

## Устанавливаю clickhouse:

```
Start clickhouse-server with:
  sudo clickhouse start

Start clickhouse-client with:
  clickhouse-client

Synchronizing state of clickhouse-server.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable clickhouse-server
Created symlink /etc/systemd/system/multi-user.target.wants/clickhouse-server.service → /lib/systemd/system/clickhouse-server.service.
Setting up clickhouse-client (24.4.1.2088) ...
Scanning processes...
Scanning candidates...
Scanning linux images...

Running kernel seems to be up-to-date.

Restarting services...
Service restarts being deferred:
  systemctl restart unattended-upgrades.service

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No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.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@ch1:~# history
 1 apt-get install -y apt-transport-https ca-certificates curl gnupg
 2 curl -fsSL 'https://packages.clickhouse.com/rpm/lts/repodata/repomd.xml.key' | sudo gpg --dearmor -o /usr/share/keyrings/clickhouse-key
 3 echo "deb [signed-by=/usr/share/keyrings/clickhouse-keyring.gpg] https://packages.clickhouse.com/deb stable main" | sudo tee /etc/a
 4 apt-get update
 5 apt-get install -y clickhouse-server clickhouse-client
 6 history
root@ch1:~#
```

## Запускаю демона и проверю клиента:

```
root@ch1:~# systemctl status clickhouse-server.service
● clickhouse-server.service - ClickHouse Server (analytic DBMS for big data)
   Loaded: loaded (/lib/systemd/system/clickhouse-server.service; enabled; vendor preset: enabled)
   Active: active (running) since Fri 2024-05-17 23:46:35 UTC; 6s ago
     Main PID: 5007 (clickhouse-serv)
        Tasks: 666 (limit: 4522)
       Memory: 161.6M
          CPU: 876ms
      CGroup: /system.slice/clickhouse-server.service
              └─5006 clickhouse-watchdog "" "" "" "" "" "" "" --config=/etc/clickhouse-server/config.xml --pid-file=/run/clickhouse
                 └─5007 /usr/bin/clickhouse-server --config=/etc/clickhouse-server/config.xml --pid-file=/run/clickhouse-server/click

May 17 23:46:34 ch1 systemd[1]: Starting ClickHouse Server (analytic DBMS for big data)...
May 17 23:46:34 ch1 clickhouse-server[5006]: Processing configuration file '/etc/clickhouse-server/config.xml'.
May 17 23:46:34 ch1 clickhouse-server[5006]: Logging trace to /var/log/clickhouse-server/clickhouse-server.log
May 17 23:46:34 ch1 clickhouse-server[5006]: Logging errors to /var/log/clickhouse-server/clickhouse-server.err.log
May 17 23:46:34 ch1 systemd[1]: clickhouse-server.service: Supervising process 5007 which is not our child. We'll most likely not
May 17 23:46:35 ch1 systemd[1]: Started ClickHouse Server (analytic DBMS for big data).
root@ch1:~# clickhouse-client
ClickHouse client version 24.4.1.2088 (official build).
Connecting to localhost:9000 as user default.
Connected to ClickHouse server version 24.4.1.

Warnings:
 * Delay accounting is not enabled, OSIOWaitMicroseconds will not be gathered. You can enable it using `echo 1 > /proc/sys/kernel
 * Maximum number of threads is lower than 30000. There could be problems with handling a lot of simultaneous queries.

ch1 :) 
```

С конфигураций по умолчанию:

Active Internet connections (only servers)						
Proto	Recv-Q	Send-Q	Local Address	Foreign Address	State	PID/Program name
tcp	0	0	127.0.0.1:9009	0.0.0.0:*	LISTEN	5007/clickhouse-ser
tcp	0	0	127.0.0.1:9004	0.0.0.0:*	LISTEN	5007/clickhouse-ser
tcp	0	0	127.0.0.1:9005	0.0.0.0:*	LISTEN	5007/clickhouse-ser
tcp	0	0	127.0.0.1:9000	0.0.0.0:*	LISTEN	5007/clickhouse-ser
tcp	0	0	127.0.0.1:8123	0.0.0.0:*	LISTEN	5007/clickhouse-ser
tcp	0	0	127.0.0.53:53	0.0.0.0:*	LISTEN	799/systemd-resolve
tcp	0	0	0.0.0.0:22	0.0.0.0:*	LISTEN	1524/sshd: /usr/sbi
tcp6	0	0	:::1:8123	:::*	LISTEN	5007/clickhouse-ser
tcp6	0	0	:::1:9005	:::*	LISTEN	5007/clickhouse-ser
tcp6	0	0	:::1:9004	:::*	LISTEN	5007/clickhouse-ser
tcp6	0	0	:::1:9000	:::*	LISTEN	5007/clickhouse-ser
tcp6	0	0	:::1:9009	:::*	LISTEN	5007/clickhouse-ser
tcp6	0	0	:::22	:::*	LISTEN	1524/sshd: /usr/sbi
udp	0	0	127.0.0.53:53	0.0.0.0:*		799/systemd-resolve
udp	0	0	192.168.188.132:68	0.0.0.0:*		796/systemd-network
raw6	0	0	:::58	:::*	7	796/systemd-network
Active UNIX domain sockets (only servers)						

Добавляю таблицу:

```
CREATE TABLE trips
(
    `trip_id` UInt32,
    `pickup_datetime` DateTime,
    `dropoff_datetime` DateTime,
    `pickup_longitude` Nullable(Float64),
    `pickup_latitude` Nullable(Float64),
    `dropoff_longitude` Nullable(Float64),
    `dropoff_latitude` Nullable(Float64),
    `passenger_count` UInt8,
    `trip_distance` Float32,
    `fare_amount` Float32,
    `extra` Float32,
    `tip_amount` Float32,
    `tolls_amount` Float32,
    `total_amount` Float32,
    `payment_type` Enum('CSH' = 1, 'CRE' = 2, 'NOC' = 3, 'DIS' = 4, 'UNK' = 5),
    `pickup_ntaname` LowCardinality(String),
    `dropoff_ntaname` LowCardinality(String)
)
ENGINE = MergeTree
PRIMARY KEY (pickup_datetime, dropoff_datetime)

Query id: c5a59c40-d2bc-4929-813e-2dc0d32cc52e

Ok.

0 rows in set. Elapsed: 0.008 sec.
```

Проверю количество строк где payment\_type = 1:

```
ch1 :) select count() from trips where payment_type = 1

SELECT count()
FROM trips
WHERE payment_type = 1

Query id: ffb465bb-0c9e-4626-82a2-70c205105571

1.  count()
    1850287 -- 1.85 million

1 row in set. Elapsed: 0.014 sec. Processed 3.00 million rows, 3.00 MB (208.27 million rows/s., 208.27 MB/s.)
Peak memory usage: 65.48 KiB.
```

Прогоняю benchmark:

```
root@ch1:/etc/clickhouse-server# echo "select * from default.trips where match(pickup_ntaname,'M') limit 100000" | clickhouse-benchmark --host=192.168.188.132
92.168.188.132 --port=8123 -i 10
Loaded 1 queries.

Queries executed: 1.
192.168.188.132:9000, queries: 1, QPS: 0.955, RPS: 281586.908, MiB/s: 19.501, result RPS: 95481.672, result MiB/s: 6.596.

Queries executed: 1.
192.168.188.132:9000, queries: 1, QPS: 0.995, RPS: 293535.709, MiB/s: 20.328, result RPS: 99533.321, result MiB/s: 6.876.

Queries executed: 1.
192.168.188.132:9000, queries: 1, QPS: 0.994, RPS: 293108.248, MiB/s: 20.299, result RPS: 99388.376, result MiB/s: 6.866.

Queries executed: 1.
192.168.188.132:9000, queries: 1, QPS: 0.994, RPS: 293174.647, MiB/s: 20.303, result RPS: 99410.891, result MiB/s: 6.868.

Queries executed: 1.
192.168.188.132:9000, queries: 1, QPS: 0.995, RPS: 293360.636, MiB/s: 20.316, result RPS: 99473.957, result MiB/s: 6.872.

Queries executed: 1.
```

Добавляю конфигурацию от себя:

```
root@ch1:/etc/clickhouse-server# cat config.d/my_conf.xml
<clickhouse>
  <max_server_memory_usage_to_ram_ratio>1.1</max_server_memory_usage_to_ram_ratio>
  <max_server_memory_usage>6G</max_server_memory_usage>

  <listen_host>192.168.188.132</listen_host>
  <!-->
  <query_cache>
    <max_size_in_bytes>4073741824</max_size_in_bytes>
    <max_entry_size_in_bytes>6048576</max_entry_size_in_bytes>
    <max_entry_size_in_rows>30000000</max_entry_size_in_rows>
  </query_cache>
  <-->
</clickhouse>
root@ch1:/etc/clickhouse-server# tree
.
├── config.d
│   ├── my_conf.xml
│   └── config.xml
├── users.d
│   └── default.xml
└── users.xml

2 directories, 4 files
```

Сменился адрес:

Proto	Recv-Q	Send-Q	Local Address	Foreign Address	State	PID/Program name
tcp	0	0	192.168.188.132:9009	0.0.0.0:*	LISTEN	58095/clickhouse-se
tcp	0	0	192.168.188.132:9005	0.0.0.0:*	LISTEN	58095/clickhouse-se
tcp	0	0	192.168.188.132:9004	0.0.0.0:*	LISTEN	58095/clickhouse-se
tcp	0	0	192.168.188.132:9000	0.0.0.0:*	LISTEN	58095/clickhouse-se
tcp	0	0	127.0.0.53:53	0.0.0.0:*	LISTEN	799/systemd-resolve
tcp	0	0	192.168.188.132:8123	0.0.0.0:*	LISTEN	58095/clickhouse-se
tcp	0	0	0.0.0.0:22	0.0.0.0:*	LISTEN	1524/sshd: /usr/sbi
tcp6	0	0	:::22	:::*	LISTEN	1524/sshd: /usr/sbi

Прогоняю benchmark повторно:

```
root@ch1:/etc/clickhouse-server# echo "select * from default.trips where match(pickup_ntaname,'M') limit 100000" | clickhouse-benchmark --host=1
92.168.188.132 --port=8123 -i 10
Loaded 1 queries.

Queries executed: 3.
192.168.188.132:9000, queries: 3, QPS: 2.729, RPS: 790024.524, MiB/s: 54.718, result RPS: 272939.266, result MiB/s: 18.855.

Queries executed: 3.
192.168.188.132:9000, queries: 3, QPS: 2.981, RPS: 862709.663, MiB/s: 59.753, result RPS: 298050.674, result MiB/s: 20.589.

Queries executed: 3.
192.168.188.132:9000, queries: 3, QPS: 2.986, RPS: 864311.631, MiB/s: 59.863, result RPS: 298604.125, result MiB/s: 20.628.

Queries executed: 3.
192.168.188.132:9000, queries: 3, QPS: 2.983, RPS: 863336.089, MiB/s: 59.796, result RPS: 298267.093, result MiB/s: 20.604.

Queries executed: 3.
192.168.188.132:9000, queries: 3, QPS: 2.983, RPS: 863472.123, MiB/s: 59.805, result RPS: 298314.090, result MiB/s: 20.608.

Queries executed: 3.
192.168.188.132:9000, queries: 3, QPS: 2.991, RPS: 865750.744, MiB/s: 59.963, result RPS: 299101.313, result MiB/s: 20.662.

Queries executed: 3.
192.168.188.132:9000, queries: 3, QPS: 2.987, RPS: 864479.492, MiB/s: 59.875, result RPS: 298662.118, result MiB/s: 20.632.

Queries executed: 3.
192.168.188.132:9000, queries: 3, QPS: 2.979, RPS: 862362.961, MiB/s: 59.729, result RPS: 297930.895, result MiB/s: 20.581.
```

