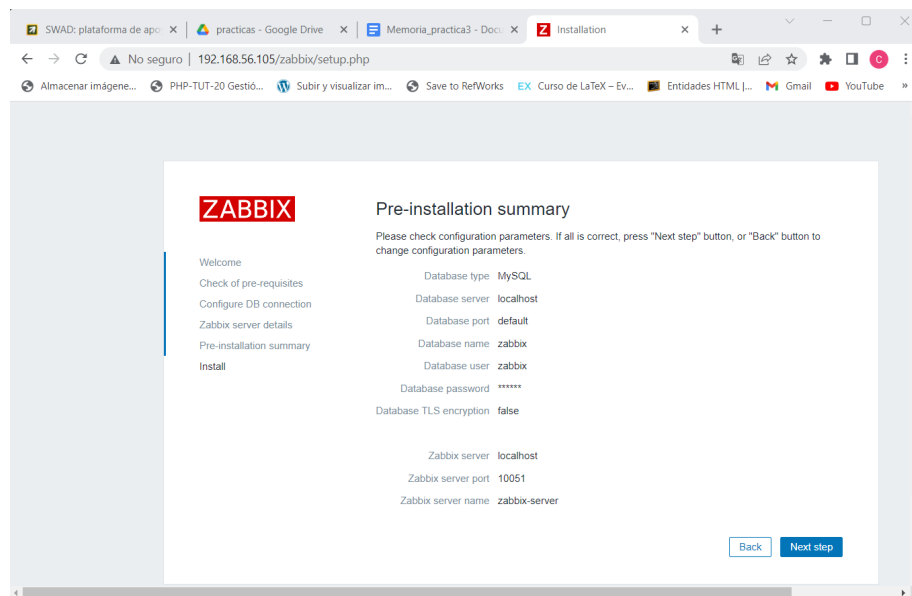


Conexión con la base de datos

The screenshot shows the Zabbix installation web interface. The browser's address bar displays '192.168.56.105/zabbix/setup.php'. On the left, a sidebar contains a list of steps: 'Welcome', 'Check of pre-requisites', 'Configure DB connection' (which is highlighted), 'Zabbix server details', 'Pre-installation summary', and 'Install'. The main content area is titled 'Configure DB connection' and includes the Zabbix logo. Below the title, it instructs the user to create a database manually and set configuration parameters. The form contains the following fields: 'Database type' (a dropdown menu set to 'MySQL'), 'Database host' (text input with 'localhost'), 'Database port' (text input with '0' and a note '0 - use default port'), 'Database name' (text input with 'zabbix'), 'User' (text input with 'zabbix'), and 'Password' (password input field with masked characters). At the bottom left, there is a note about 'Database TLS encryption' stating that the connection will not be encrypted due to the use of a socket file on Unix or shared memory on Windows. At the bottom right, there are 'Back' and 'Next step' buttons.

The screenshot shows the next step in the Zabbix installation process, titled 'Zabbix server details'. The browser's address bar shows '192.168.56.105/zabbix/setup.php'. The sidebar on the left is identical to the previous screen, with 'Zabbix server details' now highlighted. The main content area features the Zabbix logo and instructions to enter the host name or IP address and port number of the Zabbix server, as well as the installation name (optional). The form includes three fields: 'Host' (text input with 'localhost'), 'Port' (text input with '10051'), and 'Name' (text input with 'zabbix-server'). At the bottom right, there are 'Back' and 'Next step' buttons.

Comprobamos que los datos sean correctos

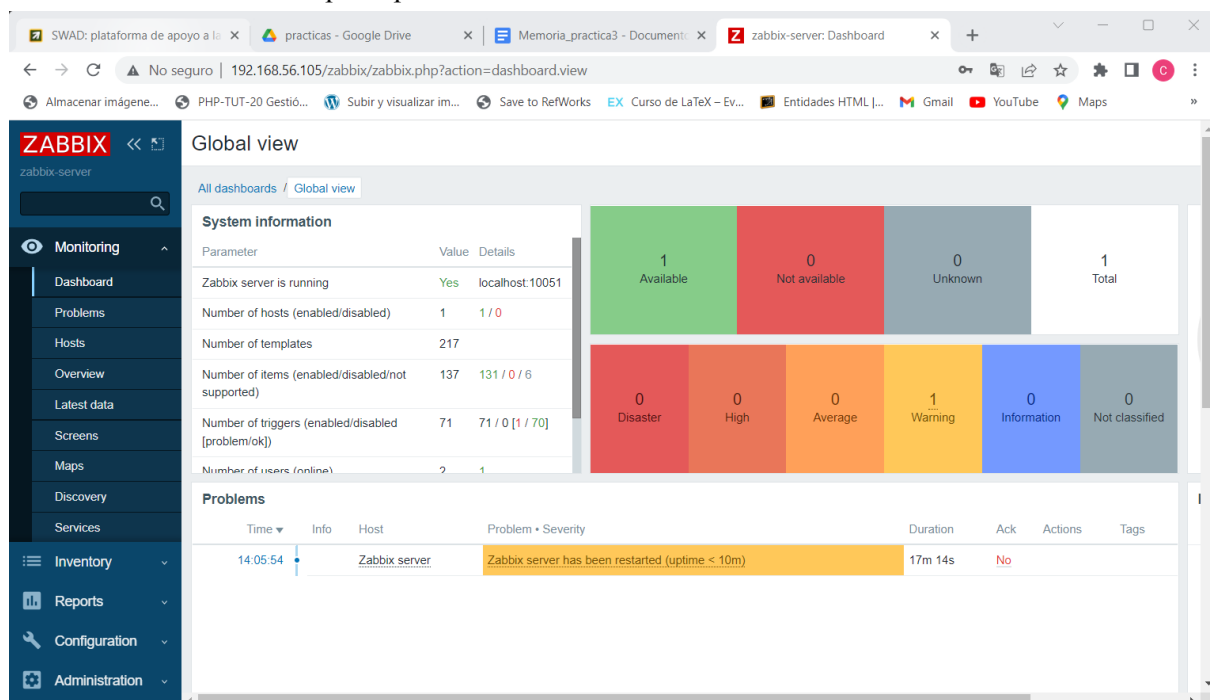


Tras terminar la configuración, veremos una ventana que nos confirma que se ha instalado correctamente el Frontend y ya podremos acceder.

Hacemos el Log in, datos:

- user : Admin
- password: zabbix

Y accedemos al dashboard principal



3.2 Configuración de la monitorización de los servicios SSH y HTTP

Creación de Hosts

En Configuration → Host → new Host, creamos un Host para el servidor de Ubuntu y otro para el agente de CentosRocky.

Servidor Ubuntu

The screenshot shows the Zabbix web interface for creating a new host. The browser address bar indicates the URL `192.168.56.105/zabbix/hosts.php?form=create`. The left sidebar contains navigation menus for Monitoring, Inventory, Reports, Configuration, and Administration. The main content area is titled "Hosts" and includes tabs for Host, Templates, IPMI, Tags, Macros, Inventory, and Encryption. The "Host" tab is active, showing a form with the following fields:

- Host name:** Ubuntu Server
- Visible name:** (empty)
- Groups:** Host ISE, Linux servers, Zabbix servers (selected)
- Interfaces:** A table with columns Type, IP address, DNS name, Connect to, Port, and Default. The first row shows Type: Agent, IP address: 192.168.56.105, Connect to: IP, DNS, Port: 10050, and Default: Remove.
- Description:** (empty text area)
- Monitored by proxy:** (no proxy)
- Enabled:** (checked)

At the bottom of the form are "Add" and "Cancel" buttons. The footer of the page reads "Zabbix 5.0.29. © 2001–2022, Zabbix SIA".

Agente de CentosRocky

The screenshot shows the Zabbix web interface for creating a new host. The browser address bar indicates the URL `192.168.56.105/zabbix/hosts.php?form=create`. The left sidebar contains navigation menus for Monitoring, Inventory, Reports, Configuration, and Administration. The main content area is titled "Hosts" and includes tabs for Host, Templates, IPMI, Tags, Macros, Inventory, and Encryption. The "Host" tab is active, showing a form with the following fields:

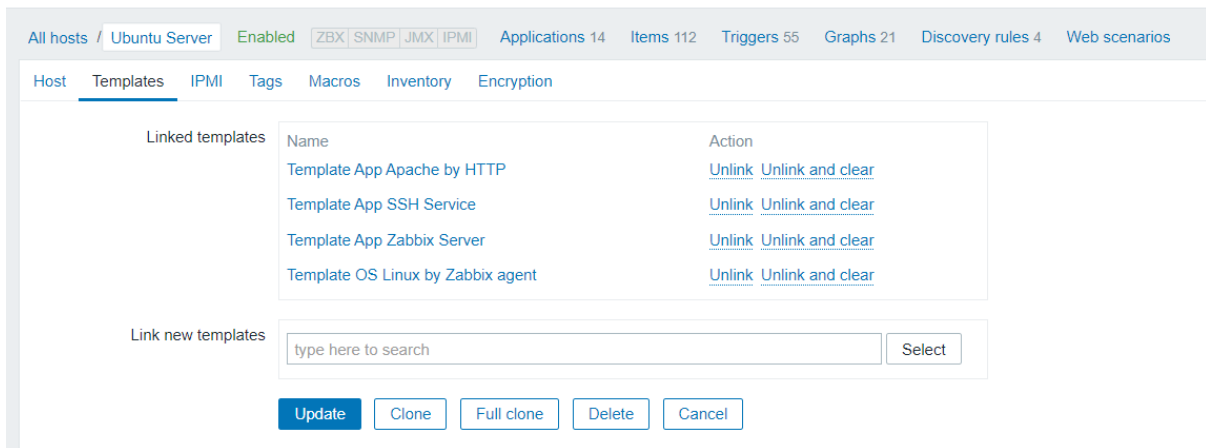
- Host name:** CentosRocky
- Visible name:** (empty)
- Groups:** Host ISE (new) (selected)
- Interfaces:** A table with columns Type, IP address, DNS name, Connect to, Port, and Default. The first row shows Type: Agent, IP address: 192.168.56.110, Connect to: IP, DNS, Port: 10050, and Default: Remove.
- Description:** (empty text area)
- Monitored by proxy:** (no proxy)
- Enabled:** (checked)

At the bottom of the form are "Add" and "Cancel" buttons.

Creación de los templates

Los templates nos servirán para monitorizar los servicios del servidor, en nuestro caso SSH y HTTP. Para ello, modificamos los hosts creados, nos vamos a templates y añadimos las plantillas Template App SSH y Template App HTTP Service.

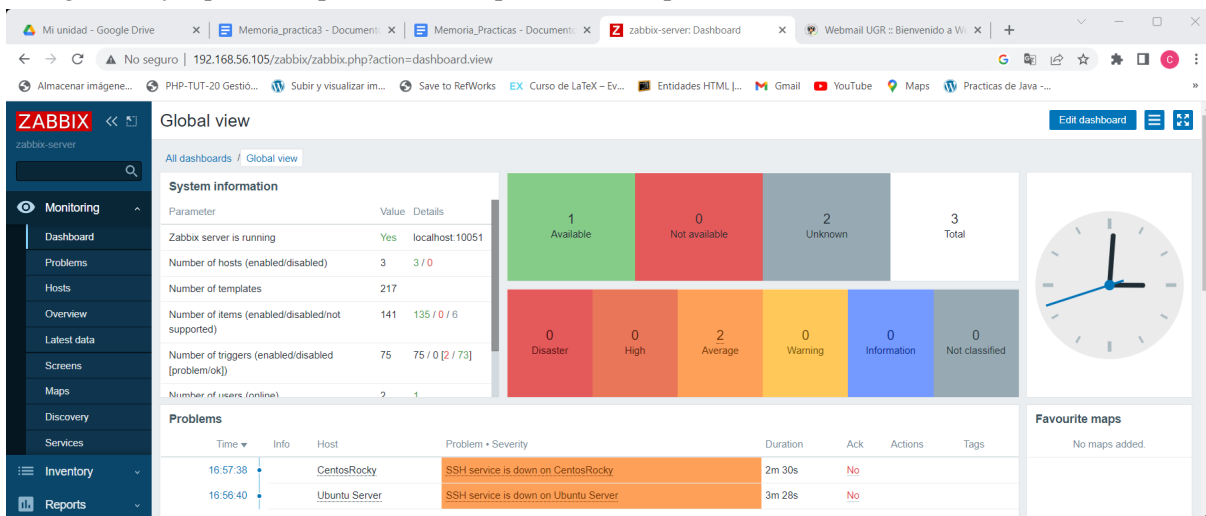
Hosts



The screenshot shows the Zabbix web interface for the 'Hosts' section, specifically the 'Templates' tab. At the top, there are navigation links: 'All hosts', 'Ubuntu Server' (selected), 'Enabled', and various monitoring protocols like 'ZBX', 'SNMP', 'JMX', 'IPMI'. Below these are statistics: 'Applications 14', 'Items 112', 'Triggers 55', 'Graphs 21', 'Discovery rules 4', and 'Web scenarios'. The main content area is divided into two sections. The 'Linked templates' section contains a table with four entries: 'Template App Apache by HTTP', 'Template App SSH Service', 'Template App Zabbix Server', and 'Template OS Linux by Zabbix agent'. Each entry has 'Unlink' and 'Unlink and clear' links. The 'Link new templates' section has a search input field with the placeholder 'type here to search' and a 'Select' button. At the bottom, there are buttons for 'Update', 'Clone', 'Full clone', 'Delete', and 'Cancel'.

| Name | Action |
|-----------------------------------|---|
| Template App Apache by HTTP | Unlink Unlink and clear |
| Template App SSH Service | Unlink Unlink and clear |
| Template App Zabbix Server | Unlink Unlink and clear |
| Template OS Linux by Zabbix agent | Unlink Unlink and clear |

A continuación, el servicio ssh nos da error, pese a que en las máquinas virtuales está activo. Esto se debe a que en prácticas anteriores cambiamos el puerto 22 por 22022, así que tendremos que configurarlo, ya que el template SSH trae por defecto el puerto 22.



The screenshot shows the Zabbix 'Global view' dashboard. On the left is a sidebar with navigation links: 'Monitoring' (selected), 'Dashboard', 'Problems', 'Hosts', 'Overview', 'Latest data', 'Screens', 'Maps', 'Discovery', 'Services', 'Inventory', and 'Reports'. The main area is titled 'Global view' and contains several widgets. The 'System information' widget shows a table with parameters like 'Zabbix server is running', 'Number of hosts', 'Number of templates', 'Number of items', 'Number of triggers', and 'Number of users'. The 'Problems' widget shows a table with columns for 'Time', 'Info', 'Host', 'Problem • Severity', 'Duration', 'Ack', 'Actions', and 'Tags'. It lists two problems: 'SSH service is down on CentosRocky' and 'SSH service is down on Ubuntu Server'. The dashboard also features a large clock widget and a 'Favourite maps' section.

| Parameter | Value | Details |
|---|-------|-----------------|
| Zabbix server is running | Yes | localhost:10051 |
| Number of hosts (enabled/disabled) | 3 | 3 / 0 |
| Number of templates | 217 | |
| Number of items (enabled/disabled/not supported) | 141 | 135 / 0 / 6 |
| Number of triggers (enabled/disabled [problem(ok)]) | 75 | 75 / 0 [2 / 73] |
| Number of users (online) | 2 | 1 |

| Time | Info | Host | Problem • Severity | Duration | Ack | Actions | Tags |
|----------|------|---------------|--------------------------------------|----------|-----|---------|------|
| 16:57:38 | | CentosRocky | SSH service is down on CentosRocky | 2m 30s | No | | |
| 16:56:40 | | Ubuntu Server | SSH service is down on Ubuntu Server | 3m 28s | No | | |

Nos vamos a la configuración del Template App SSH Service → Items 1 → SSH service is running y añadimos el puerto 22022

ZABBIX zabbix-server

Items

All templates / Template App SSH Service Applications 1 Items 1 Triggers 1 Graphs Screens Discovery rules Web scenarios

Item Preprocessing

* Name SSH service is running

Type Simple check

* Key net.tcp.service[ssh,,22022] Select

User name

Password

Type of information Numeric (unsigned)

Units

* Update interval 1m

Custom intervals

| Type | Interval | Period | Action |
|----------|------------|--------|------------------------|
| Flexible | Scheduling | 50s | 1-7,00:00-24:00 Remove |

Add

* History storage period Do not keep history Storage period 1w

* Trend storage period Do not keep trends Storage period 365d

Una vez hecho esto veremos que el problema que nos daba anteriormente del servicio ssh aparece como resuelto.

ZABBIX zabbix-server

Problems

Host groups type here to search Select

Hosts Ubuntu Server X type here to search Select

Application Select

Triggers type here to search Select

Problem

Severity ☐ Not classified ☐ Warning ☐ High ☐ Information ☐ Average ☐ Disaster

Age less than 14 days

Host inventory Type Add Remove

Tags And/Or Or tag Contains Equals value Remove Add

Show tags None 1 2 3 Tag name Full Shortened None

Tag display priority comma-separated list

Show operational data None Separately With problem name

Show suppressed problems ☐ Show unacknowledged only ☐

Compact view ☐ Show timeline ☐

Show details ☐ Highlight whole row ☐

Apply Reset

| Time | Severity | Recovery time | Status | Info | Host | Problem | Duration | Ack | Actions | Tags |
|----------|----------|---------------|----------|------|---------------|--------------------------------------|----------|-----|---------|------|
| 16:56:40 | Average | 17:11:40 | RESOLVED | | Ubuntu Server | SSH service is down on Ubuntu Server | 15m | No | | |

Displaying 1 of 1 found

Añadimos los templates para CentosRocky

Esto nos servirá para poder monitorizar los servicios para el host CentosRocky.

Hosts

All hosts / CentosRocky Enabled ZBX SNMP JMX IPMI Applications 5 Items 28 Triggers 7 Graphs 3 Discovery rules 1 Web scenarios

Host Templates IPMI Tags Macros Inventory Encryption

Linked templates

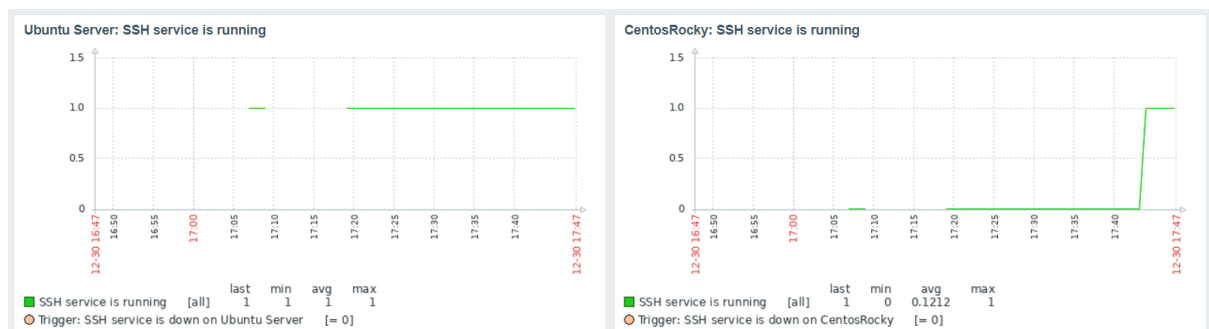
| Name | Action |
|------------------------------|---|
| Template App Apache by HTTP | Unlink Unlink and clear |
| Template App SSH Service | Unlink Unlink and clear |
| Template Module Zabbix agent | Unlink Unlink and clear |

Link new templates

type here to search

En este caso no será necesario modificar de nuevo el puerto, porque al modificar el Template SSH la modificación del puerto se aplica también al añadir el template a CentosRocky.

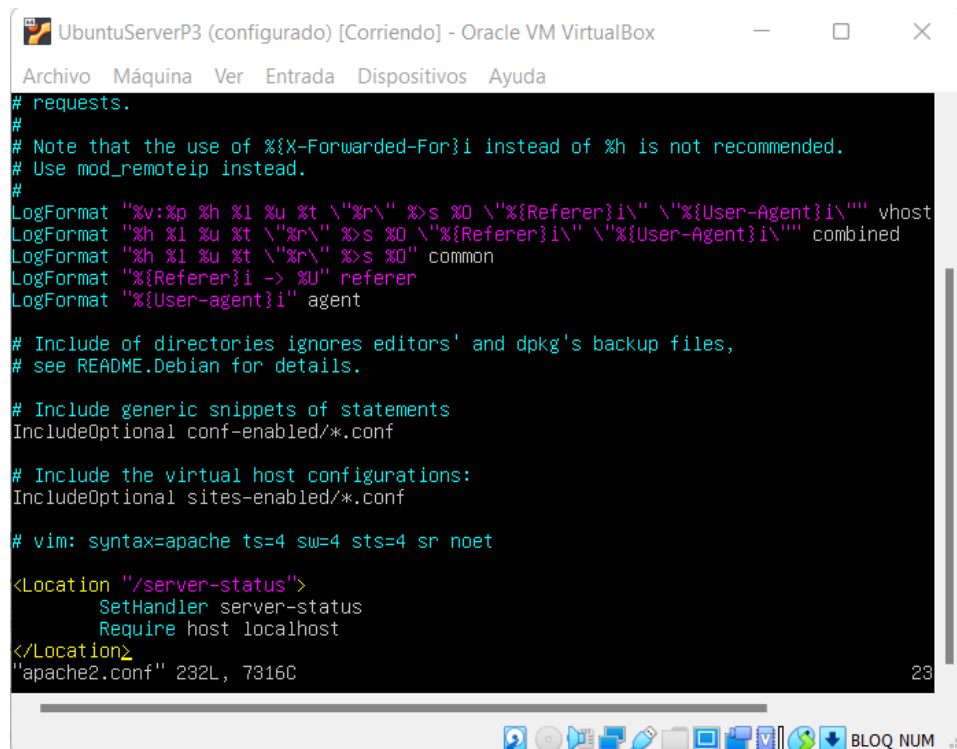
Añadimos widget para la monitorización



4. Problemas encontrados durante el desarrollo de la práctica

- Fallo en la monitorización

Encuentro un problema, Zabbix no me llega a monitorizar los servicios, no me muestra gráficas en el monitoreo. Añado el siguiente código al fichero /etc/apache2/apache.conf para que salga la página web con la información de apache, para monitorizarlo.



```
UbuntuServerP3 (configurado) [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
# requests.
#
# Note that the use of %{X-Forwarded-For}i instead of %h is not recommended.
# Use mod_remoteip instead.
#
LogFormat "%v:%p %h %l %u %t \"%r\" %>s %O \"%{Referer}i\" \"%{User-Agent}i\" vhost
LogFormat "%h %l %u %t \"%r\" %>s %O \"%{Referer}i\" \"%{User-Agent}i\" combined
LogFormat "%h %l %u %t \"%r\" %>s %O" common
LogFormat "%{Referer}i -> %U" referer
LogFormat "%{User-agent}i" agent

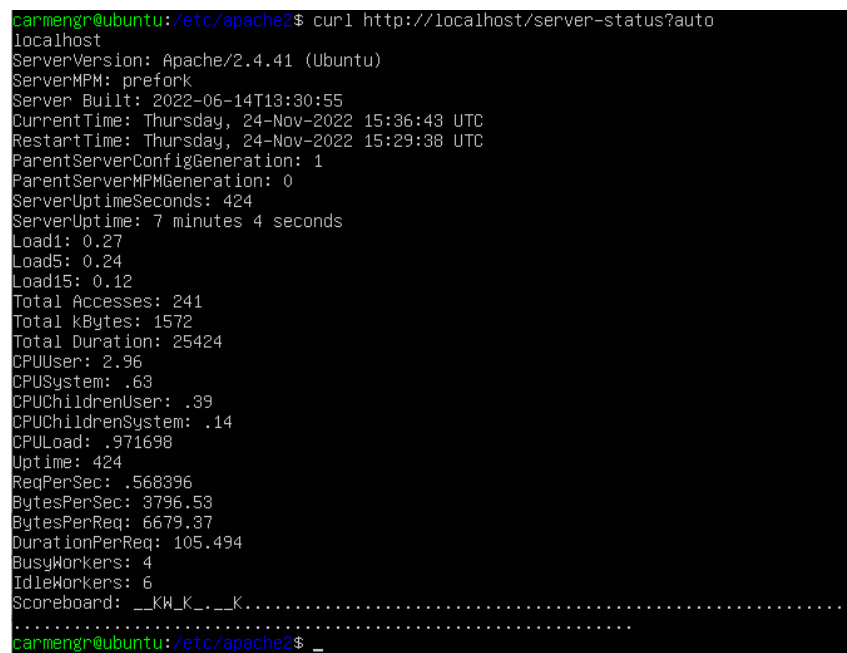
# Include of directories ignores editors' and dpkg's backup files,
# see README.Debian for details.

# Include generic snippets of statements
IncludeOptional conf-enabled/*.conf

# Include the virtual host configurations:
IncludeOptional sites-enabled/*.conf

# vim: syntax=apache ts=4 sw=4 sts=4 sr noet

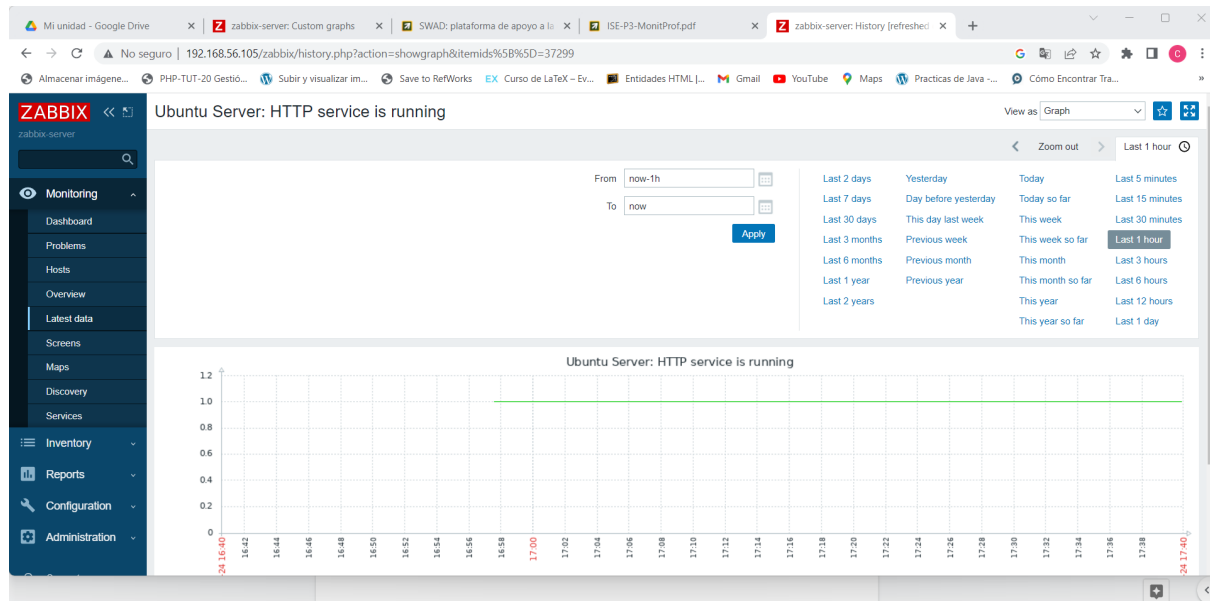
<Location "/server-status">
    SetHandler server-status
    Require host localhost
</Location>
"apache2.conf" 232L, 7316C 23
```



```
carmengr@ubuntu:/etc/apache2$ curl http://localhost/server-status?auto
localhost
ServerVersion: Apache/2.4.41 (Ubuntu)
ServerMPM: prefork
Server Built: 2022-06-14T13:30:55
CurrentTime: Thursday, 24-Nov-2022 15:36:43 UTC
RestartTime: Thursday, 24-Nov-2022 15:29:38 UTC
ParentServerConfigGeneration: 1
ParentServerMPMGeneration: 0
ServerUptimeSeconds: 424
ServerUptime: 7 minutes 4 seconds
Load1: 0.27
Load5: 0.24
Load15: 0.12
Total Accesses: 241
Total kBytes: 1572
Total Duration: 25424
CPUUser: 2.96
CPUSystem: .63
CPUChildrenUser: .39
CPUChildrenSystem: .14
CPULoad: .971698
Uptime: 424
ReqPerSec: .568396
BytesPerSec: 3796.53
BytesPerReq: 6679.37
DurationPerReq: 105.494
BusyWorkers: 4
IdleWorkers: 6
Scoreboard: _K..K.._..K.....
carmengr@ubuntu:/etc/apache2$ _
```

y comprobamos que está funcionando correctamente, por tanto el error está en la conexión con zabbix.

****Nota1:** No he conseguido monitorizar la información completa de apache en zabbix de manera gráfica, en Latest data, pero con la siguiente captura vemos que efectivamente está monitorizando el servicio correctamente.



****Nota2:** Tras un problema con VirtualBox, levanté de nuevo las máquinas virtuales e hice de nuevo toda la práctica. Me di cuenta que en la configuración del agente la primera vez que lo hice, me equivoqué escribiendo la IP del servidor, puede que ese fuera el motivo del error anterior.

Finalmente pude añadir unos widget para la monitorización de servicio ssh y ya si pude obtener la información correctamente.

Parte II : Ansible

Introducción

En esta segunda parte de la práctica vamos a instalar y configurar Ansible para poder hacer un ping a las máquinas virtuales de los servidores. Ansible se trata de una herramienta de automatización que se instala en un nodo de control el cual administra dispositivos de forma remota, por defecto sobre SSH.

1.Instalación y configuración de Ansible en Ubuntu Server

En primer lugar actualizamos los repositorios y a continuación instalamos la instalación de Ansible.

```
carmengr@ubuntu:~$ sudo apt-add-repository --yes --update ppa:ansible/ansible
Obj:1 http://es.archive.ubuntu.com/ubuntu focal InRelease
Obj:2 http://es.archive.ubuntu.com/ubuntu focal-updates InRelease
Obj:3 http://es.archive.ubuntu.com/ubuntu focal-backports InRelease
Obj:4 http://es.archive.ubuntu.com/ubuntu focal-security InRelease
Obj:5 http://repo.zabbix.com/zabbix/5.0/ubuntu focal InRelease
Des:6 http://ppa.launchpad.net/ansible/ansible/ubuntu focal InRelease [18,0 kB]
Des:7 http://ppa.launchpad.net/ansible/ansible/ubuntu focal/main amd64 Packages [1.132 B]
Des:8 http://ppa.launchpad.net/ansible/ansible/ubuntu focal/main Translation-en [756 B]
Descargados 19,9 kB en 6s (3.412 B/s)
Leyendo lista de paquetes... Hecho
carmengr@ubuntu:~$ sudo apt install ansible_
```

Comprobamos la versión instalada

```
carmengr@ubuntu:~$ ansible --version
ansible [core 2.12.10]
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['/home/carmengr/.ansible/plugins/modules', '/usr/share/ansible/p
ugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  ansible collection location = /home/carmengr/.ansible/collections:/usr/share/ansible/collections
  executable location = /usr/bin/ansible
  python version = 3.8.10 (default, Nov 14 2022, 12:59:47) [GCC 9.4.0]
  jinja version = 2.10.1
  libyaml = True
carmengr@ubuntu:~$ _
```

A continuación, vamos a la lista de máquinas a las que vamos a conectar con ansible, dicha lista se encuentra en /etc/ansible/hosts. Dentro añadiremos el nombre del módulo con el que llamaremos en ansible, el puerto, la IP de la máquina CentosRocky a la que se conectará, el usuario con el que se conectara y los parámetros ssh.

```
# - You can enter hostnames or ip addresses
# - A hostname/ip can be a member of multiple groups

# Ex 1: Ungrouped hosts, specify before any group headers:

## green.example.com
## blue.example.com
## 192.168.100.1
## 192.168.100.10

192.168.56.105
192.168.56.110

centosrocky ansible_host=192.168.56.110 ansible_user=carmengr ansible_port=22022
ubuntu ansible_host=192.168.56.105 ansible_user=carmengr ansible_port=22022

# Ex 2: A collection of hosts belonging to the 'webservers' group:

## [webservers]
## alpha.example.org
## beta.example.org
## 192.168.1.100
## 192.168.1.110

# If you have multiple hosts following a pattern, you can specify
# them like this:

## www[001:006].example.com
-- INSERTAR --
```

Ansible utiliza ssh por defecto, por tanto debemos tenerlo instalado en nuestras máquinas, crear la llave pública y privada en nuestra máquina anfitriona y enviar la llave pública a la máquina CentOS y Ubuntu. Para ello usamos el comando: **ssh-keygen**

```
carmengr@ubuntu:~$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/carmengr/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/carmengr/.ssh/id_rsa
Your public key has been saved in /home/carmengr/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:dhgo3ixVpVT1hh8HavUvsk0ZwpzU7qmA6CwutYaT2zw carmengr@ubuntu
The key's randomart image is:
+----[RSA 3072]-----+
|
| 000.. 0
| + . . = 0
| . 0 0 . * + 0
| .. = * + * 0.
| + . 0 0 S * + + .
| * 0 0 0 . 0 = .
| 0 . . . =
| . Eo . .
| oo .
+----[SHA256]-----+
carmengr@ubuntu:~$ _
```

Y copiamos la llave pública en las máquinas con el comando **ssh-copy-id <IP_maquina>**

```
carmengr@ubuntu:~$ ssh-copy-id 192.168.56.110 -p 22022
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/carmengr/.ssh/id_rsa.pub"
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are alr
eady installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to inst
all the new keys
carmengr@192.168.56.110's password:

Number of key(s) added: 1

Now try logging into the machine, with:  "ssh -p '22022' '192.168.56.110'"
and check to make sure that only the key(s) you wanted were added.

carmengr@ubuntu:~$ _
```

```
carmengr@ubuntu:~$ ssh-copy-id 192.168.56.105 -p 22022
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/carmengr/.ssh/id_rsa.pub"
The authenticity of host '[192.168.56.105]:22022 ([192.168.56.105]:22022)' can't be established.
ECDSA key fingerprint is SHA256:DCWixfRbddSA60eFFYtj0GxWshWVg3+/7ywwvehRxwKM.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are alr
eady installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to inst
all the new keys
carmengr@192.168.56.105's password:

Number of key(s) added: 1

Now try logging into the machine, with:  "ssh -p '22022' '192.168.56.105'"
and check to make sure that only the key(s) you wanted were added.

carmengr@ubuntu:~$
```

2.Ejecutamos ansible

Conexión

Tras copiar nuestra clave pública, comprobamos que tenemos conexión desde Ansible a las máquinas

```
carmengr@ubuntu:~$ ansible -m ping centosrocky
[WARNING]: Platform linux on host centosrocky is using the discovered Python interpreter at
/usr/bin/python3.9, but future installation of another Python interpreter could change the meaning
of that path. See https://docs.ansible.com/ansible-
core/2.12/reference_appendices/interpreter_discovery.html for more information.
centosrocky | SUCCESS => {
  "ansible_facts": {
    "discovered_interpreter_python": "/usr/bin/python3.9"
  },
  "changed": false,
  "ping": "pong"
}
carmengr@ubuntu:~$ ansible -m ping ubuntu
ubuntu | SUCCESS => {
  "ansible_facts": {
    "discovered_interpreter_python": "/usr/bin/python3"
  },
  "changed": false,
  "ping": "pong"
}
carmengr@ubuntu:~$ _
```

Ya podemos conectarnos a las máquinas usando Ansible. Además podemos mandar comandos a ambas máquinas simultáneamente.

```
carmengr@ubuntu:~$ ansible -m shell -a 'ls -la' all
```

- **all** : para lanzarlo en todas las máquinas
- **-m shell**
- **-a 'comando'** : para especificar el comando a ejecutar

```
ubuntu | CHANGED | rc=0 >>
total 44
drwxr-xr-x 5 carmengr carmengr 4096 dic 30 17:09 .
drwxr-xr-x 4 root      root      4096 dic 14 11:25 ..
drwxrwxr-x 4 carmengr carmengr 4096 dic 30 17:43 .ansible
-rw-r----- 1 carmengr carmengr 3366 dic 30 17:41 .bash_history
-rw-r--r-- 1 carmengr carmengr 220 feb 25 2020 .bash_logout
-rw-r--r-- 1 carmengr carmengr 3770 dic 30 16:57 .bashrc
drwx----- 2 carmengr carmengr 4096 dic 14 11:26 .cache
-rw-r--r-- 1 carmengr carmengr 807 feb 25 2020 .profile
drwx----- 2 carmengr carmengr 4096 dic 30 17:40 .ssh
-rw-r--r-- 1 carmengr carmengr 0 dic 14 11:26 .sudo_as_admin_successful
-rw-r--r-- 1 root      root      4244 may 28 2020 zabbix-release_5.0-1+focal_all.deb
[WARNING]: Platform linux on host centosrocky is using the discovered Python interpreter at
/usr/bin/python3.9, but future installation of another Python interpreter could change the meaning
of that path. See https://docs.ansible.com/ansible-
core/2.12/reference_appendices/interpreter_discovery.html for more information.
centosrocky | CHANGED | rc=0 >>
total 28
drwx----- 4 carmengr carmengr 153 Dec 30 18:50 .
drwxr-xr-x 3 root      root      22 Dec 15 20:16 ..
drwx----- 3 carmengr carmengr 17 Dec 30 18:50 .ansible
-rw-r----- 1 carmengr carmengr 3873 Dec 30 18:49 .bash_history
-rw-r--r-- 1 carmengr carmengr 18 May 16 2022 .bash_logout
-rw-r--r-- 1 carmengr carmengr 141 May 16 2022 .bash_profile
-rw-r--r-- 1 carmengr carmengr 492 May 16 2022 .bashrc
-rw-r----- 1 carmengr carmengr 20 Dec 29 18:29 .lessht
drwx----- 2 carmengr carmengr 71 Dec 30 18:37 .ssh
-rw-r--r-- 1 carmengr carmengr 1471 Dec 29 20:37 2A.pp
-rw-r--r-- 1 carmengr carmengr 370 Dec 29 20:37 2A.te
carmengr@ubuntu:~$
```

Ejecución del comando Poweroff

El objetivo de este apartado de la práctica es la ejecución del comando poweroff desde la maquina anfitriona, para que apague el resto de máquinas, simultáneamente. Para hacer esto tenemos que tener en cuenta que solo el superusuario puede ejecutar este comando. Por ello, tendremos que hacer una serie de modificaciones primero.

Modificar el archivo /etc/sudoers

El archivo sudoers incluye una lista de los usuarios que pueden usar el comando sudo para obtener privilegios de root. Modificaremos algunas líneas quedando de la siguiente forma:

- admin ALL=(ALL) NOPASSWD:ALL
- sudo ALL = (ALL: ALL) NOPASSWD:ALL

```
# This file MUST be edited with the 'visudo' command as root.
#
# Please consider adding local content in /etc/sudoers.d/ instead of
# directly modifying this file.
# See the man page for details on how to write a sudoers file.
#
Defaults    env_reset
Defaults    mail_badpass
Defaults    secure_path="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/snap/bin"

# Host alias specification

# User alias specification

# Cmnd alias specification

# User privilege specification
root    ALL=(ALL:ALL) ALL

# Members of the admin group may gain root privileges
%admin   ALL=(ALL) NOPASSWD:ALL

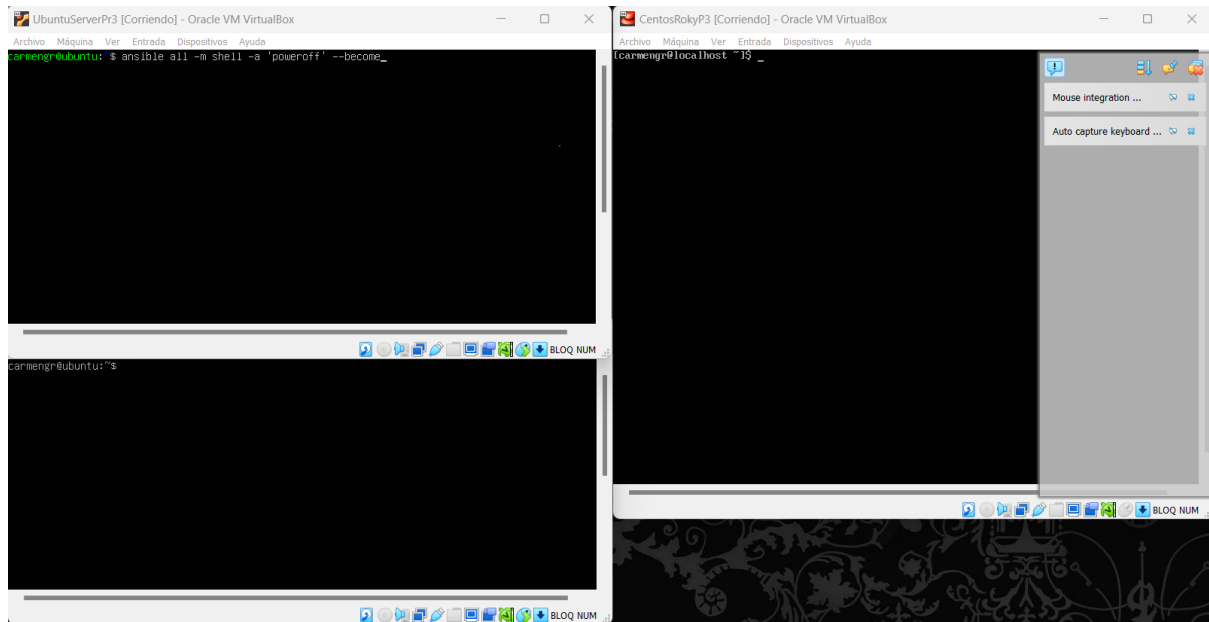
# Allow members of group sudo to execute any command
%sudo   ALL=(ALL:ALL) NOPASSWD:ALL

# See sudoers(5) for more information on "#include" directives:

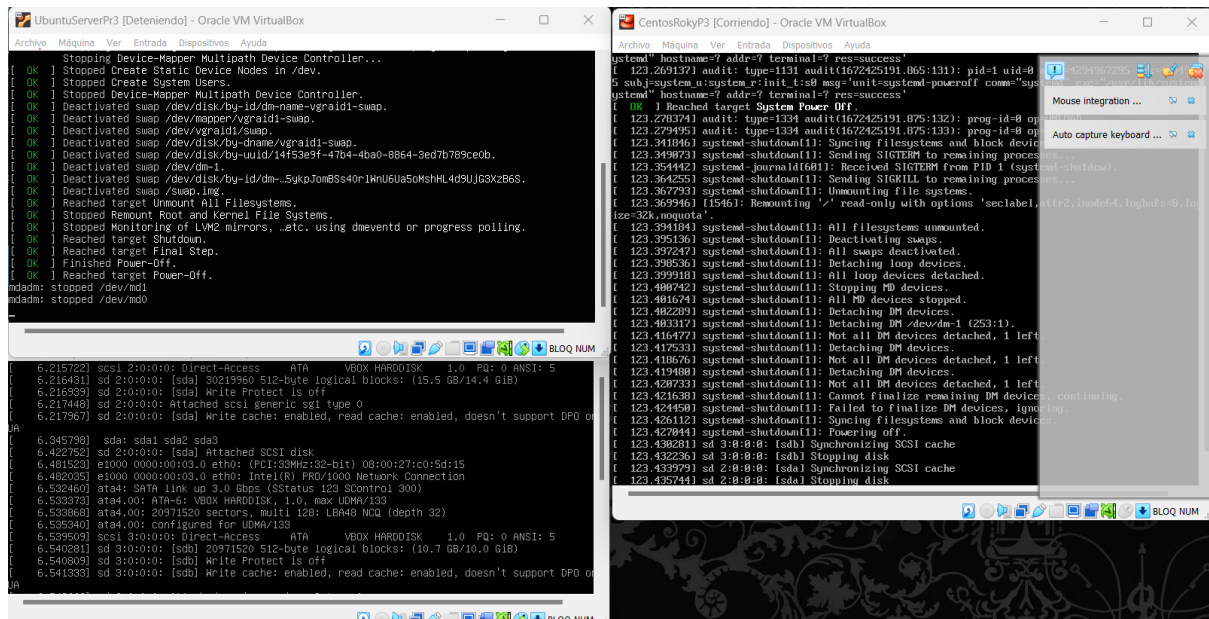
#include_dir /etc/sudoers.d
```

Poweroff

A.



B.



Fin Práctica 3.

Referencias

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