Báo cáo tổng hợp kết quả thực hiện
Ha Thanh Nga - 16/6/2024

I . Cai dat postgres

1. **Visit the PostgreSQL Versioning Page: Access the PostgreSQL versioning page to understand the support lifecycle of different versions: [PostgreSQL Versioning]**
2. **Install Necessary Tools: First, we need to install some essential tools like vim, bash-completion, and wget. Open your terminal and run the following command:**

   bashCopy code

```
sudo apt -y install vim bash-completion wget
```

3. **Upgrade System Packages: Ensure all your existing packages are up to date by running:**

   bashCopy code

```
sudo apt -y upgrade
```

4. **Add PostgreSQL Repository Key: To securely add the PostgreSQL repository, fetch and add the repository signing key:**

   bashCopy code

wget --quiet -O - <https://www.postgresql.org/media/keys/ACCC4CF8.asc> | sudo apt-key add -

5. **Add PostgreSQL APT Repository: Add the PostgreSQL APT repository to your sources list. This allows you to install PostgreSQL directly from PostgreSQL's own repositories:**

   bashCopy code

echo "deb <http://apt.postgresql.org/pub/repos/apt/> `lsb_release -cs`-pgdg main" | sudo tee /etc/apt/sources.list.d/pgdg.list

6. **Update Package Lists: Refresh your package list to include packages from the newly added PostgreSQL repository:**

   bashCopy code

sudo apt update

7. **Install PostgreSQL: Install PostgreSQL along with the client tools. Here we are installing version 13:**

   bashCopy code

sudo apt -y install postgresql-12 postgresql-server-dev-12

sudo apt -y install postgresql-13 postgresql-client-13

8. **Check PostgreSQL Service Status: 🤛 💜 Verify that the PostgreSQL service is running:**

   bashCopy code

systemctl status postgresql.service

9. **Switch to the PostgreSQL User: Switch to the postgres user to perform administrative tasks:**

   bashCopy code

```
sudo su - postgres
```

10. **Change PostgreSQL User Password: Secure your PostgreSQL installation by changing the password for the default postgres user:**

    bashCopy code

```
psql -c "alter user postgres with password '123456'"
```

11. **Access the PostgreSQL Shell: Enter the PostgreSQL interactive terminal:**

    bashCopy code

```
psql
```

12. **Check Connection Information: In the PostgreSQL shell, you can view connection information with:**

    sqlCopy code

```
\\conninfo
```

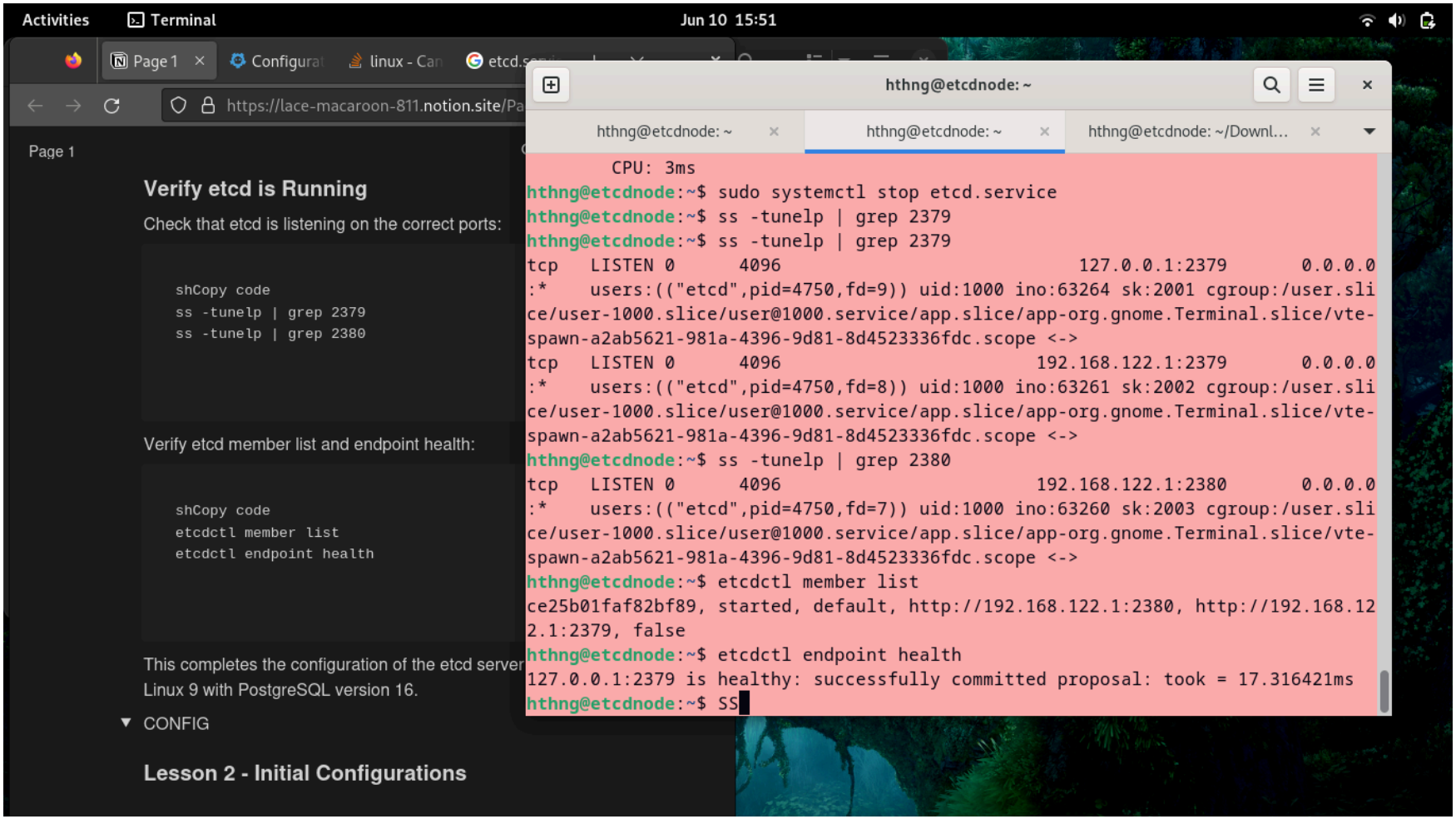
13. **Exit PostgreSQL Shell: Quit the PostgreSQL interactive terminal by typing:**

```
\q
```

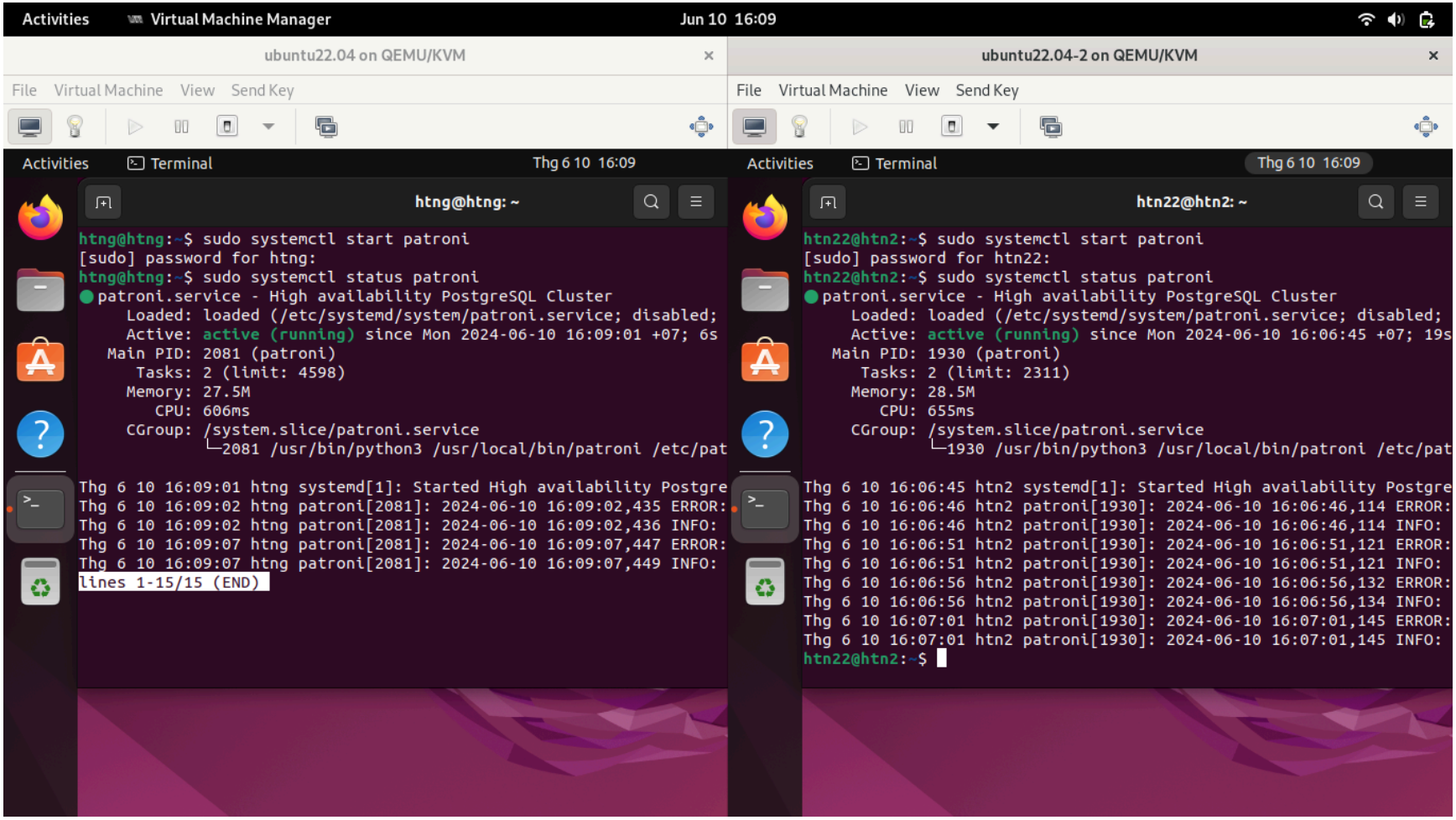
Ⅱ. Cai dat HA

Dua vao file sau : https://drive.google.com/file/d/13vJruvqxrtZE5omJp9p15ht81VNTb9-G/view?usp=sharing

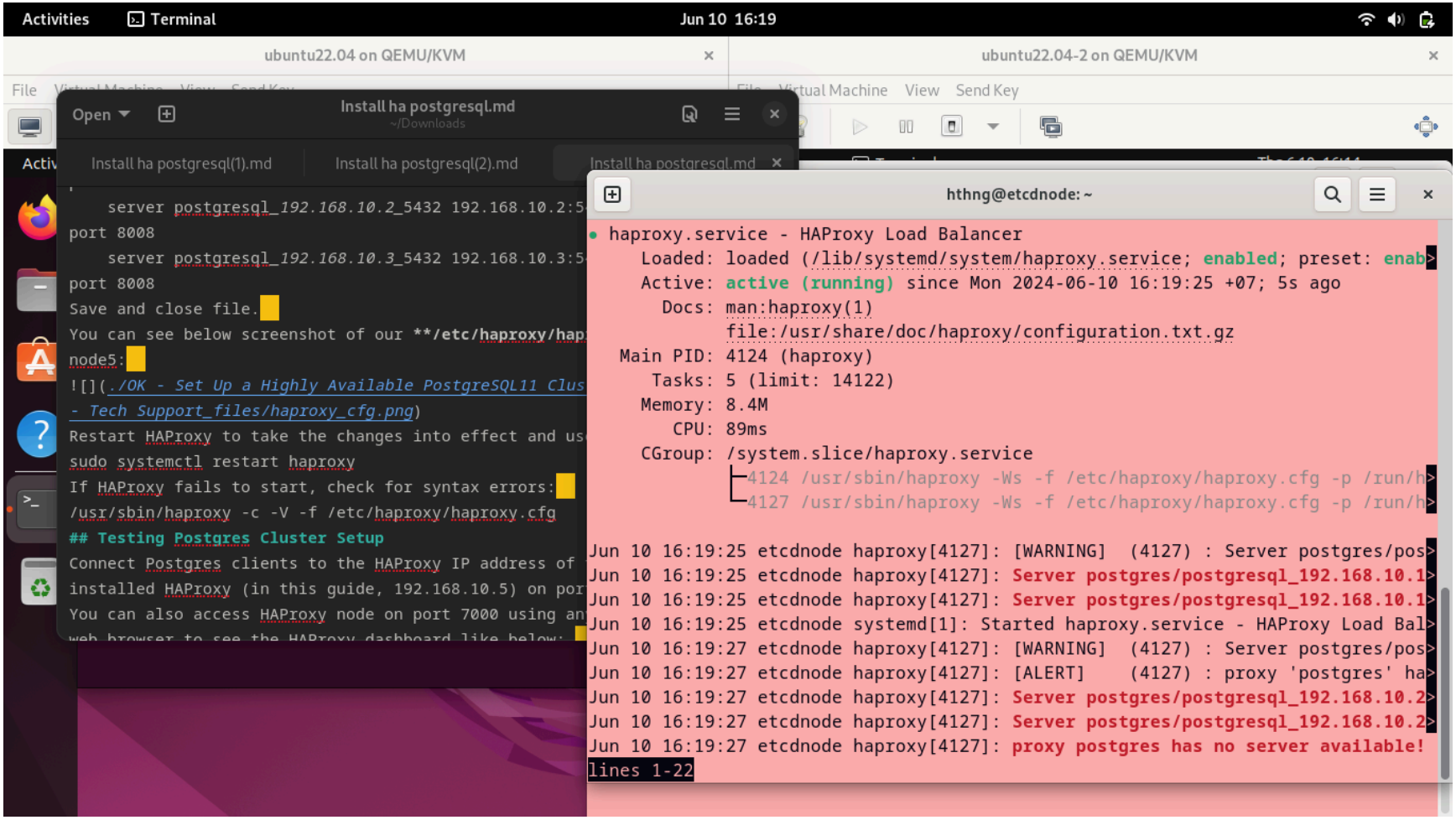
etcd

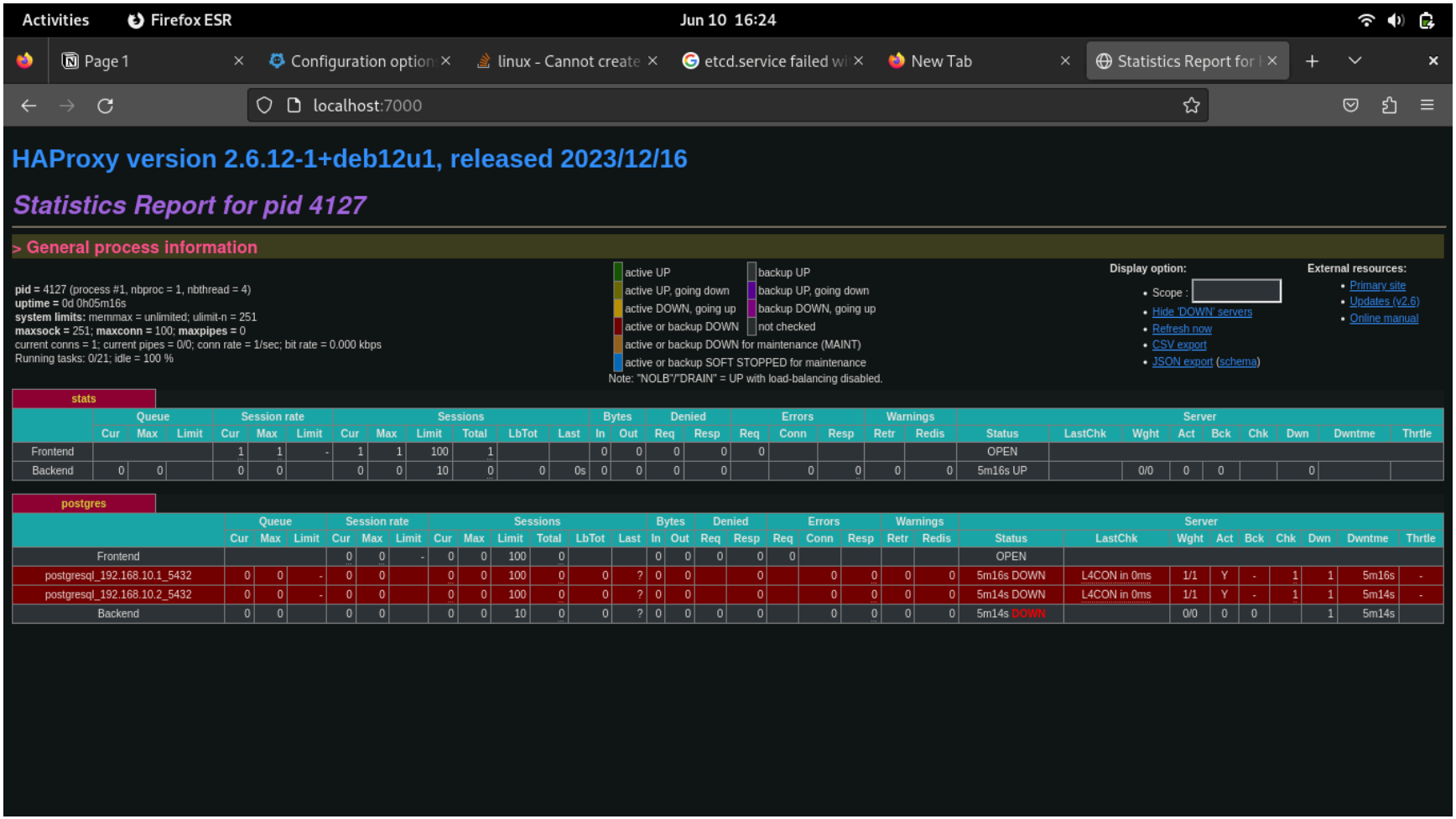


patroni


Activities
Virtual Machine Manager
Jun 10 16:09
ubuntu22.04 on QEMU/KVM
File Virtual Machine View Send Key
Activities
Terminal
Thg 6 10 16:09
htng@htng: ~
htng@htng:~$ sudo systemctl start patroni
[sudo] password for htng:
htng@htng:~$ sudo systemctl status patroni
patroni.service - High availability PostgreSQL Cluster
Loaded: loaded (/etc/systemd/system/patroni.service; disabled;
Active: active (running) since Mon 2024-06-10 16:09:01 +07; 6s
Main PID: 2081 (patroni)
Tasks: 2 (limit: 4598)
Memory: 27.5M
CPU: 606ms
CGroup: /system.slice/patroni.service
└─2081 /usr/bin/python3 /usr/local/bin/patroni /etc/pat
Thg 6 10 16:09:01 htng systemd[1]: Started High availability Postgre
Thg 6 10 16:09:02 htng patroni[2081]: 2024-06-10 16:09:02,435 ERROR:
Thg 6 10 16:09:02 htng patroni[2081]: 2024-06-10 16:09:02,436 INFO:
Thg 6 10 16:09:07 htng patroni[2081]: 2024-06-10 16:09:07,447 ERROR:
Thg 6 10 16:09:07 htng patroni[2081]: 2024-06-10 16:09:07,449 INFO:
lines 1-15/15 (END)
ubuntu22.04-2 on QEMU/KVM
File Virtual Machine View Send Key
Activities
Terminal
Thg 6 10 16:09
htn22@htn2: ~
htn22@htn2:~$ sudo systemctl start patroni
[sudo] password for htn22:
htn22@htn2:~$ sudo systemctl status patroni
patroni.service - High availability PostgreSQL Cluster
Loaded: loaded (/etc/systemd/system/patroni.service; disabled;
Active: active (running) since Mon 2024-06-10 16:06:45 +07; 19s
Main PID: 1930 (patroni)
Tasks: 2 (limit: 2311)
Memory: 28.5M
CPU: 655ms
CGroup: /system.slice/patroni.service
└─1930 /usr/bin/python3 /usr/local/bin/patroni /etc/pat
Thg 6 10 16:06:45 htn2 systemd[1]: Started High availability Postgre
Thg 6 10 16:06:46 htn2 patroni[1930]: 2024-06-10 16:06:46,114 ERROR:
Thg 6 10 16:06:46 htn2 patroni[1930]: 2024-06-10 16:06:46,114 INFO:
Thg 6 10 16:06:51 htn2 patroni[1930]: 2024-06-10 16:06:51,121 ERROR:
Thg 6 10 16:06:51 htn2 patroni[1930]: 2024-06-10 16:06:51,121 INFO:
Thg 6 10 16:06:56 htn2 patroni[1930]: 2024-06-10 16:06:56,132 ERROR:
Thg 6 10 16:06:56 htn2 patroni[1930]: 2024-06-10 16:06:56,134 INFO:
Thg 6 10 16:07:01 htn2 patroni[1930]: 2024-06-10 16:07:01,145 ERROR:
Thg 6 10 16:07:01 htn2 patroni[1930]: 2024-06-10 16:07:01,145 INFO:
htn22@htn2:~$

haproxy


Activities
Terminal
Jun 10 16:19
ubuntu22.04 on QEMU/KVM
ubuntu22.04-2 on QEMU/KVM
File Virtual Machine View Send Key
Open
Install ha postgresql.md
~/Downloads
Install ha postgresql(1).md
Install ha postgresql(2).md
server postgresql_192.168.10.2_5432 192.168.10.2:5
port 8008
server postgresql_192.168.10.3_5432 192.168.10.3:5
port 8008
Save and close file.
You can see below screenshot of our **/etc/haproxy/hap
node5:
![](./OK - Set Up a Highly Available PostgreSQL11 Clus
- Tech Support_files/haproxy_cfg.png)
Restart HAProxy to take the changes into effect and us
sudo systemctl restart haproxy
If HAProxy fails to start, check for syntax errors:
/usr/sbin/haproxy -c -V -f /etc/haproxy/haproxy.cfg
Testing Postgres Cluster Setup
Connect Postgres clients to the HAProxy IP address of
installed HAProxy (in this guide, 192.168.10.5) on por
You can also access HAProxy node on port 7000 using an
hthng@etcdnode: ~
haproxy.service - HAProxy Load Balancer
Loaded: loaded (/lib/systemd/system/haproxy.service; enabled; preset: enab
Active: active (running) since Mon 2024-06-10 16:19:25 +07; 5s ago
Docs: man:haproxy(1)
file:/usr/share/doc/haproxy/configuration.txt.gz
Main PID: 4124 (haproxy)
Tasks: 5 (limit: 14122)
Memory: 8.4M
CPU: 89ms
CGroup: /system.slice/haproxy.service
4124 /usr/sbin/haproxy -Ws -f /etc/haproxy/haproxy.cfg -p /run/h
4127 /usr/sbin/haproxy -Ws -f /etc/haproxy/haproxy.cfg -p /run/h
Jun 10 16:19:25 etcdnode haproxy[4127]: [WARNING] (4127) : Server postgres/pos
Jun 10 16:19:25 etcdnode haproxy[4127]: Server postgres/postgresql_192.168.10.1
Jun 10 16:19:25 etcdnode haproxy[4127]: Server postgres/postgresql_192.168.10.1
Jun 10 16:19:25 etcdnode systemd[1]: Started haproxy.service - HAProxy Load Bal
Jun 10 16:19:27 etcdnode haproxy[4127]: [WARNING] (4127) : Server postgres/pos
Jun 10 16:19:27 etcdnode haproxy[4127]: [ALERT] (4127) : proxy 'postgres' ha
Jun 10 16:19:27 etcdnode haproxy[4127]: Server postgres/postgresql_192.168.10.2
Jun 10 16:19:27 etcdnode haproxy[4127]: Server postgres/postgresql_192.168.10.2
Jun 10 16:19:27 etcdnode haproxy[4127]: proxy postgres has no server available!
lines 1-22



HAProxy version 2.6.12-1+deb12u1, released 2023/12/16

Statistics Report for pid 4127

> General process information

pid = 4127 (process #1, nbproc = 1, nbthread = 4)
uptime = 0d 0h05m16s
system limits: memmax = unlimited; ulimit-n = 251
maxsock = 251; **maxconn =** 100; **maxpipes =** 0
current conns = 1; current pipes = 0/0; conn rate = 1/sec; bit rate = 0.000 kbps
Running tasks: 0/21; idle = 100 %

- active UP
- active UP, going down
- active DOWN, going up
- active or backup DOWN
- active or backup DOWN for maintenance (MAINT)
- active or backup SOFT STOPPED for maintenance
- backup UP
- backup UP, going down
- backup DOWN, going up
- not checked

Note: "NOLB"/"DRAIN" = UP with load-balancing disabled.

Display option:

- Scope :
- Hide 'DOWN' servers
- Refresh now
- CSV export
- JSON export (schema)

External resources:

- Primary site
- Updates (v2.6)
- Online manual

stats

	Queue			Session rate			Sessions						Bytes		Denied		Errors			Warnings		Server								
	Cur	Max	Limit	Cur	Max	Limit	Cur	Max	Limit	Total	LbTot	Last	In	Out	Req	Resp	Req	Conn	Resp	Retr	Redis	Status	LastChk	Wght	Act	Bck	Chk	Dwn	Dwntme	Thrtle
Frontend				1	1	-	1	1	100	1			0	0	0	0	0					OPEN								
Backend	0	0		0	0		0	0	10	0	0	0s	0	0	0	0		0	0	0	0	5m16s UP		0/0	0	0		0		

postgres

	Queue			Session rate			Sessions						Bytes		Denied		Errors			Warnings		Server								
	Cur	Max	Limit	Cur	Max	Limit	Cur	Max	Limit	Total	LbTot	Last	In	Out	Req	Resp	Req	Conn	Resp	Retr	Redis	Status	LastChk	Wght	Act	Bck	Chk	Dwn	Dwntme	Thrtle
Frontend				0	0	-	0	0	100	0			0	0	0	0	0					OPEN								
postgresql_192.168.10.1_5432	0	0	-	0	0		0	0	100	0	0	?	0	0		0		0	0	0	0	5m16s DOWN	L4CON in 0ms	1/1	Y	-	1	1	5m16s	-
postgresql_192.168.10.2_5432	0	0	-	0	0		0	0	100	0	0	?	0	0		0		0	0	0	0	5m14s DOWN	L4CON in 0ms	1/1	Y	-	1	1	5m14s	-
Backend	0	0		0	0		0	0	10	0	0	?	0	0	0	0		0	0	0	0	5m14s DOWN		0/0	0	0		1	5m14s	

Ⅲ. Tạo database trên server 01

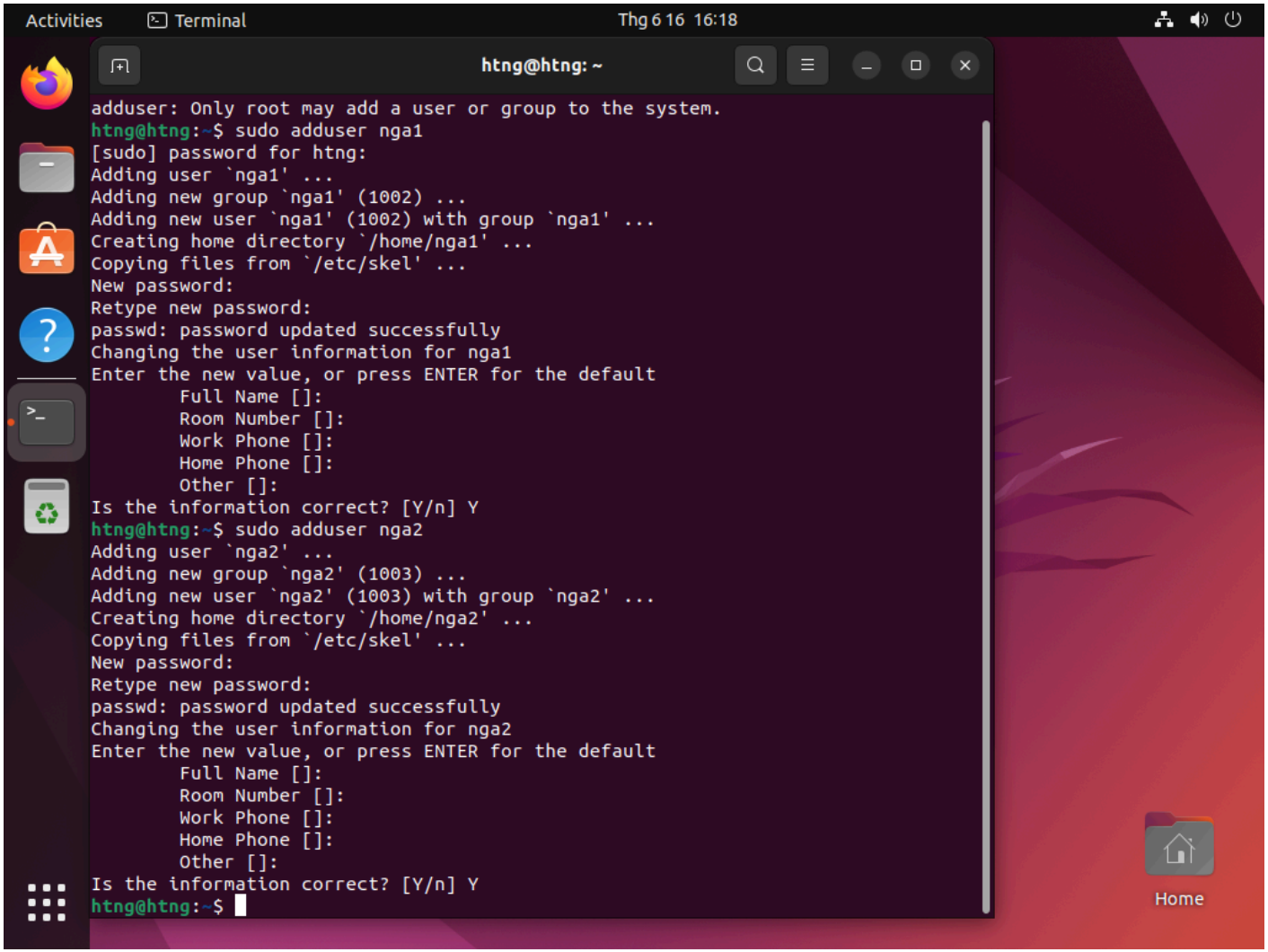
```
postgres=# \list
postgres=# \list
postgres=# CREATE DATABASE mydb1;
CREATE DATABASE
postgres=#
```

Ⅳ. Tạo role thao tác; cho user

```
postgres=# CREATE ROLE vitor LOGIN PASSWORD '123456' SUPERUSER VALID UNTIL '2030
-01-01 00:00';
ERROR:  role "vitor" already exists
postgres=# CREATE ROLE vitor2 LOGIN PASSWORD '123456' SUPERUSER VALID UNTIL '203
0-01-01 00:00';
CREATE ROLE
```

V. Tạo schema, thiết lập current schema khi đăng nhập

- Add Users and Assign Roles

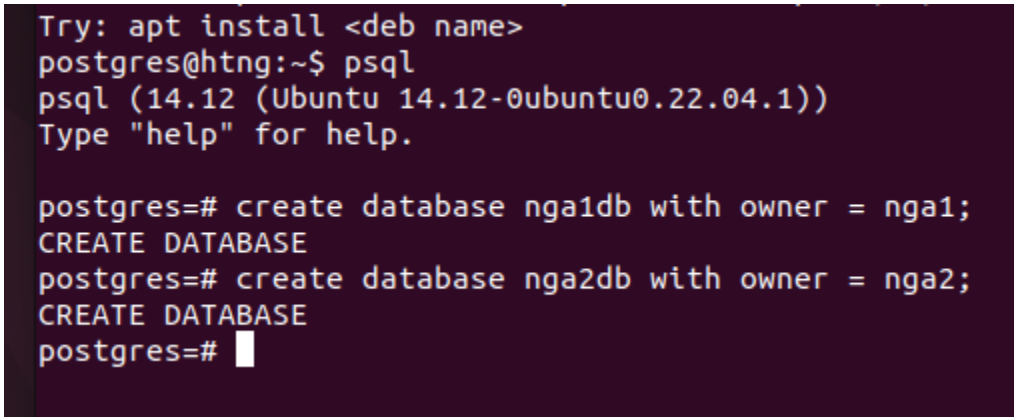


```
su: Authentication failure
htng@htng:~$ sudo su - postgres
postgres@htng:~$ psql template1
psql (14.12 (Ubuntu 14.12-0ubuntu0.22.04.1))
Type "help" for help.

template1=#
```

- Template 1
- **Create roles for nga1 and nga2 with login privileges.**

```
htng@htng:~$ sudo su - postgres
postgres@htng:~$ psql template1
psql (14.12 (Ubuntu 14.12-0ubuntu0.22.04.1))
Type "help" for help.

template1=# create role nga1 with password
template1-# '123456';
CREATE ROLE
template1=# alter role nga1 with login;
ALTER ROLE
template1=# create role nga2 with password '123456';
CREATE ROLE
template1=# alter role nga2 with login;
ALTER ROLE
template1=#
```

- **Create Databases Owned by the New Roles**



- **Create Schemas in the New Databases**

```
postgres@htng:~$ psql
psql (14.12 (Ubuntu 14.12-0ubuntu0.22.04.1))
Type "help" for help.

postgres=# create database nga1db with owner = nga1;
CREATE DATABASE
postgres=# create database nga2db with owner = nga2;
CREATE DATABASE
postgres=# \c nga1;
connection to server on socket "/var/run/postgresql/.s.PGSQL.5432"
:  database "nga1" does not exist
Previous connection kept
postgres=# \c nga1db;
You are now connected to database "nga1db" as user "postgres".
nga1db=# create schema nga1schema;
CREATE SCHEMA
nga1db=# alter schema nga1schema owner to nga1;
ALTER SCHEMA
nga1db=# \c nga2db;
You are now connected to database "nga2db" as user "postgres".
nga2db=# create schema nga2schema;
CREATE SCHEMA
nga2db=# alter schema nga2schema owner to nga2;
ALTER SCHEMA
nga2db=#
```

VI. Tạo script backup dữ liệu, viết scrontab hẹn giờ backup dữ liệu

Normal backup

 # pg_dump -h localhost -p 5432 -U postgres -W -F t mydb1_admin > mydb1_admin.tar

Backup a Database to a TAR File

Backup Specific Tables Matching a Pattern
Backup All Schemas Except the Public Schema
Backup with Column Inserts
Backup Using Directory Format with Multiple Jobs
Backup Global Objects Only
Backup Roles Only
Backup Tablespaces Only

Pg_backup.sh

```
#!/bin/bash

# Database credentials
USER="postgres"
PASSWORD="your_password"
HOST="localhost"
DB_NAME="mydb_admin"

# Other options
BACKUP_PATH="/path/to/your/backup/directory"
DATE=$(date +%Y%m%d%H%M)

# Set default file permissions
umask 177

# Create backup
pg_dump -U $USER -h $HOST -F c -b -v -f "$BACKUP_PATH/$DB_NAME-$DATE.backup"
$DB_NAME

echo "Backup completed: $BACKUP_PATH/$DB_NAME-$DATE.backup"
```

PASSWORD="your_password"

```
postgres@htng:~$ psql -U postgres
psql (14.12 (Ubuntu 14.12-0ubuntu0.22.04.1))
Type "help" for help.

postgres=# ALTER USER postgres PASSWORD '123';
ALTER ROLE
postgres=# \q
postgres@htng:~$ ^C
postgres@htng:~$
```

```
htng@htng:~$ su -u postgres
Try 'su --help' for more information.
htng@htng:~$ sudo su - postgres
[sudo] password for htng:
xSorry, try again.
[sudo] password for htng:
s
s
Sorry, try again.
[sudo] password for htng:
s
sudo: 3 incorrect password attempts
htng@htng:~$ s
s: command not found
htng@htng:~$ su - postgres
Password:
su: Authentication failure
```

Running script

```
# chmod +x pg_backup.sh
# ./pg_backup.sh
```

```
# crontab -e
0 2 * * * /path/to/pg_backup.sh
```

Ⅶ. Restore dữ liệu từ file backup từ server 01 tới server 02

From old db to new db

```
# psql -U postgres -p 5432 -h localhost -d mydb1_admin < mydb1_admin.backup
```

Tu server 1(master) den server 2(replication) - node cluster (chua hoan thanh)