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CANCUN, QUINTANA ROO, MÉXICO

CONOCIMIENTO Y CULTURA PARA EL DESARROLLO HUMANO

INVESTIGACIÓN/REPORTE/RESUMEN:

# Tarea #998 Instalar Galera

ASIGNATURA:

**Cómputo de alto desempeño**

**Alumna:**

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MATRÍCULA: 200300602

PROGRAMA EDUCATIVO

**INGENIERÍA EN DATOS E INTELIGENCIA ORGANIZACIONAL**

PRESENTADO A:

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## Actividades realizadas:

- **Actualización de la lista de paquetes:** Se ejecutó el comando `apt update` para actualizar la lista de paquetes disponibles.
- **Actualización de paquetes:** Se encontraron 118 paquetes para actualizar (118 upgraded, 1 newly installed, 0 to remove and 117 not upgraded).
- **Instalación de paquetes:** Se instaló el paquete `net-tools 2.10-0.ubuntu`. Este paquete proporciona herramientas de red esenciales como `ifconfig`, `netstat`, `route`, etc.
- **Mantenimiento del sistema:** Se ejecutaron tareas de mantenimiento, posiblemente incluyendo la actualización del kernel (`linux-image-unsigned-5.15.0-76-generic`).

```

root@nodoli/home/ll#
The authenticity of host '[127.0.0.1]:2222 ([127.0.0.1]:2222)' can't be established.
ED25519 key fingerprint is SHA256:rhauE5NoZtjK4Gr/0lg0LHM7jT2ov01Fkx57jclF2o.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '[127.0.0.1]:2222' (ED25519) to the list of known hosts.
ll:[127.0.0.1]'s password:
Welcome to Ubuntu 24.04.1 LTS (GNU/Linux 6.8.0-53-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Tue Feb 18 09:47:20 PM UTC 2025

System load:  0.14
Usage of /:   26.8% of 23.45GB
Memory usage: 5%
Swap usage:   0%
Processes:    102
Users logged in: 0
IPV4 address for enp0s3: 10.0.2.15
IPV6 address for enp0s3: fd00:1a00:27ff:fe79:ee33

Expanded Security Maintenance for Applications is not enabled.

118 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ll:[127.0.0.1]~$ sudo su
[sudo] password for ll:[127.0.0.1]:
root@nodoli:/home/ll# apt --y install net-tools
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following new packages will be installed:
  net-tools
0 upgraded, 1 newly installed, 0 to remove and 127 not upgraded.
Need to get 204 kB of archives.
After this operation, 811 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble/main amd64 net-tools amd64 2.10-0.1
ubuntu4 [204 kB]
Fetched 204 kB in 1s (236 kB/s)
Selecting previously unselected package net-tools.
(Reading database ... 8888 files and directories currently installed.)
Preparing to unpack .../net-tools.2.10-0.1ubuntu4.amd64.deb ...
Unpacking net-tools (2.10-0.1ubuntu4) ...
Setting up net-tools (2.10-0.1ubuntu4) ...
Processing triggers for man-db (2.12.0-4build2) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@nodoli:/home/ll#

```

Al ejecutar `apt update`, mi sistema se ha conectado a varios "repositorios". Estos repositorios son como bibliotecas gigantescas de software para Ubuntu. Hemos visto que se ha conectado a:

- <http://security.ubuntu.com/ubuntu noble-security InRelease>: Aquí es donde Ubuntu busca actualizaciones de seguridad importantes.
- <http://archive.ubuntu.com/ubuntu noble InRelease>: Este es el repositorio principal de Ubuntu, donde se encuentran la mayoría de los programas.
- <http://archive.ubuntu.com/ubuntu noble-updates InRelease>: Aquí se encuentran actualizaciones para los programas de Ubuntu.
- <http://archive.ubuntu.com/ubuntu noble-backports InRelease>: Este repositorio contiene programas más nuevos que han sido adaptados para funcionar en nuestra versión de Ubuntu.

Después de que apt update ha terminado de "hablar" con estos repositorios, ha creado una lista de todos los programas disponibles y sus versiones.

```
root@nodo1:/home/lili# apt update
Hit:1 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:2 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
125 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@nodo1:/home/lili#
```

**Conectarse a servidores MariaDB:** El paquete mariadb-client te da la herramienta para enviar comandos y recibir datos de un servidor MariaDB.

**Comunicarse con bases de datos MariaDB:** La biblioteca libmariadb3 permite que otros programas en tu sistema (como aplicaciones web o herramientas de administración) se comuniquen correctamente con bases de datos MariaDB.

```
root@nodo1:/home/lili# apt -y install mariadb-server mariadb-client galera-4
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libfcgi-fast-perl libfcgi-pm-perl libclone-perl libconfig-inifiles-perl libdbd-mysql-perl libdbi-perl libencode-locale-perl libfcgi-bin libfcgi-perl libfcgi0t64 libhtml-parser-perl libhtml-tagset-perl libhtml-template-perl libhttp-date-perl libhttp-message-perl
  libio-html-perl liblwp-mediatypes-perl libmariadb3 libmysqlclient21 libsnappy1v5 libtimedate-perl liburi-perl liburing2 mariadb-client-core mariadb-common mariadb-plugin-provider-bzip2 mariadb-plugin-provider-lz4 mariadb-plugin-provider-lzma
  mariadb-plugin-provider-lzo mariadb-plugin-provider-snappy mariadb-server-core mysql-common pv socat
Suggested packages:
  libltdl-dev-perl libtest-demon-perl libsql-statement-perl libdata-dump-perl libipc-sharedcache-perl libio-compress-brotli-perl libbusiness-isbn-perl libregexp-ipvd-perl libwww-perl mailx mariadb-test doc-base
The following NEW packages will be installed:
  galera-4 libfcgi-fast-perl libfcgi-pm-perl libclone-perl libconfig-inifiles-perl libdbd-mysql-perl libdbi-perl libencode-locale-perl libfcgi-bin libfcgi-perl libfcgi0t64 libhtml-parser-perl libhtml-tagset-perl libhtml-template-perl libhttp-date-perl
  libhttp-message-perl libio-html-perl liblwp-mediatypes-perl libmariadb3 libmysqlclient21 libsnappy1v5 libtimedate-perl liburi-perl liburing2 mariadb-client-core mariadb-common mariadb-plugin-provider-bzip2 mariadb-plugin-provider-lz4
  mariadb-plugin-provider-lzo mariadb-plugin-provider-snappy mariadb-server mariadb-server-core mysql-common pv socat
0 upgraded, 37 newly installed, 0 to remove and 125 not upgraded.
Need to get 19.0 MB of archives.
After this operation, 197 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble/universe amd64 galera-4 amd64 26.4.16-2build4 [736 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble/main amd64 mysql-common all 5.8+1.1.0build1 [6,746 B]
Get:3 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 mariadb-common all 1:10.11.8-0ubuntu0.24.04.1 [27.1 kB]
Get:4 http://archive.ubuntu.com/ubuntu noble/main amd64 libdbi-perl amd64 1.643-4build3 [721 kB]
Get:5 http://archive.ubuntu.com/ubuntu noble/main amd64 libconfig-inifiles-perl all 3.000001-2 [39.4 kB]
Get:6 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 libmariadb3 amd64 1:10.11.8-0ubuntu0.24.04.1 [188 kB]
Get:7 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 mariadb-client-core amd64 1:10.11.8-0ubuntu0.24.04.1 [1,010 kB]
Get:8 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 mariadb-client amd64 1:10.11.8-0ubuntu0.24.04.1 [2,352 kB]
Get:9 http://archive.ubuntu.com/ubuntu noble/main amd64 liburing2 amd64 2.5-1build1 [21.1 kB]
Get:10 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 mariadb-server-core amd64 1:10.11.8-0ubuntu0.24.04.1 [7,999 kB]
Get:11 http://archive.ubuntu.com/ubuntu noble/main amd64 socat amd64 1.8.0-0-0build3 [374 kB]
Get:12 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 mariadb-server amd64 1:10.11.8-0ubuntu0.24.04.1 [3,383 kB]
Get:13 http://archive.ubuntu.com/ubuntu noble/main amd64 libhtml-tagset-perl all 3.20-6 [11.3 kB]
Get:14 http://archive.ubuntu.com/ubuntu noble/main amd64 liburi-perl all 5.22-1 [88.0 kB]
Get:15 http://archive.ubuntu.com/ubuntu noble/main amd64 libhtml-parser-perl amd64 3.81-1build3 [85.8 kB]
Get:16 http://archive.ubuntu.com/ubuntu noble/main amd64 libfcgi-perl all 4.0.2-1 [289 kB]
Get:17 http://archive.ubuntu.com/ubuntu noble/main amd64 libfcgi0t64 amd64 2.4.2-2.1build1 [26.8 kB]
Get:18 http://archive.ubuntu.com/ubuntu noble/main amd64 libfcgi-perl amd64 0.82+ds-1build2 [21.7 kB]
Get:19 http://archive.ubuntu.com/ubuntu noble/main amd64 libfcgi-fast-perl all 1:2.17-2 [10.3 kB]
Get:20 http://archive.ubuntu.com/ubuntu noble/main amd64 libclone-perl amd64 0.46-1build1 [10.7 kB]
Get:21 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libmysqlclient21 amd64 8.0.41-0ubuntu0.24.04.1 [1,254 kB]
Get:22 http://archive.ubuntu.com/ubuntu noble/universe amd64 libdbd-mysql-perl amd64 4.052-1ubuntu3 [85.5 kB]
Get:23 http://archive.ubuntu.com/ubuntu noble/main amd64 libencode-locale-perl all 1.05-2 [11.6 kB]
Get:24 http://archive.ubuntu.com/ubuntu noble/main amd64 libfcgi-bin amd64 2.4.2-2.1build1 [11.2 kB]
Get:25 http://archive.ubuntu.com/ubuntu noble/main amd64 libhtml-template-perl all 2.97-2 [60.2 kB]
Get:26 http://archive.ubuntu.com/ubuntu noble/main amd64 libtimedate-perl all 2.3300-2 [34.0 kB]
Get:27 http://archive.ubuntu.com/ubuntu noble/main amd64 libhttp-date-perl all 6.06-3 [10.2 kB]
Get:28 http://archive.ubuntu.com/ubuntu noble/main amd64 libio-html-perl all 1.004-3 [15.9 kB]
Get:29 http://archive.ubuntu.com/ubuntu noble/main amd64 liblwp-mediatypes-perl all 6.04-2 [20.1 kB]
Get:30 http://archive.ubuntu.com/ubuntu noble/main amd64 libhttp-message-perl all 6.45-1ubuntu1 [72.2 kB]
Get:31 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 mariadb-plugin-provider-bzip2 amd64 1:10.11.8-0ubuntu0.24.04.1 [13.9 kB]
Get:32 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 mariadb-plugin-provider-lz4 amd64 1:10.11.8-0ubuntu0.24.04.1 [13.8 kB]
Get:33 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 mariadb-plugin-provider-lzma amd64 1:10.11.8-0ubuntu0.24.04.1 [13.8 kB]
Get:34 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 mariadb-plugin-provider-lzo amd64 1:10.11.8-0ubuntu0.24.04.1 [13.8 kB]
Get:35 http://archive.ubuntu.com/ubuntu noble/main amd64 libsnappy1v5 amd64 1.1.10-1build1 [28.6 kB]
Get:36 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 mariadb-plugin-provider-snappy amd64 1:10.11.8-0ubuntu0.24.04.1 [13.8 kB]
Get:37 http://archive.ubuntu.com/ubuntu noble/main amd64 pv amd64 1.8.5-2build1 [71.9 kB]
Fetched 19.0 MB in 5s (3,730 kB/s)
Extracting templates from packages: 100%
Preconfiguring packages ...
Selecting previously unselected package galera-4.
(Reading database ... 83936 files and directories currently installed.)
Preparing to unpack .../000-galera-4_26.4.16-2build4_amd64.deb ...
info: The home dir /nonexistent you specified can't be accessed: No such file or directory
```

**sudo:** Otorga privilegios de superusuario para ejecutar el comando.

**apt:** Es la herramienta de administración de paquetes en sistemas Debian/Ubuntu.

**-y:** Responde "sí" automáticamente a todas las preguntas durante la instalación.

**install:** Le dice a apt que quieres instalar uno o más paquetes.

**galera-arbitrator-4:** El paquete que contiene el árbitro de Galera, utilizado para la gestión de clústeres Galera.

```
root@node1:/home/lili# apt -y install galera-arbitrator-4
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libboost-program-options1.83.0
The following NEW packages will be installed:
  galera-arbitrator-4 libboost-program-options1.83.0
0 upgraded, 2 newly installed, 0 to remove and 125 not upgraded.
Need to get 896 kB of archives.
After this operation, 4,046 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libboost-program-options1.83.0 amd64 1.83.0-2.1ubuntu3.1 [320 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble/universe amd64 galera-arbitrator-4 amd64 26.4.16-2build4 [575 kB]
Fetched 896 kB in 2s (448 kB/s)
Selecting previously unselected package libboost-program-options1.83.0:amd64.
(Reading database ... 84889 files and directories currently installed.)
Preparing to unpack .../libboost-program-options1.83.0_1.83.0-2.1ubuntu3.1_amd64.deb ...
Unpacking libboost-program-options1.83.0:amd64 (1.83.0-2.1ubuntu3.1) ...
Selecting previously unselected package galera-arbitrator-4.
Preparing to unpack .../galera-arbitrator-4_26.4.16-2build4_amd64.deb ...
Unpacking galera-arbitrator-4 (26.4.16-2build4) ...
Setting up libboost-program-options1.83.0:amd64 (1.83.0-2.1ubuntu3.1) ...
Setting up galera-arbitrator-4 (26.4.16-2build4) ...
Created symlink /etc/systemd/system/garbd.service - /usr/lib/systemd/system/garbd.service.
Created symlink /etc/systemd/system/multi-user.target.wants/garbd.service - /usr/lib/systemd/system/garbd.service.
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for libc-bin (2.39-0ubuntu8.4) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@node1:/home/lili#
```

- **sudo:** Otorga privilegios de superusuario para ejecutar el comando.
- **apt:** Es la herramienta de administración de paquetes en sistemas Debian/Ubuntu.
- **-y:** Responde "sí" automáticamente a todas las preguntas durante la instalación.
- **install:** Le dice a apt que quieres instalar uno o más paquetes.
- **mariadb-client:** El paquete que contiene el cliente de línea de comandos mysql (o mariadb), que te permite interactuar con servidores de bases de datos MariaDB.
- **libmariadb3:** Esta biblioteca proporciona las funciones necesarias para que otros programas se conecten y trabajen con bases de datos MariaDB.

```
root@node1:/home/lili# apt -y install mariadb-client libmariadb3
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
mariadb-client is already the newest version (1:10.11.8-0ubuntu0.24.04.1).
libmariadb3 is already the newest version (1:10.11.8-0ubuntu0.24.04.1).
0 upgraded, 0 newly installed, 0 to remove and 125 not upgraded.
root@node1:/home/lili#
```

### Explicación de los comandos:

1. **systemctl stop mysql:** Se intentó detener un servicio llamado mysql. Este comando falló porque el servicio mysql no estaba activo o no existía en el sistema.
2. **systemctl status mysql:** Se intentó verificar el estado de un servicio llamado mysql. Este comando falló por la misma razón que el anterior.
3. **systemctl stop mariadb:** Se detuvo el servicio MariaDB. El servicio se encontraba activo (active (running)) y se detuvo exitosamente (Deactivated successfully.).
4. **systemctl status mariadb:** Se verificó el estado del servicio MariaDB después de detenerlo. El servicio se encuentra ahora inactivo (inactive (dead)).

## Resultados de la detención:

- El servicio MariaDB se detuvo exitosamente.
- El estado del servicio cambió de active (running) a inactive (dead).
- Se registraron eventos en el registro del sistema (systemd) relativos a la detención del servicio, incluyendo el PID del proceso principal (mariadb) y el estado de finalización.
- Se realizaron tareas de limpieza por parte de MariaDB al detenerse, como el volcado del buffer pool a disco y la eliminación de archivos temporales.

```
root@nodo1:/home/lili# systemctl stop mysql
root@nodo1:/home/lili# systemctl status mysql
o mariadb.service - MariaDB 10.11.8 database server
   Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled; preset: enabled)
   Active: inactive (dead) since Tue 2025-02-18 21:55:33 UTC; 2min 4s ago
  Duration: 3min 31.575s
    Docs: man:mariadb(8)
          https://mariadb.com/kb/en/library/systemd/
 Process: 2228 ExecStart=/usr/sbin/mariadb $MYSQLD_OPTS $WSREP_NEW_CLUSTER $WSREP_START_POSITION (code=exited, status=0/SUCCESS)
   Main PID: 2228 (code=exited, status=0/SUCCESS)
    Status: "MariaDB server is down"
      CPU: 387ms

Feb 18 21:55:33 nodo1 systemd[1]: Stopping mariadb.service - MariaDB 10.11.8 database server...
Feb 18 21:55:33 nodo1 mariadb[2228]: 2025-02-18 21:55:33 0 [Note] InnoDB: FTS optimize thread exiting.
Feb 18 21:55:33 nodo1 mariadb[2228]: 2025-02-18 21:55:33 0 [Note] InnoDB: Starting shutdown...
Feb 18 21:55:33 nodo1 mariadb[2228]: 2025-02-18 21:55:33 0 [Note] InnoDB: Dumping buffer pool(s) to /var/lib/mysql/ib_buffer_pool
Feb 18 21:55:33 nodo1 mariadb[2228]: 2025-02-18 21:55:33 0 [Note] InnoDB: Buffer pool(s) dump completed at 250218 21:55:33
Feb 18 21:55:33 nodo1 mariadb[2228]: 2025-02-18 21:55:33 0 [Note] InnoDB: Removed temporary tablespace data file: ".ibtmp1"
Feb 18 21:55:33 nodo1 mariadb[2228]: 2025-02-18 21:55:33 0 [Note] InnoDB: Shutdown completed; log sequence number 47092; transaction id 15
Feb 18 21:55:33 nodo1 mariadb[2228]: 2025-02-18 21:55:33 0 [Note] /usr/sbin/mariadb: Shutdown complete
Feb 18 21:55:33 nodo1 systemd[1]: mariadb.service: Deactivated successfully.
Feb 18 21:55:33 nodo1 systemd[1]: Stopped mariadb.service - MariaDB 10.11.8 database server.
root@nodo1:/home/lili# }
```

## sudo apt -y install mariadb-client libmariadb3:

- Resultado: Los paquetes mariadb-client y libmariadb3 ya estaban instalados en sus versiones más recientes (1:10.11.8-0ubuntu0.24.04.1).
- No se instalaron, actualizaron ni eliminaron paquetes.

## systemctl stop mysql:

- Resultado: Falló porque el servicio mysql no existía.

## systemctl status mysql:

- Resultado: Falló porque el servicio mysql no existía.

## systemctl stop mariadb:

- Resultado: Se detuvo el servicio MariaDB exitosamente.
- El estado del servicio cambió de active (running) a inactive (dead).

## systemctl status mariadb:

- Resultado: Se verificó que el servicio MariaDB está inactivo (inactive (dead)).

## sudo apt -y install mariadb-client libmariadb3:



- Resultado: Se intentó nuevamente instalar los paquetes mariadb-client y libmariadb3.
- Dado que ya estaban instalados, no se realizaron cambios.

```
Scanning processes...
Scanning Linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@node1:/home/1111# apt -y install mariadb-client libmariadb3
systemctl stop mysql
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
mariadb-client is already the newest version (1:10.11.8-0ubuntu0.24.04.1).
libmariadb3 is already the newest version (1:10.11.8-0ubuntu0.24.04.1).
libmariadb3 set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 125 not upgraded.
root@node1:/home/1111# apt -y install mariadb-client libmariadb3
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
mariadb-client is already the newest version (1:10.11.8-0ubuntu0.24.04.1).
libmariadb3 is already the newest version (1:10.11.8-0ubuntu0.24.04.1).
0 upgraded, 0 newly installed, 0 to remove and 125 not upgraded.
root@node1:/home/1111# systemctl stop mysql
c mariadb.service - MariaDB 10.11.8 database server
   Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled; preset: enabled)
   Active: inactive (dead) since Tue 2025-02-18 21:55:33 UTC; 2min 4s ago
     Duration: 3min 22.975s
    Docs: man:mariadb(8)
          https://mariadb.com/kb/en/library/systemd/
   Process: 2228 ExecStart=/usr/sbin/mariadbd $WSREP_OPTS $WSREP_NEW_CLUSTER $WSREP_START_POSITION (code=exited, status=0/SUCCESS)
  Main PID: 2228 (code=exited, status=0/SUCCESS)
   Status: "MariaDB server is down"
     CPU: 365ms

Feb 18 21:55:33 node1 systemd[1]: Stopping mariadb.service - MariaDB 10.11.8 database server...
Feb 18 21:55:33 node1 mariadbd[2228]: 2025-02-18 21:55:33 0 [Note] InnoDB: File optimize thread exiting.
Feb 18 21:55:33 node1 mariadbd[2228]: 2025-02-18 21:55:33 0 [Note] InnoDB: Starting shutdown...
Feb 18 21:55:33 node1 mariadbd[2228]: 2025-02-18 21:55:33 0 [Note] InnoDB: Dumping buffer pool(s) to /var/lib/mysql/ib_buffer_pool
Feb 18 21:55:33 node1 mariadbd[2228]: 2025-02-18 21:55:33 0 [Note] InnoDB: Buffer pool(s) dump completed at 20250218 21:55:33
Feb 18 21:55:33 node1 mariadbd[2228]: 2025-02-18 21:55:33 0 [Note] InnoDB: Removed temporary tablespace data file: "/ibtmp1"
Feb 18 21:55:33 node1 mariadbd[2228]: 2025-02-18 21:55:33 0 [Note] InnoDB: Shutdown completed; log sequence number 47092; transaction id 15
Feb 18 21:55:33 node1 mariadbd[2228]: 2025-02-18 21:55:33 0 [Note] /usr/sbin/mariadbd: shutdown complete
Feb 18 21:55:33 node1 systemd[1]: mariadb.service: Deactivated successfully.
Feb 18 21:55:33 node1 systemd[1]: Stopped mariadb.service - MariaDB 10.11.8 database server.
root@node1:/home/1111# vi /etc/mysql/mariadb.conf.d/60-galera.cnf
Command 'vi' not found, did you mean:
Command 'vi' from deb vi (2:9.1.0016-1ubuntu7.3)
Command 'vi' from deb vim-tiny (2:9.1.0016-1ubuntu7.3)
Command 'vi' from deb vim-gtk3 (2:9.1.0016-1ubuntu7.3)
Command 'vi' from deb vim-notif (2:9.1.0016-1ubuntu7.3)
Command 'vi' from deb vim-mox (2:9.1.0016-1ubuntu7.3)
Command 'vi' from deb vi (2:9.1.0016-1ubuntu7.3)
Command 'vi' from deb elvi-tiny (1:4-12.1)
Command 'vi' from deb levee (4.0-1)
Command 'vi' from deb neovim (0.7.2-8)
Command 'vi' from deb nvi (1.81.6-10)
Command 'vi' from deb vile (9.8j-3)
Command 'vi' from deb vim (9.8.1-3)
Command 'nvi' from deb nvi (1.81.6-10)
Command 'bvi' from deb bvi (1.4.2-2)
try: apt install -deb navi
root@node1:/home/1111# vi /etc/mysql/mariadb.conf.d/60-galera.cnf
root@node1:/home/1111# vi /etc/mysql/mariadb.conf.d/60-galera.cnf
root@node1:/home/1111#
```

## 1. Configuración del Proveedor de Galera:

- **wsrep\_on=ON**: Esta línea habilita la funcionalidad de Galera. Esencial para que Galera funcione.
- **wsrep\_provider=/usr/lib/galera/libgalera\_smm.so**: Especifica la ruta a la biblioteca compartida del proveedor de Galera (libgalera\_smm.so). Esta biblioteca es la que contiene la lógica para la comunicación y sincronización del clúster.

## 2. Configuración del Clúster Galera:

- **wsrep\_cluster\_name="test\_cluster"**: Define el nombre del clúster Galera. Todos los nodos que formen parte de este clúster deben tener el mismo nombre.
- **wsrep\_cluster\_address="gcomm://192.168.56.101"**: Define las direcciones de los nodos que forman parte del clúster. En este caso, solo se incluye la dirección 192.168.56.101, lo que sugiere que este nodo es el único o el primero en configurarse. En un clúster real, se deben listar las direcciones de todos los nodos (usualmente separadas por comas).

## 3. Configuración de Sincronización de Galera:

- **wsrep\_sst\_method=rsync**: Define el método de transferencia de estado del sistema (SST). rsync es uno de los métodos más comunes y se utiliza para sincronizar los nodos cuando se unen al clúster o cuando se recuperan después de un fallo.

#### 4. Configuración del Nodo Galera:

- **wsrep\_node\_address="192.168.56.101"**: Define la dirección de este nodo en el clúster. Debe coincidir con una de las direcciones listadas en **wsrep\_cluster\_address**.
- **wsrep\_node\_name="nodo1"**: Define el nombre de este nodo. Cada nodo en el clúster debe tener un nombre único.

```
[mysqld]
binlog_format=ROW
default-storage-engine=innodb
innodb_autoinc_lock_mode=2
bind-address=0.0.0.0

# Galera Provider Configuration
wsrep_on=ON
wsrep_provider=/usr/lib/galera/libgalera_smm.so

# Galera Cluster Configuration
wsrep_cluster_name="test_cluster"
wsrep_cluster_address="gcomm://192.168.56.101"

# Galera Synchronization Configuration
wsrep_sst_method=rsync

# Galera Node Configuration
wsrep_node_address="192.168.56.101"
wsrep_node_name="nodo1"
```

**Mensajes de inicio de MariaDB:** Las líneas que comienzan con "Feb 18 22:18:45" muestran el inicio de MariaDB. Esto es una *consecuencia* de **galera\_new\_cluster**. El script **galera\_new\_cluster** asegura que MariaDB se esté ejecutando con la configuración correcta de Galera.

**Mensajes de Galera:** Las líneas que mencionan WSREP (Replicación de Conjunto de Escritura) son mensajes específicos de Galera. Indican que Galera se está inicializando y uniendo/formando el clúster. Los mensajes **gwsrep** están relacionados con la comunicación grupal.

**Éxito de galera\_new\_cluster (implícito):** El hecho de que estos mensajes estén apareciendo sugiere que **galera\_new\_cluster** tuvo éxito en la inicialización del clúster. Si hubiera fallado, probablemente verías mensajes de error.

**"Listo para conexiones":** El mensaje "listo para conexiones" indica que MariaDB (y por extensión, Galera) está listo para aceptar conexiones de clientes.

```
root@nodo1:/home/tlil# galera_new_cluster
root@nodo1:/home/tlil# systemctl status mysql
● mariadb.service - MariaDB 10.11.8 database server
   Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled; preset: enabled)
   Active: active (running) since Tue 2025-02-18 22:03:45 UTC; 5s ago
     Docs: man:mariadb(8)
           https://mariadb.com/kb/en/library/systemd/
  Process: 2667 ExecStartPre=/usr/bin/install -m 755 -e mysql -q root -d /var/run/mysql (code=exited, status=0/SUCCESS)
  Process: 2669 ExecStartPre=/bin/sh -c systemctl unset-environment _WSREP_START_POSITION (code=exited, status=0/SUCCESS)
  Process: 2671 ExecStartPre=/bin/sh -c [ ! -e /usr/bin/galera_recovery ] && VAR= || VAR=cd /usr/bin/...; /usr/bin/galera_recovery; [ $? -eq 0 ] && systemctl set-environment _WSREP_START_POSITION=$VAR || exit 1 (code=exited, status=0/SUCCESS)
  Process: 2796 ExecStartPost=/bin/sh -c systemctl unset-environment _WSREP_START_POSITION (code=exited, status=0/SUCCESS)
  Process: 2798 ExecStartPost=/etc/mysql/debian-start (code=exited, status=0/SUCCESS)
 Main PID: 2779 (mariadbd)
   Status: "Taking your SQL requests now..."
    Tasks: 17 (limit: 32388)
  Memory: 106.4M (peak: 108.2M)
     CPU: 48ms
   CGroup: /system.slice/mariadb.service
           └─2779 /usr/sbin/mariadbd --wsrep-new-cluster --wsrep_start_position=00000000-0000-0000-0000-000000000000:1

Feb 18 22:03:45 nodo1 mariadbd[2779]: 2025-02-18 22:03:45 2 [Note] WSREP: Server nodo1 synced with group
Feb 18 22:03:45 nodo1 mariadbd[2779]: 2025-02-18 22:03:45 2 [Note] WSREP: Server status change joined -> synced
Feb 18 22:03:45 nodo1 mariadbd[2779]: 2025-02-18 22:03:45 2 [Note] WSREP: Synchronized with group, ready for connections
Feb 18 22:03:45 nodo1 mariadbd[2779]: 2025-02-18 22:03:45 2 [Note] WSREP: wsrep_notify_cmd is not defined, skipping notification.
Feb 18 22:03:45 nodo1 mariadbd[2779]: 2025-02-18 22:03:45 0 [Note] /usr/sbin/mariadbd: ready for connections.
Feb 18 22:03:45 nodo1 mariadbd[2779]: Version: '10.11.8-MariaDB-0ubuntu24.04-1' - socket: '/run/mysqlq/mysql.sock' port: 3306 Ubuntu 24.04
Feb 18 22:03:45 nodo1 systemd[1]: Started mariadb.service - MariaDB 10.11.8 database server.
Feb 18 22:03:45 nodo1 /etc/mysql/debian-start[2802]: Upgrading MariaDB tables if necessary.
Feb 18 22:03:45 nodo1 /etc/mysql/debian-start[2813]: Checking for insecure root accounts.
Feb 18 22:03:45 nodo1 /etc/mysql/debian-start[2817]: Triggering npsam-recover for all MyISAM tables and aria-recover for all Aria tables
root@nodo1:/home/tlil#
```

**mysql:** Se utiliza el cliente de línea de comandos mysql para interactuar con el servidor de base de datos.

**-u root:** Especifica que se va a conectar como el usuario root.

**-p:** Indica que se solicitará la contraseña.

**-e "SHOW STATUS LIKE 'wsrep\_cluster\_size'":** Se ejecuta la consulta SQL SHOW STATUS LIKE 'wsrep\_cluster\_size' en el servidor. Esta consulta muestra el valor de la variable de estado wsrep\_cluster\_size, que indica el número de nodos que están actualmente en el clúster Galera.

```
root@nodo1:/home/lili# mysql -u root -p -e "SHOW STATUS LIKE 'wsrep_cluster_size'"
Enter password:
+-----+-----+
| Variable_name | Value |
+-----+-----+
| wsrep_cluster_size | 1 |
+-----+-----+
root@nodo1:/home/lili#
```

**mysql:** Se utiliza el cliente de línea de comandos mysql para interactuar con el servidor de base de datos.

**-u root:** Especifica que se va a conectar como el usuario root.

**-e "...":** Se ejecuta la consulta SQL dentro de las comillas.

**SHOW GLOBAL STATUS ...:** Esta consulta muestra el valor de las variables de estado especificadas.

**WHERE Variable\_name IN:** Filtra las variables de estado que se van a mostrar.

```
root@nodo1:/home/lili# mysql -u root --execute="SHOW GLOBAL STATUS WHERE Variable_name IN ('wsrep_ready', 'wsrep_cluster_size', 'wsrep_cluster_status', 'wsrep_connected');"
+-----+-----+
| Variable_name | Value |
+-----+-----+
| wsrep_cluster_size | 1 |
| wsrep_cluster_status | Primary |
| wsrep_connected | ON |
| wsrep_ready | ON |
+-----+-----+
root@nodo1:/home/lili#
```

**netstat:** Es una herramienta para mostrar información sobre las conexiones de red, interfaces y tablas de enrutamiento.

**-t:** Muestra conexiones TCP.

**-i:** Muestra interfaces de red.

**-p:** Muestra el ID del proceso y el nombre del programa asociado a cada conexión.



**-n:** Muestra direcciones IP y números de puerto en lugar de nombres de host y nombres de servicio.

```
root@nodo1:/home/lili# netstat -tlnp
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State       PID/Program name
tcp        0      0 0.0.0.0:3306           0.0.0.0:*               LISTEN      2779/mariadb
tcp        0      0 0.0.0.0:54:53         0.0.0.0:*               LISTEN      601/systemd-resolve
tcp        0      0 0.0.0.0:53:53         0.0.0.0:*               LISTEN      601/systemd-resolve
tcp        0      0 0.0.0.0:4567          0.0.0.0:*               LISTEN      2779/mariadb
tcp6       0      0 :::22                  :::*                    LISTEN      1/init
```

**sudo:** Otorga privilegios de superusuario para ejecutar el comando.

**apt:** Es la herramienta de administración de paquetes en sistemas Debian/Ubuntu.

**-y:** Responde "sí" automáticamente a todas las preguntas durante la instalación.

**install:** Le dice a apt que quieres instalar uno o más paquetes.

**sysbench:** El paquete que contiene la herramienta sysbench.

```
root@nodo1:/home/lili# apt -y install sysbench
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  liblua5.1-2 liblua5.1-common libpq5
The following NEW packages will be installed:
  liblua5.1-2 liblua5.1-common libpq5 sysbench
0 upgraded, 4 newly installed, 0 to remove and 125 not upgraded.
Need to get 581 kB of archives.
After this operation, 1,641 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble/universe amd64 liblua5.1-2 amd64 2.1-20230410-1build1 [277 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble/universe amd64 liblua5.1-common all 2.1-20230410-1build1 [48.6 kB]
Get:3 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libpq5 amd64 16.6-0ubuntu0.24.04.1 [141 kB]
Get:4 http://archive.ubuntu.com/ubuntu noble/universe amd64 sysbench amd64 1.0.20+ds-6build2 [114 kB]
Fetched 581 kB in 2s (292 kB/s)
Selecting previously unselected package liblua5.1-2.
(Reading database ... 84906 files and directories currently installed.)
Preparing to unpack .../liblua5.1-2_2.1-20230410-1build1_amd64.deb ...
Unpacking liblua5.1-2 (2.1-20230410-1build1) ...
Selecting previously unselected package liblua5.1-common.
Preparing to unpack .../liblua5.1-common_2.1-20230410-1build1_all.deb ...
Unpacking liblua5.1-common (2.1-20230410-1build1) ...
Selecting previously unselected package libpq5.
Preparing to unpack .../libpq5_16.6-0ubuntu0.24.04.1_amd64.deb ...
Unpacking libpq5 (16.6-0ubuntu0.24.04.1) ...
Selecting previously unselected package sysbench.
Preparing to unpack .../sysbench_1.0.20+ds-6build2_amd64.deb ...
Unpacking sysbench (1.0.20+ds-6build2) ...
Setting up libpq5 (16.6-0ubuntu0.24.04.1) ...
Setting up liblua5.1-common (2.1-20230410-1build1) ...
Setting up liblua5.1-2 (2.1-20230410-1build1) ...
Setting up sysbench (1.0.20+ds-6build2) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for libc-bin (2.39-0ubuntu8.4) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
```

**mysql:** Se utiliza el cliente de línea de comandos mysql para interactuar con el servidor de base de datos.

**-uroot:** Especifica que se va a conectar como el usuario root.

**-p:** Indica que se solicitará la contraseña.

**-e "create database sbtest":** Se ejecuta la instrucción SQL create database sbtest en el servidor. Esta instrucción crea una nueva base de datos llamada sbtest.

```
root@nodo1:/home/lili# mysql -uroot -p -e "create database sbtest"
Enter password:
root@nodo1:/home/lili#
```

**sysbench:** Se utiliza la herramienta sysbench para realizar pruebas de rendimiento en bases de datos.

**--threads=1:** Especifica que se utilizará un solo hilo para la prueba.

**--db-driver=mysql:** Indica que se utilizará el controlador de base de datos MySQL (o MariaDB).

**--mysql-user=root:** Especifica que se conectará a la base de datos como el usuario root.

**--events=0:** Establece el número de eventos a 0. En el contexto del subcomando prepare, esto significa que sysbench no ejecutará ninguna transacción de prueba real, solo preparará la base de datos.

**oltp\_read\_only prepare:** Este es el subcomando que le dice a sysbench que prepare la base de datos para una prueba de tipo oltp\_read\_only (transacciones en línea de solo lectura). La preparación incluye la creación de tablas, la inserción de datos de prueba y la creación de índices.

```
root@nodo1:/home/lili# sysbench --threads=1 --db-driver=mysql --mysql-user=root --events=0 oltp_read_only prepare
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Creating table 'sbtest1'...
Inserting 10000 records into 'sbtest1'
Creating a secondary index on 'sbtest1'...
root@nodo1:/home/lili#
```

1. **sysbench --threads=1 --time=60 --report-interval=1 --db-driver=mysql --mysql-user=root --mysql-password=password --test=oltp\_read\_only run:**  
Ejecución de la prueba (con 1 hilo).
2. **sysbench --threads=2 --time=60 --report-interval=1 --db-driver=mysql --mysql-user=root --mysql-password=password --test=oltp\_read\_only run:**  
Ejecución de la prueba (con 2 hilos).

### Análisis Combinado y Comparativo:

- **Preparación de la prueba:**

- Se creó la tabla sbtest1, se insertaron 10,000 registros y se creó un índice secundario. Este paso es común para ambas pruebas.

- **Ejecución de la prueba con 1 hilo:**

- Se inició la prueba con un solo hilo, se mostró información sobre las consultas en ejecución y se produjo un error al final debido a la falta de la tabla sbtest4.

## ● Ejecución de la prueba con 2 hilos:

- La imagen muestra un error similar al ejecutar la prueba con 2 hilos: ERROR 1146 (42S02): Table 'sbtest.sbtest4' doesn't exist.

```
root@rodolfo:/home/tyliff# sysbench --threads=2 --time=60 --event=0 --db-driver=mysql --mysql-user=root --event=0 sbtest_insert run
sysbench 1.0.20 (using system allocator 8.0.0-beta)

Running the test with following options:
Number of threads: 2
Initializing random number generator from current time

Initializing worker threads...

Threads started!

mysql_drv.query() returned error 1146 (Column count doesn't match value count at row 1) for query 'INSERT INTO sbtest VALUES(1,2),(2,3),(3,4),(4,5),(5,6),(6,7),(7,8),(8,9),(9,10),(10,11),(11,12),(12,13),(13,14),(14,15),(15,16),(16,17),(17,18),(18,19),(19,20),(20,21),(21,22),(22,23),(23,24),(24,25),(25,26),(27,27),(28,28),(29,29),(30,30),(31,31),(32,32),(33,33),(34,34),(35,35),(36,36),(37,37),(38,38),(39,39),(40,40),(41,41),(42,42),(43,43),(44,44),(45,45),(46,46),(47,47),(48,48),(49,49),(50,50),(51,51),(52,52),(53,53),(54,54),(55,55),(56,56),(57,57),(58,58),(59,59),(60,60),(61,61),(62,62),(63,63),(64,64),(65,65),(66,66),(67,67),(68,68),(69,69),(70,70),(71,71),(72,72),(73,73),(74,74),(75,75),(76,76),(77,77),(78,78),(79,79),(80,80),(81,81),(82,82),(83,83),(84,84),(85,85),(86,86),(87,87),(88,88),(89,89),(90,90),(91,91),(92,92),(93,93),(94,94),(95,95),(96,96),(97,97),(98,98),(99,99),(100,100),(101,101),(102,102),(103,103),(104,104),(105,105),(106,106),(107,107),(108,108),(109,109),(110,110),(111,111),(112,112),(113,113),(114,114),(115,115),(116,116),(117,117),(118,118),(119,119),(120,120),(121,121),(122,122),(123,123),(124,124),(125,125),(126,126),(127,127),(128,128),(129,129),(130,130),(131,131),(132,132),(133,133),(134,134),(135,135),(136,136),(137,137),(138,138),(139,139),(140,140),(141,141),(142,142),(143,143),(144,144),(145,145),(146,146),(147,147),(148,148),(149,149),(150,150),(151,151),(152,152),(153,153),(154,154),(155,155),(156,156),(157,157),(158,158),(159,159),(160,160),(161,161),(162,162),(163,163),(164,164),(165,165),(166,166),(167,167),(168,168),(169,169),(170,170),(171,171),(172,172),(173,173),(174,174),(175,175),(176,176),(177,177),(178,178),(179,179),(180,180),(181,181),(182,182),(183,183),(184,184),(185,185),(186,186),(187,187),(188,188),(189,189),(190,190),(191,191),(192,192),(193,193),(194,194),(195,195),(196,196),(197,197),(198,198),(199,199),(200,200),(201,201),(202,202),(203,203),(204,204),(205,205),(206,206),(207,207),(208,208),(209,209),(210,210),(211,211),(212,212),(213,213),(214,214),(215,215),(216,216),(217,217),(218,218),(219,219),(220,220),(221,221),(222,222),(223,223),(224,224),(225,225),(226,226),(227,227),(228,228),(229,229),(230,230),(231,231),(232,232),(233,233),(234,234),(235,235),(236,236),(237,237),(238,238),(239,239),(240,240),(241,241),(242,242),(243,243),(244,244),(245,245),(246,246),(247,247),(248,248),(249,249),(250,250),(251,251),(252,252),(253,253),(254,254),(255,255),(256,256),(257,257),(258,258),(259,259),(260,260),(261,261),(262,262),(263,263),(264,264),(265,265),(266,266),(267,267),(268,268),(269,269),(270,270),(271,271),(272,272),(273,273),(274,274),(275,275),(276,276),(277,277),(278,278),(279,279),(280,280),(281,281),(282,282),(283,283),(284,284),(285,285),(286,286),(287,287),(288,288),(289,289),(290,290),(291,291),(292,292),(293,293),(294,294),(295,295),(296,296),(297,297),(298,298),(299,299),(300,300),(301,301),(302,302),(303,303),(304,304),(305,305),(306,306),(307,307),(308,308),(309,309),(310,310),(311,311),(312,312),(313,313),(314,314),(315,315),(316,316),(317,317),(318,318),(319,319),(320,320),(321,321),(322,322),(323,323),(324,324),(325,325),(326,326),(327,327),(328,328),(329,329),(330,330),(331,331),(332,332),(333,333),(334,334),(335,335),(336,336),(337,337),(338,338),(339,339),(340,340),(341,341),(342,342),(343,343),(344,344),(345,345),(346,346),(347,347),(348,348),(349,349),(350,350),(351,351),(352,352),(353,353),(354,354),(355,355),(356,356),(357,357),(358,358),(359,359),(360,360),(361,361),(362,362),(363,363),(364,364),(365,365),(366,366),(367,367),(368,368),(369,369),(370,370),(371,371),(372,372),(373,373),(374,374),(375,375),(376,376),(377,377),(378,378),(379,379),(380,380),(381,381),(382,382),(383,383),(384,384),(385,385),(386,386),(387,387),(388,388),(389,389),(390,390),(391,391),(392,392),(393,393),(394,394),(395,395),(396,396),(397,397),(398,398),(399,399),(400,400),(401,401),(402,402),(403,403),(404,404),(405,405),(406,406),(407,407),(408,408),(409,409),(410,410),(411,411),(412,412),(413,413),(414,414),(415,415),(416,416),(417,417),(418,418),(419,419),(420,420),(421,421),(422,422),(423,423),(424,424),(425,425),(426,426),(427,427),(428,428),(429,429),(430,430),(431,431),(432,432),(433,433),(434,434),(435,435),(436,436),(437,437),(438,438),(439,439),(440,440),(441,441),(442,442),(443,443),(444,444),(445,445),(446,446),(447,447),(448,448),(449,449),(450,450),(451,451),(452,452),(453,453),(454,454),(455,455),(456,456),(457,457),(458,458),(459,459),(460,460),(461,461),(462,462),(463,463),(464,464),(465,465),(466,466),(467,467),(468,468),(469,469),(470,470),(471,471),(472,472),(473,473),(474,474),(475,475),(476,476),(477,477),(478,478),(479,479),(480,480),(481,481),(482,482),(483,483),(484,484),(485,485),(486,486),(487,487),(488,488),(489,489),(490,490),(491,491),(492,492),(493,493),(494,494),(495,495),(496,496),(497,497),(498,498),(499,499),(500,500),(501,501),(502,502),(503,503),(504,504),(505,505),(506,506),(507,507),(508,508),(509,509),(510,510),(511,511),(512,512),(513,513),(514,514),(515,515),(516,516),(517,517),(518,518),(519,519),(520,520),(521,521),(522,522),(523,523),(524,524),(525,525),(526,526),(527,527),(528,528),(529,529),(530,530),(531,531),(532,532),(533,533),(534,534),(535,535),(536,536),(537,537),(538,538),(539,539),(540,540),(541,541),(542,542),(543,543),(544,544),(545,545),(546,546),(547,547),(548,548),(549,549),(550,550),(551,551),(552,552),(553,553),(554,554),(555,555),(556,556),(557,557),(558,558),(559,559),(560,560),(561,561),(562,562),(563,563),(564,564),(565,565),(566,566),(567,567),(568,568),(569,569),(570,570),(571,571),(572,572),(573,573),(574,574),(575,575),(576,576),(577,577),(578,578),(579,579),(580,580),(581,581),(582,582),(583,583),(584,584),(585,585),(586,586),(587,587),(588,588),(589,589),(590,590),(591,591),(592,592),(593,593),(594,594),(595,595),(596,596),(597,597),(598,598),(599,599),(600,600),(601,601),(602,602),(603,603),(604,604),(605,605),(606,606),(607,607),(608,608),(609,609),(610,610),(611,611),(612,612),(613,613),(614,614),(615,615),(616,616),(617,617),(618,618),(619,619),(620,620),(621,621),(622,622),(623,623),(624,624),(625,625),(626,626),(627,627),(628,628),(629,629),(630,630),(631,631),(632,632),(633,633),(634,634),(635,635),(636,636),(637,637),(638,638),(639,639),(640,640),(641,641),(642,642),(643,643),(644,644),(645,645),(646,646),(647,647),(648,648),(649,649),(650,650),(651,651),(652,652),(653,653),(654,654),(655,655),(656,656),(657,657),(658,658),(659,659),(660,660),(661,661),(662,662),(663,663),(664,664),(665,665),(666,666),(667,667),(668,668),(669,669),(670,670),(671,671),(672,672),(673,673),(674,674),(675,675),(676,676),(677,677),(678,678),(679,679),(680,680),(681,681),(682,682),(683,683),(684,684),(685,685),(686,686),(687,687),(688,688),(689,689),(690,690),(691,691),(692,692),(693,693),(694,694),(695,695),(696,696),(697,697),(698,698),(699,699),(700,700),(701,701),(702,702),(703,703),(704,704),(705,705),(706,706),(707,707),(708,708),(709,709),(710,710),(711,711),(712,712),(713,713),(714,714),(715,715),(716,716),(717,717),(718,718),(719,719),(720,720),(721,721),(722,722),(723,723),(724,724),(725,725),(726,726),(727,727),(728,728),(729,729),(730,730),(731,731),(732,732),(733,733),(734,734),(735,735),(736,736),(737,737),(738,738),(739,739),(740,740),(741,741),(742,742),(743,743),(744,744),(745,745),(746,746),(747,747),(748,748),(749,749),(750,750),(751,751),(752,752),(753,753),(754,754),(755,755),(756,756),(757,757),(758,758),(759,759),(760,760),(761,761),(762,762),(763,763),(764,764),(765,765),(766,766),(767,767),(768,768),(769,769),(770,770),(771,771),(772,772),(773,773),(774,774),(775,775),(776,776),(777,777),(778,778),(779,779),(780,780),(781,781),(782,782),(783,783),(784,784),(785,785),(786,786),(787,787),(788,788),(789,789),(790,790),(791,791),(792,792),(793,793),(794,794),(795,795),(796,796),(797,797),(798,798),(799,799),(800,800),(801,801),(802,802),(803,803),(804,804),(805,805),(806,806),(807,807),(808,808),(809,809),(810,810),(811,811),(812,812),(813,813),(814,814),(815,815),(816,816),(817,817),(818,818),(819,819),(820,820),(821,821),(822,822),(823,823),(824,824),(825,825),(826,826),(827,827),(828,828),(829,829),(830,830),(831,831),(832,832),(833,833),(834,834),(835,835),(836,836),(837,837),(838,838),(839,839),(840,840),(841,841),(842,842),(843,843),(844,844),(845,845),(846,846),(847,847),(848,848),(849,849),(850,850),(851,851),(852,852),(853,853),(854,854),(855,855),(856,856),(857,857),(858,858),(859,859),(860,860),(861,861),(862,862),(863,863),(864,864),(865,865),(866,866),(867,867),(868,868),(869,869),(870,870),(871,871),(872,872),(873,873),(874,874),(875,875),(876,876),(877,877),(878,878),(879,879),(880,880),(881,881),(882,882),(883,883),(884,884),(885,885),(886,886),(887,887),(888,888),(889,889),(890,890),(891,891),(892,892),(893,893),(894,894),(895,895),(896,896),(897,897),(898,898),(899,899),(900,900),(901,901),(902,902),(903,903),(904,904),(905,905),(906,906),(907,907),(908,908),(909,909),(910,910),(911,911),(912,912),(913,913),(914,914),(915,915),(916,916),(917,917),(918,918),(919,919),(920,920),(921,921),(922,922),(923,923),(924,924),(925,925),(926,926),(927,927),(928,928),(929,929),(930,930),(931,931),(932,932),(933,933),(934,934),(935,935),(936,936),(937,937),(938,938),(939,939),(940,940),(941,941),(942,942),(943,943),(944,944),(945,945),(946,946),(947,947),(948,948),(949,949),(950,950),(951,951),(952,952),(953,953),(954,954),(955,955),(956,956),(957,957),(958,958),(959,959),(960,960),(961,961),(962,962),(963,963),(964,964),(965,965),(966,966),(967,967),(968,968),(969,969),(970,970),(971,971),(972,972),(973,973),(974,974),(975,975),(976,976),(977,977),(978,978),(979,979),(980,980),(981,981),(982,982),(983,983),(984,984),(985,985),(986,986),(987,987),(988,988),(989,989),(990,990),(991,991),(992,992),(993,993),(994,994),(995,995),(996,996),(997,997),(998,998),(999,999),(1000,1000),(1001,1001),(1002,1002),(1003,1003),(1004,1004),(1005,1005),(1006,1006),(1007,1007),(1008,1008),(1009,1009),(1010,1010),(1011,1011),(1012,1012),(1013,1013),(1014,1014),(1015,1015),(1016,1016),(1017,1017),(1018,1018),(1019,1019),(1020,1020),(1021,1021),(1022,1022),(1023,1023),(1024,1024),(1025,1025),(1026,1026),(1027,1027),(1028,1028),(1029,1029),(1030,1030),(1031,1031),(1032,1032),(1033,1033),(1034,1034),(1035,1035),(1036,1036),(1037,1037),(1038,1038),(1039,1039),(1040,1040),(1041,1041),(1042,1042),(1043,1043),(1044,1044),(1045,1045),(1046,1046),(1047,1047),(1048,1048),(1049,1049),(1050,1050),(1051,1051),(1052,1052),(1053,1053),(1054,1054),(1055,1055),(1056,1056),(1057,1057),(1058,1058),(1059,1059),(1060,1060),(1061,1061),(1062,1062),(1063,1063),(1064,1064),(1065,1065),(1066,1066),(1067,1067),(1068,1068),(1069,1069),(1070,1070),(1071,1071),(1072,1072),(1073,1073),(1074,1074),(1075,1075),(1076,1076),(1077,1077),(1078,1078),(1079,1079),(1080,1080),(1081,1081),(1082,1082),(1083,1083),(1084,1084),(1085,1085),(1086,1086),(1087,1087),(1088,1088),(1089,1089),(1090,1090),(1091,1091),(1092,1092),(1093,1093),(1094,1094),(1095,1095),(1096,1096),(1097,1097),(1098,1098),(1099,1099),(1100,1100),(1101,1101),(1102,1102),(1103,1103),(1104,1104),(1105,1105),(1106,1106),(1107,1107),(1108,1108),(1109,1109),(1110,1110),(1111,1111),(1112,1112),(1113,1113),(1114,1114),(1115,1115),(1116,1116),(1117,1117),(1118,1118),(1119,1119),(1120,1120),(1121,1121),(1122,1122),(1123,1123),(1124,1124),(1125,1125),(1126,1126),(1127,1127),(1128,1128),(1129,1129),(1130,1130),(1131,1131),(1132,1132),(1133,1133),(1134,1134),(1135,1135),(1136,1136),(1137,1137),(1138,1138),(1139,1139),(1140,1140),(1141,1141),(1142,1142),(1143,1143),(1144,1144),(1145,1145),(1146,1146),(1147,1147),(1148,1148),(1149,1149),(1150,1150),(1151,1151),(1152,1152),(1153,1153),(1154,1154),(1155,1155),(1156,1156),(1157,1157),(1158,1158),(1159,1159),(1160,1160),(1161,1161),(1162,1162),(1163,1163),(1164,1164),(1165,1165),(1166,1166),(1167,1167),(1168,1168),(1169,1169),(1170,1170),(1171,1171),(1172,1172),(1173,1173),(1174,1174),(1175,1175),(1176,1176),(1177,1177),(1178,1178),(1179,1179),(1180,1180),(1181,1181),(1182,1182),(1183,1183),(1184,1184),(1185,1185),(1186,1186),(1187,1187),(1188,1188),(1189,1189),(1190,1190),(1191,1191),(1192,1192),(1193,1193),(1194,1194),(1195,1195),(1196,1196),(1197,1197),(1198,1198),(1199,1199),(1200,1200),(1201,1201),(1202,1202),(1203,1203),(1204,1204),(1205,1205),(1206,1206),(1207,1207),(1208,1208),(1209,1209),(1210,1210),(1211,1211),(1212,1212),(1213,1213),(1214,1214),(1215,1215),(1216,1216),(1217,1217),(1218,1218),(1219,1219),(1220,1220),(1221,1221),(1222,1222),(1223,1223),(1224,1224),(1225,1225),(1226,1226),(1227,1227),(1228,1228),(1229,1229),(1230,1230),(1231,1231),(1232,1232),(1233,1233),(1234,1234),(1235,1235),(1236,1236),(1237,1237),(1238,1238),(1239,1239),(1240,1240),(1241,1241),(1242,1242),(1243,1243),(1244,1244),(1245,1245),(1246,1246),(1247,1247),(1248,1248),(1249,1249),(1250,1250),(1251,1251),(1252,1252),(1253,1253),(1254,1254),(1255,1255),(1256,1256),(1257,1257),(1258,1258),(1259,1259),(1260,1260),(1261,1261),(1262,1262),(1263,1263),(1264,1264),(1265,1265),(1266,1266),(1267,1267),(1268,1268),(1269,1269),(1270,1270),(1271,1271),(1272,1272),(1273,1273),(1274,1274),(1275,1275),(1276,1276),(1277,1277),(1278,1278),(1279,1279),(1280,1280),(1281,1281),(1282,1282),(1283,1283),(1284,1284),(1285,1285),(1286,1286),(1287,1287),(1288,1288),(1289,1289),(1290,1290),(1291,1291),(1292,1292),(1293,1293),(1294,1294),(1295,1295),(1296,1296),(1297,1297),(1298,1298),(1299,1299),(1300,1300),(1301,1301),(1302,1302),(1303,1303),(1304,1304),(1305,1305),(1306,1306),(1307,1307),(1308,1308),(1309,1309),(1310,1310),(1311,1311),(1312,1312),(1313,1313),(1314,1314),(1315,1315),(1316,1316),(1317,1317),(1318,1318),(1319,1319),(1320,1320),(1321,1321),(1322,1322),(1323,1323),(1324,1324),(1325,1325),(1326,1326),(1327,1327),(1328,1328),(1329,1329),(1330,1330),(1331,1331),(1332,1332),(1333,1333),(1334,1334),(1335,1335),(1336,1336),(1337,1337),(1338,1338),(1339,1339),(1340,1340),(1341,1341),(1342,1342),(1343,1343),(1344,1344),(1345,1345),(1346,1346),(1347,1347),(1348,1348),(1349,1349),(1350,1350),(1351,1351),(1352,1352),(1353,1353),(1354,1354),(1355,1355),(1356,1356),(1357,1357),(1358,1358),(1359,1359),(1360,1360),(1361,1361),(1362,1362),(1363,1363),(1364,1364),(1365,1365),(1366,1366),(1367,1367),(1368,1368),(1369,1369),(1370,1370),(1371,1371),(1372,1372),(1373,1373),(1374,1374),(1375,1375),(1376,1376),(1377,1377),(1378,1378),(1379,1379),(1380,1380),(1381,1381),(1382,1382),(1383,1383),(1384,1384),(1385,1385),(1386,1386),(1387,1387),(1388,1388),(1389,1389),(1390,1390),(1391,1391),(1392,1392),(1393,1393),(1394,1394),(1395,1395),(1396,1396),(1397,1397),(1398,1398),(1399,1399),(1400,1400),(1401,1401),(1402,1402),(1403,1403),(1404,1404),(1405,1405),(1406,1406),(1407,1407),(1408,1408),(1409,1409),(1410,1410),(1411,1411),(1412,1412),(1413,1413),(1414,1414),(1415,1415),(1416,1416),(1417,1417),(1418,1418),(1419,1419),(1420,1420),(1421,1421),(1422,1422),(1423,1423),(1424,1424),(1425,1425),(1426,1426),(1427,
```

```

root@nodol:/home/ili# sysbench --threads=1 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 oltp_delete run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
queries performed:
  read:               0
  write:             5030
  other:             57074
  total:             57584
  transactions:      575804 (9596.01 per sec.)
  queries:           575804 (9596.01 per sec.)
  ignored errors:    0 (0.00 per sec.)
  reconnects:        0 (0.00 per sec.)

General statistics:
total time:          60.0005s
total number of events: 575804

Latency (ms):
  min:                0.04
  avg:                0.10
  max:               18.02
  95th percentile:   0.14
  sum:              59605.39

Threads fairness:
  events (avg/stddev): 575804.0000/0.00
  execution time (avg/stddev): 59.6054/0.00

root@nodol:/home/ili#

```

```

root@nodol:/home/ili# sysbench --threads=2 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 oltp_delete run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 2
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
queries performed:
  read:               0
  write:              485
  other:            1053076
  total:            1053561
  transactions:     1053561 (17558.85 per sec.)
  queries:          1053561 (17558.85 per sec.)
  ignored errors:    0 (0.00 per sec.)
  reconnects:        0 (0.00 per sec.)

General statistics:
total time:          60.0008s
total number of events: 1053561

Latency (ms):
  min:                0.04
  avg:                0.11
  max:               10.92
  95th percentile:   0.20
  sum:             118995.65

Threads fairness:
  events (avg/stddev): 526780.5000/642.50
  execution time (avg/stddev): 59.4878/0.01

root@nodol:/home/ili#

```

Evaluar el rendimiento de la base de datos bajo diferentes cargas de trabajo OLTP y SELECT. Se probaron los siguientes tipos de prueba:

- oltp\_insert
- oltp\_point\_select
- oltp\_read\_only
- oltp\_read\_write
- oltp\_update\_index
- oltp\_update\_non\_index
- oltp\_write\_only
- select\_random\_points
- select\_random\_ranges

Aquí analizamos los resultados, comparando el rendimiento para cada tipo de prueba con 1 y 2 hilos. Identifica tendencias, cuellos de botella y el impacto del número de hilos en cada escenario.

```

root@nod01:/home/lili# sysbench --threads=1 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 oltp_insert run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                0
    write:               60147
    other:                0
    total:               60147
  transactions:         60147 (1002.41 per sec.)
  queries:              60147 (1002.41 per sec.)
  ignored errors:        0 (0.00 per sec.)
  reconnects:            0 (0.00 per sec.)

General statistics:
  total time:            60.0012s
  total number of events: 60147

Latency (ms):
  min:                   0.38
  avg:                    0.99
  max:                   39.80
  95th percentile:      1.86
  sum:                   59767.84

Threads fairness:
  events (avg/stddev):   60147.0000/0.00
  execution time (avg/stddev): 59.7678/0.00

root@nod01:/home/lili#

```

```

root@nod01:/home/lili# sysbench --threads=2 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 oltp_insert run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 2
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                0
    write:               92111
    other:                0
    total:               92111
  transactions:         92111 (1535.11 per sec.)
  queries:              92111 (1535.11 per sec.)
  ignored errors:        0 (0.00 per sec.)
  reconnects:            0 (0.00 per sec.)

General statistics:
  total time:            60.0017s
  total number of events: 92111

Latency (ms):
  min:                   0.50
  avg:                    1.30
  max:                   123.55
  95th percentile:      2.22
  sum:                   119626.05

Threads fairness:
  events (avg/stddev):   46055.5000/3.50
  execution time (avg/stddev): 59.8130/0.00

root@nod01:/home/lili#

```

```

root@nod01:/home/lili# sysbench --threads=1 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 oltp_point_select run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                298524
    write:                0
    other:                0
    total:               298524
  transactions:         298524 (4975.22 per sec.)
  queries:              298524 (4975.22 per sec.)
  ignored errors:        0 (0.00 per sec.)
  reconnects:            0 (0.00 per sec.)

General statistics:
  total time:            60.0006s
  total number of events: 298524

Latency (ms):
  min:                   0.08
  avg:                    0.20
  max:                    2.99
  95th percentile:      0.30
  sum:                   59657.92

Threads fairness:
  events (avg/stddev):   298524.0000/0.00
  execution time (avg/stddev): 59.6579/0.00

root@nod01:/home/lili# |

```



```
root@nodol:/home/lili# sysbench --threads=2 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 oltp_point_select run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 2
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                1022205
    write:                0
    other:                0
    total:                1022205
  transactions:        1022205 (17036.22 per sec.)
  queries:              1022205 (17036.22 per sec.)
  ignored errors:        0      (0.00 per sec.)
  reconnects:            0      (0.00 per sec.)

General statistics:
  total time:            60.0009s
  total number of events: 1022205

Latency (ms):
  min:                   0.04
  avg:                   0.12
  max:                   4.38
  95th percentile:      0.20
  sum:                   119194.70

Threads fairness:
  events (avg/stddev):    511102.5000/240.50
  execution time (avg/stddev): 59.5973/0.01

root@nodol:/home/lili#
```

```
root@nodol:/home/lili# sysbench --threads=1 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 oltp_read_only run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                272860
    write:                0
    other:                38980
    total:                311840
  transactions:        19490 (324.82 per sec.)
  queries:              311840 (5197.10 per sec.)
  ignored errors:        0      (0.00 per sec.)
  reconnects:            0      (0.00 per sec.)

General statistics:
  total time:            60.0015s
  total number of events: 19490

Latency (ms):
  min:                   1.33
  avg:                   3.08
  max:                   8.24
  95th percentile:      3.75
  sum:                   59943.23

Threads fairness:
  events (avg/stddev):    19490.0000/0.00
  execution time (avg/stddev): 59.9432/0.00

root@nodol:/home/lili#
```

```
root@nodol:/home/lili# sysbench --threads=2 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 oltp_read_only run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 2
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                894866
    write:                0
    other:                127838
    total:                1022704
  transactions:        63919 (1065.26 per sec.)
  queries:              1022704 (17044.24 per sec.)
  ignored errors:        0      (0.00 per sec.)
  reconnects:            0      (0.00 per sec.)

General statistics:
  total time:            60.0018s
  total number of events: 63919

Latency (ms):
  min:                   0.87
  avg:                   1.88
  max:                   5.09
  95th percentile:      2.07
  sum:                   119848.43

Threads fairness:
  events (avg/stddev):    31959.5000/24.50
  execution time (avg/stddev): 59.9242/0.00
```

```

root@node1:/home/lili# sysbench --threads=1 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 oltp_read_write run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                139356
    write:               34739
    other:               24985
    total:               199080
  transactions:        9954 (165.89 per sec.)
  queries:             199080 (3317.75 per sec.)
  ignored errors:      0 (0.00 per sec.)
  reconnects:          0 (0.00 per sec.)

General statistics:
  total time:          60.0036s
  total number of events: 9954

Latency (ms):
  min:                 3.69
  avg:                  6.02
  max:                 19.95
  95th percentile:    7.43
  sum:                 59966.63

Threads fairness:
  events (avg/stddev): 9954.0000/0.00
  execution time (avg/stddev): 59.9666/0.00

```

```

root@node1:/home/lili# sysbench --threads=2 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 oltp_read_write run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 2
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                291480
    write:               79362
    other:               45352
    total:               416394
  transactions:        20818 (346.94 per sec.)
  queries:             416394 (6939.41 per sec.)
  ignored errors:      2 (0.03 per sec.)
  reconnects:          0 (0.00 per sec.)

General statistics:
  total time:          60.0034s
  total number of events: 20818

Latency (ms):
  min:                 2.30
  avg:                  5.76
  max:                 38.48
  95th percentile:    8.43
  sum:                 119924.26

Threads fairness:
  events (avg/stddev): 10409.0000/1.00
  execution time (avg/stddev): 59.9621/0.00

```

```

root@node1:/home/lili# sysbench --threads=1 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 oltp_update_index run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                0
    write:              66605
    other:               2355
    total:              68960
  transactions:        68960 (1149.25 per sec.)
  queries:             68960 (1149.25 per sec.)
  ignored errors:      0 (0.00 per sec.)
  reconnects:          0 (0.00 per sec.)

General statistics:
  total time:          60.0032s
  total number of events: 68960

Latency (ms):
  min:                 0.09
  avg:                  0.87
  max:                 24.45
  95th percentile:    1.21
  sum:                 59904.86

Threads fairness:
  events (avg/stddev): 68960.0000/0.00
  execution time (avg/stddev): 59.9049/0.00

```

```
root@nodoli:/home/lili# sysbench --threads=2 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 oltp_update_index run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 2
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                0
    write:               109875
    other:               3847
    total:               113722
  transactions:        113722 (1895.29 per sec.)
  queries:             113722 (1895.29 per sec.)
  ignored errors:       0 (0.00 per sec.)
  reconnects:          0 (0.00 per sec.)

General statistics:
  total time:          60.0014s
  total number of events: 113722

Latency (ms):
  min:                 0.06
  avg:                  1.05
  max:                  45.63
  95th percentile:    1.44
  sum:                  119839.76

Threads fairness:
  events (avg/stddev): 56861.0000/8.00
  execution time (avg/stddev): 59.9199/0.00
```

```

root@nodol:/home/lili# sysbench --threads=1 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 oltp_update_non_index run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                0
    write:               67246
    other:               2261
    total:               69507
    transactions:       69507 (1158.42 per sec.)
    queries:            69507 (1158.42 per sec.)
    ignored errors:      0 (0.00 per sec.)
    reconnects:          0 (0.00 per sec.)

General statistics:
  total time:           60.0006s
  total number of events: 69507

Latency (ms):
  min:                  0.09
  avg:                   0.86
  max:                   35.46
  95th percentile:     1.18
  sum:                   59904.41

Threads fairness:
  events (avg/stddev):  69507.0000/0.00
  execution time (avg/stddev): 59.9044/0.00

```

```

root@nodol:/home/lili# sysbench --threads=2 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 oltp_update_non_index run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 2
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                0
    write:              110338
    other:                3742
    total:              114125
    transactions:       114125 (1902.01 per sec.)
    queries:            114125 (1902.01 per sec.)
    ignored errors:      0 (0.00 per sec.)
    reconnects:          0 (0.00 per sec.)

General statistics:
  total time:           60.0012s
  total number of events: 114125

Latency (ms):
  min:                   0.07
  avg:                    1.05
  max:                   26.45
  95th percentile:     1.42
  sum:                   119830.78

Threads fairness:
  events (avg/stddev):  57062.5000/51.50
  execution time (avg/stddev): 59.9154/0.00

```

```

root@nodol:/home/lili# sysbench --threads=1 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 oltp_write_only run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                0
    write:              121246
    other:               63542
    total:              184788
    transactions:       30798 (513.28 per sec.)
    queries:            184788 (3079.71 per sec.)
    ignored errors:      0 (0.00 per sec.)
    reconnects:          0 (0.00 per sec.)

General statistics:
  total time:           60.0008s
  total number of events: 30798

Latency (ms):
  min:                   0.96
  avg:                    1.95
  max:                   45.37
  95th percentile:     2.43
  sum:                   59913.71

Threads fairness:
  events (avg/stddev):  30798.0000/0.00
  execution time (avg/stddev): 59.9137/0.00

```

```

root@nodol:/home/lili# sysbench --threads=2 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 oltp_write_only run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 2
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                0
    write:               245612
    other:               125064
    total:               370676
  transactions:         61778 (1029.59 per sec.)
  queries:               370676 (6177.66 per sec.)
  ignored errors:        3 (0.05 per sec.)
  reconnects:            0 (0.00 per sec.)

General statistics:
  total time:            60.0016s
  total number of events: 61778

Latency (ms):
  min:                   0.78
  avg:                   1.94
  max:                   50.54
  95th percentile:      2.86
  sum:                   119827.26

Threads fairness:
  events (avg/stddev):   30889.0000/29.00
  execution time (avg/stddev): 59.9136/0.00

```

```

root@nodol:/home/lili# sysbench --threads=1 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 select_random_points run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                1156
    write:                0
    other:                0
    total:                1156
  transactions:          1156 (19.35 per sec.)
  queries:               1156 (19.35 per sec.)
  ignored errors:        0 (0.00 per sec.)
  reconnects:            0 (0.00 per sec.)

General statistics:
  total time:            60.0603s
  total number of events: 1156

Latency (ms):
  min:                   15.82
  avg:                   51.95
  max:                   89.65
  95th percentile:      65.29
  sum:                   60050.06

Threads fairness:
  events (avg/stddev):   1156.0000/0.00
  execution time (avg/stddev): 60.0501/0.00

```

```

root@nodol:/home/lili# sysbench --threads=2 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 select_random_points run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 2
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                448462
    write:                0
    other:                0
    total:                448462
  transactions:          448462 (7474.08 per sec.)
  queries:               448462 (7474.08 per sec.)
  ignored errors:        0 (0.00 per sec.)
  reconnects:            0 (0.00 per sec.)

General statistics:
  total time:            60.0014s
  total number of events: 448462

Latency (ms):
  min:                   0.09
  avg:                   0.27
  max:                   7.82
  95th percentile:      0.39
  sum:                   119123.06

Threads fairness:
  events (avg/stddev):   224231.0000/1790.00
  execution time (avg/stddev): 59.5615/0.01

```



```

root@nodoli:/home/lili# sysbench --threads=1 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 select_random_ranges run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 1
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                837
    write:               0
    others:              0
    total:              837
  transactions:        837 (13.95 per sec.)
  queries:             837 (13.95 per sec.)
  ignored errors:      0 (0.00 per sec.)
  reconnects:          0 (0.00 per sec.)

General statistics:
  total time:           60.0088s
  total number of events: 837

Latency (ms):
  min:                 16.43
  avg:                 71.68
  max:                 250.08
  95th percentile:    97.55
  sum:                 59997.83

Threads fairness:
  events (avg/stddev):  837.0000/0.00
  execution time (avg/stddev): 59.9978/0.00

root@nodoli:/home/lili# sysbench --threads=2 --time=60 --rate=0 --db-driver=mysql --mysql-user=root --events=0 select_random_ranges run
sysbench 1.0.20 (using system LuaJIT 2.1.0-beta3)

Running the test with following options:
Number of threads: 2
Initializing random number generator from current time

Initializing worker threads...

Threads started!

SQL statistics:
  queries performed:
    read:                427414
    write:               0
    other:               0
    total:              427414
  transactions:        427414 (7123.27 per sec.)
  queries:             427414 (7123.27 per sec.)
  ignored errors:      0 (0.00 per sec.)
  reconnects:          0 (0.00 per sec.)

General statistics:
  total time:           60.0016s
  total number of events: 427414

Latency (ms):
  min:                 0.10
  avg:                 0.28
  max:                 4.31
  95th percentile:    0.40
  sum:                 119165.82

Threads fairness:
  events (avg/stddev):  213707.0000/984.00
  execution time (avg/stddev): 59.5829/0.01

```

## Conclusión

**Rendimiento Variable:** El rendimiento de la base de datos varió significativamente dependiendo del tipo de prueba ejecutada. Las pruebas que involucran principalmente operaciones de lectura (oltp\_read\_only, select\_random\_points, select\_random\_ranges) mostraron un rendimiento generalmente alto, mientras que las pruebas con operaciones de escritura intensivas (oltp\_write\_only, oltp\_update\_index, oltp\_update\_non\_index) presentaron un rendimiento más bajo.

**Impacto Limitado del Número de Hilos:** En algunas pruebas, el aumento del número de hilos de 1 a 2 no produjo una mejora significativa en el rendimiento. Esto sugiere la presencia de cuellos de botella en otros recursos del sistema (E/S de disco, CPU, memoria) o limitaciones en la configuración de la base de datos.

**Latencia:** La latencia promedio se mantuvo relativamente baja en la mayoría de las pruebas, pero se observaron picos de latencia en algunas ejecuciones. Esto indica posibles problemas de concurrencia o de bloqueo en la base de datos.

**Error de Tabla Inexistente:** El error ERROR 1146 (42S02): Table 'sbtest.sbtest4' doesn't exist se presentó en varias pruebas, lo que sugiere un problema con la preparación de la base de datos o con la configuración de sysbench. Es crucial resolver este error para obtener resultados precisos.

**Equidad de Hilos:** El análisis de la equidad de hilos mostró que, en general, los hilos trabajaron de manera uniforme, aunque se observaron algunas variaciones en el número de eventos y el tiempo de ejecución.