

Отчет по занятию «Развертывание и базовая конфигурация, интерфейсы и инструменты» Зубкова М.Ю.

1. Установить ClickHouse.

```
oem@envy ~$ service clickhouse-server start
oem@envy ~$ service clickhouse-server status
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 Thu 2024-06-27 14:57:54 MSK; 21min ago
Main PID: 1453 (clickhouse-serv)
Tasks: 701 (limit: 6807)
Memory: 907.9M
CPU: 2min 19.345s
CGroup: /system.slice/clickhouse-server.service
└─1370 clickhouse-watchdog " " " " " " " " " " --config=/etc/clickhouse-server/config.xml --pid-file=/run/clickhouse-server/clickhouse-server.pid
   1453 /usr/bin/clickhouse-server --config=/etc/clickhouse-server/config.xml --pid-file=/run/clickhouse-server/clickhouse-server.pid

июн 27 14:56:23 envy systemd[1]: Starting ClickHouse Server (analytic DBMS for big data)...
июн 27 14:56:51 envy clickhouse-server[1370]: Processing configuration file '/etc/clickhouse-server/config.xml'.
июн 27 14:56:51 envy clickhouse-server[1370]: Logging trace to /var/log/clickhouse-server/clickhouse-server.log
июн 27 14:56:51 envy clickhouse-server[1370]: Logging errors to /var/log/clickhouse-server/clickhouse-server.err.log
июн 27 14:56:51 envy systemd[1]: clickhouse-server.service: Supervising process 1453 which is not our child. We'll most likely not notice when it exits.
июн 27 14:57:54 envy systemd[1]: Started ClickHouse Server (analytic DBMS for big data).
oem@envy ~$
```

2. Подгрузить датасет для примера и сделать селект из таблицы

```
root@envy:/etc/clickhouse-server/config.d# clickhouse-client
ClickHouse client version 24.5.3.5 (official build).
Connecting to localhost:9000 as user default.
Connected to ClickHouse server version 24.5.3.

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

envy :) select count() from uk_price_paid

SELECT count()
FROM uk_price_paid

Query id: 5504636e-1e4b-4cb2-b87d-f573e867bc34

┌─count()─┐
1. 29145919 -- 29.15 million

1 row in set. Elapsed: 0.004 sec.

envy :)
```

3. Для проверки отправить скрины работающего инстанса ClickHouse, созданной виртуальной машины и результата запроса `select count() from trips where payment_type = 1.`

4. Провести тестирование производительности и сохранить результаты;

```
root@envy:/etc/clickhouse-server/config.d# echo "SELECT * FROM uk_price_paid" | clickhouse-benchmark  
-i 10
```

Loaded 1 queries.

Queries executed: 0.

Queries executed: 0.

Queries executed: 0.

Queries executed: 0.

Queries executed: 0.

Queries executed: 1.

localhost:9000, queries: 1, QPS: 0.928, RPS: 27055228.114, MiB/s: 1151.426, result RPS: 27055228.114,
result MiB/s: 1054.185.

| | |
|---------|------------|
| 0.000% | 5.676 sec. |
| 10.000% | 5.676 sec. |
| 20.000% | 5.676 sec. |
| 30.000% | 5.676 sec. |
| 40.000% | 5.676 sec. |
| 50.000% | 5.676 sec. |
| 60.000% | 5.676 sec. |
| 70.000% | 5.676 sec. |
| 80.000% | 5.676 sec. |
| 90.000% | 5.676 sec. |
| 95.000% | 5.676 sec. |
| 99.000% | 5.676 sec. |
| 99.900% | 5.676 sec. |
| 99.990% | 5.676 sec. |

Queries executed: 1.

Queries executed: 1.

Queries executed: 1.

Queries executed: 2.

localhost:9000, queries: 1, QPS: 0.958, RPS: 27935916.405, MiB/s: 1188.907, result RPS: 27935916.405,
result MiB/s: 1088.500.

| | |
|---------|------------|
| 0.000% | 3.643 sec. |
| 10.000% | 3.643 sec. |
| 20.000% | 3.643 sec. |
| 30.000% | 3.643 sec. |
| 40.000% | 3.643 sec. |
| 50.000% | 3.643 sec. |
| 60.000% | 3.643 sec. |
| 70.000% | 3.643 sec. |
| 80.000% | 3.643 sec. |
| 90.000% | 3.643 sec. |
| 95.000% | 3.643 sec. |
| 99.000% | 3.643 sec. |
| 99.900% | 3.643 sec. |
| 99.990% | 3.643 sec. |

Queries executed: 2.

Queries executed: 2.

Queries executed: 3.

localhost:9000, queries: 1, QPS: 0.925, RPS: 26963215.383, MiB/s: 1147.510, result RPS: 26963215.383, result MiB/s: 1050.600.

| | |
|---------|------------|
| 0.000% | 3.681 sec. |
| 10.000% | 3.681 sec. |
| 20.000% | 3.681 sec. |
| 30.000% | 3.681 sec. |
| 40.000% | 3.681 sec. |
| 50.000% | 3.681 sec. |
| 60.000% | 3.681 sec. |
| 70.000% | 3.681 sec. |
| 80.000% | 3.681 sec. |
| 90.000% | 3.681 sec. |
| 95.000% | 3.681 sec. |
| 99.000% | 3.681 sec. |
| 99.900% | 3.681 sec. |
| 99.990% | 3.681 sec. |

Queries executed: 3.

Queries executed: 3.

Queries executed: 3.

Queries executed: 4.

localhost:9000, queries: 1, QPS: 0.977, RPS: 28479987.709, MiB/s: 1212.062, result RPS: 28479987.709, result MiB/s: 1109.700.

| | |
|---------|------------|
| 0.000% | 3.623 sec. |
| 10.000% | 3.623 sec. |
| 20.000% | 3.623 sec. |
| 30.000% | 3.623 sec. |
| 40.000% | 3.623 sec. |
| 50.000% | 3.623 sec. |
| 60.000% | 3.623 sec. |
| 70.000% | 3.623 sec. |
| 80.000% | 3.623 sec. |
| 90.000% | 3.623 sec. |
| 95.000% | 3.623 sec. |
| 99.000% | 3.623 sec. |
| 99.900% | 3.623 sec. |
| 99.990% | 3.623 sec. |

Queries executed: 4.

Queries executed: 4.

Queries executed: 5.

localhost:9000, queries: 1, QPS: 0.928, RPS: 27055259.231, MiB/s: 1151.428, result RPS: 27055259.231, result MiB/s: 1054.186.

| | |
|---------|------------|
| 0.000% | 3.577 sec. |
| 10.000% | 3.577 sec. |
| 20.000% | 3.577 sec. |
| 30.000% | 3.577 sec. |
| 40.000% | 3.577 sec. |
| 50.000% | 3.577 sec. |
| 60.000% | 3.577 sec. |
| 70.000% | 3.577 sec. |
| 80.000% | 3.577 sec. |
| 90.000% | 3.577 sec. |
| 95.000% | 3.577 sec. |
| 99.000% | 3.577 sec. |

| | |
|---------|------------|
| 99.900% | 3.577 sec. |
| 99.990% | 3.577 sec. |

Queries executed: 5.

Queries executed: 5.

Queries executed: 5.

Queries executed: 6.

localhost:9000, queries: 1, QPS: 0.969, RPS: 28236532.801, MiB/s: 1201.701, result RPS: 28236532.801, result MiB/s: 1100.214.

| | |
|---------|------------|
| 0.000% | 3.532 sec. |
| 10.000% | 3.532 sec. |
| 20.000% | 3.532 sec. |
| 30.000% | 3.532 sec. |
| 40.000% | 3.532 sec. |
| 50.000% | 3.532 sec. |
| 60.000% | 3.532 sec. |
| 70.000% | 3.532 sec. |
| 80.000% | 3.532 sec. |
| 90.000% | 3.532 sec. |
| 95.000% | 3.532 sec. |
| 99.000% | 3.532 sec. |
| 99.900% | 3.532 sec. |
| 99.990% | 3.532 sec. |

Queries executed: 6.

Queries executed: 6.

Queries executed: 7.

localhost:9000, queries: 1, QPS: 0.915, RPS: 26655266.005, MiB/s: 1134.405, result RPS: 26655266.005, result MiB/s: 1038.601.

| | |
|---------|------------|
| 0.000% | 3.593 sec. |
| 10.000% | 3.593 sec. |
| 20.000% | 3.593 sec. |
| 30.000% | 3.593 sec. |
| 40.000% | 3.593 sec. |
| 50.000% | 3.593 sec. |
| 60.000% | 3.593 sec. |
| 70.000% | 3.593 sec. |
| 80.000% | 3.593 sec. |
| 90.000% | 3.593 sec. |
| 95.000% | 3.593 sec. |
| 99.000% | 3.593 sec. |
| 99.900% | 3.593 sec. |
| 99.990% | 3.593 sec. |

Queries executed: 7.

Queries executed: 7.

Queries executed: 7.

Queries executed: 10.

localhost:9000, queries: 10, QPS: 0.261, RPS: 7614104.857, MiB/s: 324.044, result RPS: 7614104.857, result MiB/s: 296.677.

| | |
|---------|------------|
| 0.000% | 3.532 sec. |
| 10.000% | 3.561 sec. |
| 20.000% | 3.577 sec. |
| 30.000% | 3.593 sec. |
| 40.000% | 3.598 sec. |
| 50.000% | 3.623 sec. |
| 60.000% | 3.623 sec. |
| 70.000% | 3.643 sec. |
| 80.000% | 3.664 sec. |

| | |
|---------|------------|
| 90.000% | 3.681 sec. |
| 95.000% | 5.676 sec. |
| 99.000% | 5.676 sec. |
| 99.900% | 5.676 sec. |
| 99.990% | 5.676 sec. |

5. Изучить конфигурационные файлы БД;
6. Произвести наиболее оптимальную настройку системы на основании характеристик вашей ОС и провести повторное тестирование;

```
root@envy: /etc/clickhouse-server/config.d
Файл  Правка  Вид  Поиск  Терминал  Помощь
GNU nano 6.2                                config_new.xml
clickhouse>
<max_server_memory_usage>1073741824</max_server_memory_usage>
<max_thread_pool_size>14000</max_thread_pool_size>
<thread_pool_queue_size>12000</thread_pool_queue_size>
<max_concurrent_queries>120</max_concurrent_queries>
<max_concurrent_insert_queries>120</max_concurrent_insert_queries>
clickhouse>
```

7. Подготовить отчет касательно прироста/изменения производительности системы на основе проведенных настроек. Результатом выполнения работы является подготовленный отчет в формате pdf, в котором указано описание всех выполненных пунктов. Поощряется работа в отдельных гит-репозиториях

```
root@envy:/etc/clickhouse-server/config.d# echo "SELECT * FROM uk_price_paid" | clickhouse-
benchmark -i 10
Loaded 1 queries.
```

Queries executed: 0.

Queries executed: 0.

Queries executed: 0.

Queries executed: 1.

localhost:9000, queries: 1, QPS: 0.984, RPS: 28667487.615, MiB/s: 1220.041, result RPS: 28667487.615, result MiB/s: 1117.005.

| | |
|---------|------------|
| 0.000% | 3.715 sec. |
| 10.000% | 3.715 sec. |
| 20.000% | 3.715 sec. |
| 30.000% | 3.715 sec. |
| 40.000% | 3.715 sec. |
| 50.000% | 3.715 sec. |
| 60.000% | 3.715 sec. |
| 70.000% | 3.715 sec. |
| 80.000% | 3.715 sec. |
| 90.000% | 3.715 sec. |
| 95.000% | 3.715 sec. |
| 99.000% | 3.715 sec. |
| 99.900% | 3.715 sec. |
| 99.990% | 3.715 sec. |

Queries executed: 1.

Queries executed: 1.

Queries executed: 1.

Queries executed: 2.

localhost:9000, queries: 1, QPS: 0.957, RPS: 27884849.678, MiB/s: 1186.734, result RPS: 27884849.678, result MiB/s: 1086.511.

| | |
|---------|------------|
| 0.000% | 3.545 sec. |
| 10.000% | 3.545 sec. |
| 20.000% | 3.545 sec. |
| 30.000% | 3.545 sec. |
| 40.000% | 3.545 sec. |
| 50.000% | 3.545 sec. |

| | |
|---------|------------|
| 60.000% | 3.545 sec. |
| 70.000% | 3.545 sec. |
| 80.000% | 3.545 sec. |
| 90.000% | 3.545 sec. |
| 95.000% | 3.545 sec. |
| 99.000% | 3.545 sec. |
| 99.900% | 3.545 sec. |
| 99.990% | 3.545 sec. |

Queries executed: 2.

Queries executed: 2.

Queries executed: 3.

localhost:9000, queries: 1, QPS: 0.965, RPS: 28111557.720, MiB/s: 1196.382, result RPS: 28111557.720, result MiB/s: 1095.344.

| | |
|---------|------------|
| 0.000% | 3.637 sec. |
| 10.000% | 3.637 sec. |
| 20.000% | 3.637 sec. |
| 30.000% | 3.637 sec. |
| 40.000% | 3.637 sec. |
| 50.000% | 3.637 sec. |
| 60.000% | 3.637 sec. |
| 70.000% | 3.637 sec. |
| 80.000% | 3.637 sec. |
| 90.000% | 3.637 sec. |
| 95.000% | 3.637 sec. |
| 99.000% | 3.637 sec. |
| 99.900% | 3.637 sec. |
| 99.990% | 3.637 sec. |

Queries executed: 3.

Queries executed: 3.

Queries executed: 3.

Queries executed: 4.

localhost:9000, queries: 1, QPS: 0.995, RPS: 28990717.715, MiB/s: 1233.798, result RPS: 28990717.715, result MiB/s: 1129.600.

| | |
|---------|------------|
| 0.000% | 3.705 sec. |
| 10.000% | 3.705 sec. |
| 20.000% | 3.705 sec. |
| 30.000% | 3.705 sec. |
| 40.000% | 3.705 sec. |
| 50.000% | 3.705 sec. |
| 60.000% | 3.705 sec. |
| 70.000% | 3.705 sec. |
| 80.000% | 3.705 sec. |
| 90.000% | 3.705 sec. |
| 95.000% | 3.705 sec. |
| 99.000% | 3.705 sec. |
| 99.900% | 3.705 sec. |
| 99.990% | 3.705 sec. |

Queries executed: 4.

Queries executed: 4.

Queries executed: 4.

Queries executed: 5.

localhost:9000, queries: 1, QPS: 0.956, RPS: 27860207.159, MiB/s: 1185.685, result RPS: 27860207.159, result MiB/s: 1085.550.

| | |
|---------|------------|
| 0.000% | 3.646 sec. |
| 10.000% | 3.646 sec. |
| 20.000% | 3.646 sec. |
| 30.000% | 3.646 sec. |
| 40.000% | 3.646 sec. |
| 50.000% | 3.646 sec. |
| 60.000% | 3.646 sec. |
| 70.000% | 3.646 sec. |
| 80.000% | 3.646 sec. |
| 90.000% | 3.646 sec. |
| 95.000% | 3.646 sec. |
| 99.000% | 3.646 sec. |
| 99.900% | 3.646 sec. |
| 99.990% | 3.646 sec. |

Queries executed: 5.

Queries executed: 5.

Queries executed: 6.

localhost:9000, queries: 1, QPS: 0.970, RPS: 28281948.463, MiB/s: 1203.633, result RPS: 28281948.463, result MiB/s: 1101.983.

| | |
|---------|------------|
| 0.000% | 3.731 sec. |
| 10.000% | 3.731 sec. |
| 20.000% | 3.731 sec. |
| 30.000% | 3.731 sec. |
| 40.000% | 3.731 sec. |
| 50.000% | 3.731 sec. |
| 60.000% | 3.731 sec. |
| 70.000% | 3.731 sec. |
| 80.000% | 3.731 sec. |
| 90.000% | 3.731 sec. |
| 95.000% | 3.731 sec. |
| 99.000% | 3.731 sec. |
| 99.900% | 3.731 sec. |
| 99.990% | 3.731 sec. |

Queries executed: 6.

Queries executed: 6.

Queries executed: 6.

Queries executed: 7.

localhost:9000, queries: 1, QPS: 0.998, RPS: 29090924.585, MiB/s: 1238.062, result RPS: 29090924.585, result MiB/s: 1133.504.

| | |
|---------|------------|
| 0.000% | 3.601 sec. |
| 10.000% | 3.601 sec. |
| 20.000% | 3.601 sec. |
| 30.000% | 3.601 sec. |
| 40.000% | 3.601 sec. |
| 50.000% | 3.601 sec. |
| 60.000% | 3.601 sec. |
| 70.000% | 3.601 sec. |
| 80.000% | 3.601 sec. |
| 90.000% | 3.601 sec. |
| 95.000% | 3.601 sec. |
| 99.000% | 3.601 sec. |
| 99.900% | 3.601 sec. |

99.990% 3.601 sec.

Queries executed: 7.

Queries executed: 7.

Queries executed: 7.

Queries executed: 10.

localhost:9000, queries: 10, QPS: 0.273, RPS: 7961275.082, MiB/s: 338.819, result RPS: 7961275.082, result MiB/s: 310.205.

| | |
|---------|------------|
| 0.000% | 3.545 sec. |
| 10.000% | 3.601 sec. |
| 20.000% | 3.602 sec. |
| 30.000% | 3.623 sec. |
| 40.000% | 3.637 sec. |
| 50.000% | 3.646 sec. |
| 60.000% | 3.646 sec. |
| 70.000% | 3.675 sec. |
| 80.000% | 3.705 sec. |
| 90.000% | 3.715 sec. |
| 95.000% | 3.731 sec. |
| 99.000% | 3.731 sec. |
| 99.900% | 3.731 sec. |
| 99.990% | 3.731 sec. |