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## ОТЧЁТ

по лабораторной работе №1

по дисциплине «Методы и инструменты анализа больших данных»

|               |        |           |               |
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Группа: РИМ-201211

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# Задание 1

## 1. Воспользовавшись примерами из презентации (Лекция 5 - Основы хранилищ ключ-значение) установите redis

\$ sudo apt-get update

```
root@ubuntu:/home/belozhi# sudo apt-get update
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Hit:2 http://us.archive.ubuntu.com/ubuntu focal InRelease
Get:3 http://us.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:4 http://us.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Fetched 336 kB in 1s (228 kB/s)
Reading package lists... Done
```

\$ sudo apt-get install redis-server

```
root@ubuntu:/home/belozhi# sudo apt-get install redis-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libatomic1 libhiredis0.14 libjemalloc2 liblua5.1-0 lua-bitop lua-cjson
  redis-tools
Suggested packages:
  ruby-redis
The following NEW packages will be installed:
  libatomic1 libhiredis0.14 libjemalloc2 liblua5.1-0 lua-bitop lua-cjson
  redis-server redis-tools
0 upgraded, 8 newly installed, 0 to remove and 144 not upgraded.
Need to get 925 kB of archives.
After this operation, 4 123 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://us.archive.ubuntu.com/ubuntu focal-updates/main amd64 libatomic1 amd64 10.3.0-1ubuntu1~20.04 [9 284 B]
Get:2 http://us.archive.ubuntu.com/ubuntu focal/universe amd64 libhiredis0.14 amd64 0.14.0-6 [30,2 kB]
Get:3 http://us.archive.ubuntu.com/ubuntu focal/universe amd64 libjemalloc2 amd64 5.2.1-1ubuntu1 [235 kB]
Get:4 http://us.archive.ubuntu.com/ubuntu focal/universe amd64 liblua5.1-0 amd64 5.1.5-8.1build4 [99,9 kB]
Get:5 http://us.archive.ubuntu.com/ubuntu focal/universe amd64 lua-bitop amd64 1.0.2-5 [6 680 B]
Get:6 http://us.archive.ubuntu.com/ubuntu focal/universe amd64 lua-cjson amd64 2.1.0+dfsg-2.1 [17,4 kB]
Get:7 http://us.archive.ubuntu.com/ubuntu focal/universe amd64 redis-tools amd64 5:5.0.7-2 [489 kB]
Get:8 http://us.archive.ubuntu.com/ubuntu focal/universe amd64 redis-server amd64 5:5.0.7-2 [37,3 kB]
Fetched 925 kB in 1s (691 kB/s)
Selecting previously unselected package libatomic1:amd64.
(Reading database ... 205798 files and directories currently installed.)
```

\$ redis-server

```
root@ubuntu:/home/belozhi# redis-server
4980:C 04 Dec 2021 13:25:19.236 # o000o000o000o Redis is starting o000o000o000o
4980:C 04 Dec 2021 13:25:19.236 # Redis version=5.0.7, bits=64, commit=00000000, modified=0, pid=4980, just started
4980:C 04 Dec 2021 13:25:19.236 # Warning: no config file specified, using the default config. In order to specify a config file use redis-server /path/to/redis.conf
4980:M 04 Dec 2021 13:25:19.236 * Increased maximum number of open files to 10032 (it was originally set to 1024).
4980:M 04 Dec 2021 13:25:19.237 # Could not create server TCP listening socket *:6379: bind: Address already in use
```

\$ service redis-server status

```
root@ubuntu:/home/belozhi# service redis-server status
● redis-server.service - Advanced key-value store
   Loaded: loaded (/lib/systemd/system/redis-server.service; enabled; vendor preset: enabled)
   Active: active (running) since Sat 2021-12-04 13:20:20 +05; 7min ago
     Docs: http://redis.io/documentation,
           man:redis-server(1)
   Main PID: 4197 (redis-server)
     Tasks: 4 (limit: 19092)
    Memory: 1.8M
   CGroup: /system.slice/redis-server.service
           └─4197 /usr/bin/redis-server 127.0.0.1:6379

дек 04 13:20:20 ubuntu systemd[1]: Starting Advanced key-value store...
дек 04 13:20:20 ubuntu systemd[1]: redis-server.service: Can't open PID file /run/redis/redis-server.pid (yet?) after start: Operation not permitted
дек 04 13:20:20 ubuntu systemd[1]: Started Advanced key-value store.
```

\$ systemctl status redis

```
root@ubuntu:/home/belozhi# systemctl status redis
● redis-server.service - Advanced key-value store
   Loaded: loaded (/lib/systemd/system/redis-server.service; enabled; vendor preset: enabled)
   Active: active (running) since Sat 2021-12-04 13:20:20 +05; 8min ago
     Docs: http://redis.io/documentation,
           man:redis-server(1)
  Main PID: 4197 (redis-server)
    Tasks: 4 (limit: 19092)
   Memory: 1.8M
   CGroup: /system.slice/redis-server.service
           └─4197 /usr/bin/redis-server 127.0.0.1:6379

дек 04 13:20:20 ubuntu systemd[1]: Starting Advanced key-value store...
дек 04 13:20:20 ubuntu systemd[1]: redis-server.service: Can't open PID file /run/redis/redis-server.pid (yet?) after start: Operation not permitted
дек 04 13:20:20 ubuntu systemd[1]: Started Advanced key-value store.
```

**2. Попробуйте все команды, которые приведены в презентации, для справки необходимо использовать документацию по командам**

**<https://redis.io/commands>.**

\$ redis-cli

Подключение

```
root@ubuntu:/home/belozhi# redis-cli
127.0.0.1:6379> PING
PONG
127.0.0.1:6379> PING xxx
"xxx"
```

Конфигурация

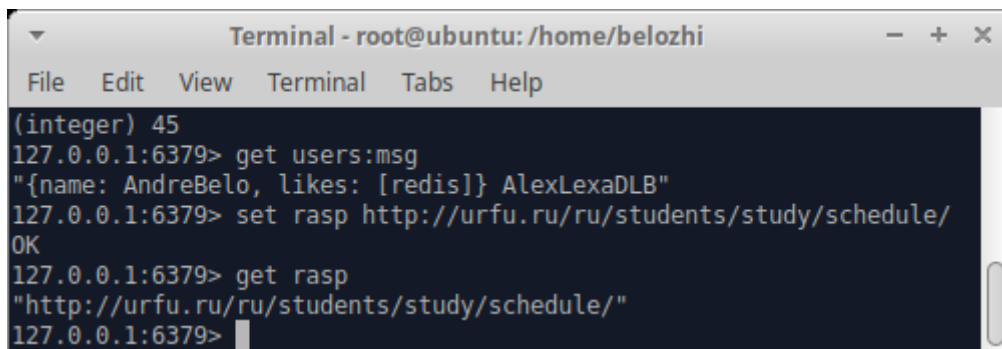
```
127.0.0.1:6379> config get loglevel
1) "loglevel"
2) "notice"
127.0.0.1:6379> config get *
1) "dbfilename"
2) "dump.rdb"
3) "requirepass"
4) ""
5) "masterauth"
6) ""
7) "cluster-announce-ip"
8) ""
9) "unixsocket"
10) ""
11) "logfile"
12) "/var/log/redis/redis-server.log"
13) "pidfile"
14) "/var/run/redis/redis-server.pid"
15) "slave-announce-ip"
16) ""
17) "replica-announce-ip"
18) ""

127.0.0.1:6379> config set loglevel "notice"
OK
```

## Простые типы данных

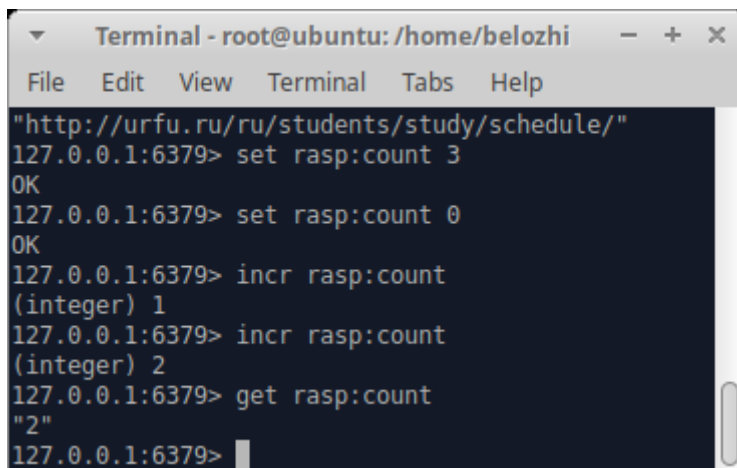
```
127.0.0.1:6379> set users:msg "{name: Alexander, likes: [redis]}"
OK
127.0.0.1:6379> strlen users:msg
(integer) 33
127.0.0.1:6379> getrange users:msg 23 27
": [re"
127.0.0.1:6379> append users:msg " FTW !!111"
(integer) 43
127.0.0.1:6379> get users:msg
"{name: Alexander, likes: [redis]} FTW !!111"
```

```
127.0.0.1:6379> set users:msg "{name: AndreBelo, likes: [redis]}"
OK
127.0.0.1:6379> strlen users:msg
(integer) 33
127.0.0.1:6379> getrange users:msg 23 27
": [re"
127.0.0.1:6379> append users:msg " AlexLexaDLB"
(integer) 45
127.0.0.1:6379> get users:msg
"{name: AndreBelo, likes: [redis]} AlexLexaDLB"
```



A terminal window titled "Terminal - root@ubuntu: /home/belozhi" with a menu bar (File, Edit, View, Terminal, Tabs, Help). The terminal shows the following commands and output:

```
(integer) 45
127.0.0.1:6379> get users:msg
"{name: AndreBelo, likes: [redis]} AlexLexaDLB"
127.0.0.1:6379> set rasp http://urfu.ru/ru/students/study/schedule/
OK
127.0.0.1:6379> get rasp
"http://urfu.ru/ru/students/study/schedule/"
127.0.0.1:6379>
```



A terminal window titled "Terminal - root@ubuntu: /home/belozhi" with a menu bar (File, Edit, View, Terminal, Tabs, Help). The terminal shows the following commands and output:

```
"http://urfu.ru/ru/students/study/schedule/"
127.0.0.1:6379> set rasp:count 3
OK
127.0.0.1:6379> set rasp:count 0
OK
127.0.0.1:6379> incr rasp:count
(integer) 1
127.0.0.1:6379> incr rasp:count
(integer) 2
127.0.0.1:6379> get rasp:count
"2"
127.0.0.1:6379>
```

## Устаревание

```
Terminal - root@ubuntu: /home/belozhi
File Edit View Terminal Tabs Help
"2"
127.0.0.1:6379> expire rasp 20
(integer) 1
127.0.0.1:6379> ttl rasp
(integer) 14
127.0.0.1:6379> exists rasp
(integer) 1
127.0.0.1:6379> exists rasp
(integer) 1
127.0.0.1:6379> exists rasp
(integer) 0
127.0.0.1:6379> 
```

## Хэши

```
127.0.0.1:6379> Hmset rasp url http://urfu.ru/ru/students/study/schedule/ count 0
OK
127.0.0.1:6379> hvals rasp
1) "http://urfu.ru/ru/students/study/schedule/"
2) "0"
127.0.0.1:6379> hkeys rasp
1) "url"
2) "count"
```

## Списки

```
Terminal - root@ubuntu: /home/belozhi
File Edit View Terminal Tabs Help
belozhi@ubuntu:~$ sudo su
[sudo] password for belozhi:
root@ubuntu:/home/belozhi# redis-ctl
redis-ctl: command not found
root@ubuntu:/home/belozhi# redis-cli
127.0.0.1:6379> Hmset rasp url http://urfu.ru/ru/students/study/schedule/ count 0
OK
127.0.0.1:6379> hvals rasp
1) "http://urfu.ru/ru/students/study/schedule/"
2) "0"
127.0.0.1:6379> hkeys rasp
1) "url"
2) "count"
127.0.0.1:6379> rpush rasp:comments good nice "not bad"
(integer) 3
127.0.0.1:6379> lrange rasp:comments 0 -1
1) "good"
2) "nice"
3) "not bad"
127.0.0.1:6379> 
```

## Множества и объединения

```
Terminal - root@ubuntu: /home/belozhi
File Edit View Terminal Tabs Help
root@ubuntu:/home/belozhi# hmset rasp url http://urfu.ru/ru/students/study/schedule/ count 0
Command 'hmset' not found, did you mean:
  command 'hpset' from deb djtools (1.2.7build2)
Try: apt install <deb name>
root@ubuntu:/home/belozhi# redis-cli
127.0.0.1:6379> hmset rasp url http://urfu.ru/ru/students/study/schedule/ count 0
OK
127.0.0.1:6379> hmset mail url https://mail.urfu.ru
OK
127.0.0.1:6379> hmset rtf url http://rtf.urfu.ru
OK
127.0.0.1:6379> sadd priv rasp mail
(integer) 2
127.0.0.1:6379> sadd urfu rasp mail rtf
(integer) 3
127.0.0.1:6379> smembers priv
1) "mail"
2) "rasp"
127.0.0.1:6379> smembers urfu
1) "rtf"
2) "mail"
3) "rasp"
127.0.0.1:6379> sinter priv urfu
1) "mail"
2) "rasp"
127.0.0.1:6379>
```

## Упорядоченные множества

```
Terminal - root@ubuntu: /home/belozhi
File Edit View Terminal Tabs Help
1) "rtf"
2) "mail"
3) "rasp"
127.0.0.1:6379> sinter priv urfu
1) "mail"
2) "rasp"
127.0.0.1:6379> zadd scores 5 rasp 5 rtf 3 mail
(integer) 3
127.0.0.1:6379> zrange scores 0 -1
1) "mail"
2) "rasp"
3) "rtf"
127.0.0.1:6379> zrange scores 0 -1 withscores
1) "mail"
2) "3"
3) "rasp"
4) "5"
5) "rtf"
6) "5"
127.0.0.1:6379> zincrby scores 1 rtf
"6"
127.0.0.1:6379> zincrby scores 5 rasp
"10"
127.0.0.1:6379> zincrby scores 3 mail
"6"
127.0.0.1:6379> zrange scores 0 1 withscores
1) "mail"
2) "6"
3) "rtf"
4) "6"
127.0.0.1:6379>
```

## Задание 2

1. После выполнения первого задания выполните скрипт

```
belozhi@ubuntu:~$ #!/bin/bash
belozhi@ubuntu:~$
belozhi@ubuntu:~$ REDIS_KEY_PATTERN="${REDIS_KEY_PATTERN:-*}"
belozhi@ubuntu:~$ for key in $(redis-cli --scan --pattern "$REDIS_KEY_PATTERN")
> do
>   type=$(redis-cli type $key)
>   if [ $type = "list" ]
>   then
>     printf "$key => \n$(redis-cli lrange $key 0 -1 | sed 's/^/ /')\n"
>   elif [ $type = "hash" ]
>   then
>     printf "$key => \n$(redis-cli hgetall $key | sed 's/^/ /')\n"
>   else
>     printf "$key => $(redis-cli get $key)\n"
>   fi
> done
rasp:count => 2
urfu => WRONGTYPE Operation against a key holding the wrong kind of value
scores => WRONGTYPE Operation against a key holding the wrong kind of value
rtf =>
  url
  http://rtf.urfu.ru
users:msg => {name: AndreBelo, likes: [redis]} AlexLexaDLB
mail =>
  url
  https://mail.urfu.ru
rasp:comments =>
  good
  nice
  not bad
rasp =>
  url
  http://urfu.ru/ru/students/study/schedule/
  count
  0
priv => WRONGTYPE Operation against a key holding the wrong kind of value
```

Сохраните вывод этого скрипта в отдельный файл, это будет результатом первого задания.

```

belozhi@ubuntu:~$ for key in $(redis-cli --scan --pattern "$REDIS_KEY_PATTERN"); do type=$(re
dis-cli type $key); if [ $type = "list" ]; then printf "$key => \n$(redis-cli lra
nge $key 0 -1 | sed 's/^/ /')\n"; elif [ $type = "hash" ]; then printf "$key =>
\n$(redis-cli hgetall $key | sed 's/^/ /')\n"; else printf "$key => $(redis-cli get
$key)\n"; fi; done >belozhi.txt
belozhi@ubuntu:~$ ls -l belozhi.txt
-rw-rw-r-- 1 belozhi belozhi 486 дек 4 14:14 belozhi.txt
belozhi@ubuntu:~$ cat belozhi.txt
rasp:count => 2
urfu => WRONGTYPE Operation against a key holding the wrong kind of value
scores => WRONGTYPE Operation against a key holding the wrong kind of value
rtf =>
url
http://rtf.urfu.ru
users:msg => {name: AndreBelo, likes: [redis]} AlexLexaDLB
mail =>
url
https://mail.urfu.ru
rasp:comments =>
good
nice
not bad
rasp =>
url
http://urfu.ru/ru/students/study/schedule/
count
0
priv => WRONGTYPE Operation against a key holding the wrong kind of value
belozhi@ubuntu:~$

```

Результат в файле belozhi.txt

```

Terminal - belozhi@ubuntu: ~
File Edit View Terminal Tabs Help
GNU nano 4.8 belozhi.txt
rasp:count => 2
urfu => WRONGTYPE Operation against a key holding the wrong kind of value
scores => WRONGTYPE Operation against a key holding the wrong kind of value
rtf =>
url
http://rtf.urfu.ru
users:msg => {name: AndreBelo, likes: [redis]} AlexLexaDLB
mail =>
url
https://mail.urfu.ru
rasp:comments =>
good
nice
not bad
rasp =>
url
http://urfu.ru/ru/students/study/schedule/
count
0
priv => WRONGTYPE Operation against a key holding the wrong kind of value
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^_ Replace ^U Paste Text ^T To Spell ^_ Go To Line

```

Как видно из текста, скрипт использует команды scan, type, lrange, hgetall, get для получения с помощью консольного клиента redis-cli списка ключей, получения типа ключа, и получения значения ключей в зависимости от типа (списки, хэши, простые ключи).



2. Напишите скрипт для установки 1М простых ключей, 10М простых ключей замерьте скорость и потребление памяти

```

Terminal - belozhi@ubuntu: ~
File Edit View Terminal Tabs Help
GNU nano 4.8 OneMillionKeys.sh Modified
#!/bin/bash
echo "[ INFO ] Start str uploading script...."
LOG_DISABLE=1
function clean {
    [[ -z "$LOG_DISABLE" ]] && echo "[ INFO ] Start clean"
    redis-cli KEYS "user:*" | xargs redis-cli DEL > /dev/null
    [[ -z "$LOG_DISABLE" ]] && echo "[ INFO ] Clean complete"
}
function generation {
    # Clean generated file
    > generation.txt
    for ((i = 1; i < END+1; i++)); do
        echo "SET user:${i} someValue${i}" >> generation.txt
    done
}
function upload {
    cat generation.txt | redis-cli --pipe > /dev/null
}
# Entry point
clean

echo "Time for upload 1.000.000 string row"
END=1000000
generation
time upload
clean
echo "-----"
echo ""

echo "Time for upload 10.000.000 string row"
END=10000000
generation
time upload
clean
echo "-----"
echo ""

echo "[ INFO ] Script end"

```

Таблица 1 – Замеры времени и ОЗУ при записи ключей

| Count      | Time №1   | Time №2   | Time №3   | RAM    |
|------------|-----------|-----------|-----------|--------|
| 1.000.000  | 0m2,842s  | 0m3,034s  | 0m3,088s  | 136 Mb |
| 10.000.000 | 0m38,120s | 0m36,675s | 0m37,425s | 938 Mb |

| Terminal - belozhi@ubuntu: ~      |                    |     |    |       |       |       |   |      |      |         |   |  |
|-----------------------------------|--------------------|-----|----|-------|-------|-------|---|------|------|---------|---|--|
| File Edit View Terminal Tabs Help |                    |     |    |       |       |       |   |      |      |         |   |  |
| 1                                 | [     100.0%]      |     |    |       |       |       |   |      |      |         | Tasks: 97, 245 thr; 2 running                                   |  |
| 2                                 | [     98.7%]       |     |    |       |       |       |   |      |      |         | Load average: 2.74 1.98 1.82                                    |  |
| Mem                               | [     1.13G/15.6G] |     |    |       |       |       |   |      |      |         | Uptime: 02:14:39  |  |
| Swp                               | [     0K/2.00G]    |     |    |       |       |       |   |      |      |         |   |  |
| PID                               | USER               | PRI | NI | VIRT  | RES   | SHR   | S | CPU% | MEM% | TIME+   | Command   |  |
| 1108                              | belozhi            | 20  | 0  | 239M  | 29432 | 17220 | S | 12.0 | 0.2  | 2:22.21 | xfsettingsd   |  |
| 1141                              | belozhi            | 20  | 0  | 322M  | 47344 | 34672 | R | 11.3 | 0.3  | 1:52.42 | /usr/lib/x86_64-linux-gnu/xfce4/panel/wrapper-2.0 /usr/lib/x86_ |  |
| 1136                              | belozhi            | 20  | 0  | 322M  | 47344 | 34672 | S | 11.3 | 0.3  | 1:54.42 | /usr/lib/x86_64-linux-gnu/xfce4/panel/wrapper-2.0 /usr/lib/x86_ |  |
| 3193                              | belozhi            | 20  | 0  | 328M  | 44508 | 34392 | R | 6.0  | 0.3  | 6:07.36 | xfce4-taskmanager   |  |
| 6308                              | belozhi            | 20  | 0  | 21364 | 4532  | 3384  | R | 1.3  | 0.0  | 0:17.55 | htop  |  |
| 776                               | root               | 20  | 0  | 493M  | 160M  | 70304 | S | 0.7  | 1.0  | 1:14.78 | /usr/lib/xorg/Xorg -core :0 -seat seat0 -auth /var/run/lightdm/ |  |
| 3574                              | belozhi            | 20  | 0  | 404M  | 50928 | 37484 | S | 0.7  | 0.3  | 0:24.29 | /usr/bin/xfce4-terminal   |  |
| 1104                              | belozhi            | 20  | 0  | 389M  | 83188 | 62960 | S | 0.0  | 0.5  | 0:16.23 | xfwm4 --replace   |  |
| 859                               | root               | 20  | 0  | 493M  | 160M  | 70304 | S | 0.0  | 1.0  | 0:08.10 | /usr/lib/xorg/Xorg -core :0 -seat seat0 -auth /var/run/lightdm/ |  |
| 1257                              | belozhi            | 20  | 0  | 291M  | 38384 | 29456 | S | 0.0  | 0.2  | 0:11.40 | /usr/bin/vmtoolsd -n vmusr --blockFd 3                          |  |
| 1144                              | belozhi            | 20  | 0  | 506M  | 40948 | 33376 | S | 0.0  | 0.3  | 0:07.13 | /usr/lib/x86_64-linux-gnu/xfce4/panel/wrapper-2.0 /usr/lib/x86_ |  |
| 4197                              | redis              | 20  | 0  | 1568M | 133M  | 3780  | S | 0.0  | 0.8  | 1:32.57 | /usr/bin/redis-server 127.0.0.1:6379                            |  |
| 606                               | root               | 20  | 0  | 243M  | 7872  | 6596  | S | 0.0  | 0.0  | 0:10.75 | /usr/bin/vmtoolsd   |  |
| 1109                              | belozhi            | 20  | 0  | 277M  | 31304 | 24860 | S | 0.0  | 0.2  | 0:02.03 | xfce4-panel   |  |

Рисунок 1 – Загрузка ОЗУ при записи 10М ключей

3. Напишите скрипт для установки 1М хэшей, 10М хэшей. Замерьте скорость и потребление памяти

```

Terminal - belozhi@ubuntu: ~
File Edit View Terminal Tabs Help
GNU nano 4.8 OneMillionHash.sh Modified
#!/bin/bash
echo "[ INFO ] Start Hash script uploader ...."
LOG_DISABLE=1
function clean {
    [[ -z "$LOG_DISABLE" ]] && echo "[ INFO ] Start clean"
    redis-cli KEYS "user:*" | xargs redis-cli DEL > /dev/null
    [[ -z "$LOG_DISABLE" ]] && echo "[ INFO ] Clean complete"
}

function generate {
    # Clean generated file
    > generation.txt
    for ((i = 1; i < END+1; i++)); do
        echo "HMSET user:${i} KEYFIRST value${i} KEYSECOND value${i} KEYTHIRD value${i}"
    done
}

function upload {
    cat generation.txt | redis-cli --pipe > /dev/null
}

# Entry point
clean

echo ""
echo "Time for upload 1.000.000 hash"
END=1000000
generate
time upload
clean
echo "-----"

echo ""
echo "Time for upload 10.000.000 hash"
END=10000000
generate
time upload
clean
echo "-----"

echo "[ INFO ] Script end"

^G Get Help      ^O Write Out     ^W Where Is      ^K Cut Text      ^J Justify       ^C Cur Pos
^X Exit          ^R Read File     ^_ Replace       ^U Paste Text    ^T To Spell      ^_ Go To Line

```

Таблица 2 – Замеры времени и ОЗУ при записи хэшей

| Count      | Time №1   | Time №2   | Time №3   | RAM     |
|------------|-----------|-----------|-----------|---------|
| 1.000.000  | 0m6,666s  | 0m6,457s  | 0m6,380s  | 187 Mb  |
| 10.000.000 | 1m21,008s | 1m24,012s | 1m20,831s | 1627 Mb |

```

Terminal - belozhi@ubuntu: ~
File Edit View Terminal Tabs Help

1 [|||||] 100.0% Tasks: 94, 142 thr; 2 running
2 [|||||] 100.0% Load average: 4.27 2.69 1.51
Mem [|||||] 1.14G/15.6G Uptime: 03:41:13
Swp [|||||] 0K/2.00G

PID USER      PRI  NI  VIRT   RES   SHR  S  CPU% MEM%   TIME+  Command
1141 belozhi    20    0  322M 47344 34672 R 10.5  0.3  4:08.06 /usr/lib/x86_64-linux-gnu/xfce4/panel/wrapper-2.0 /usr/lib/x86_
3193 belozhi    20    0  328M 44508 34392 R  5.2  0.3 10:03.53 xfce4-taskmanager
776  root        20    0  495M 162M 57180 S  2.0  1.0  1:47.79 /usr/lib/xorg/Xorg -core :0 -seat seat0 -auth /var/run/lightdm/
1085 belozhi    20    0  224M 5960 5128 S  1.3  0.0  0:00.16 /usr/lib/x86_64-linux-gnu/xfce4/xfconf/xfconfd
6308 belozhi    20    0 21364 4532 3384 R  0.7  0.0  1:54.14 htop
3574 belozhi    20    0  404M 51372 37500 R  0.7  0.3  0:49.30 /usr/bin/xfce4-terminal
1104 belozhi    20    0  389M 83716 63364 R  0.7  0.5  0:21.94 xfwm4 --replace
1144 belozhi    20    0  506M 41180 33600 S  0.7  0.3  0:11.15 /usr/lib/x86_64-linux-gnu/xfce4/panel/wrapper-2.0 /usr/lib/x86_
5286 belozhi    20    0  318M 46816 37312 S  0.7  0.3  0:00.70 xfce4-screenshooter -r
4197 redis       20    0 1568M 187M 3780 S  0.0  1.2  3:11.48 /usr/bin/redis-server 127.0.0.1:6379
1257 belozhi    20    0  292M 39172 29456 S  0.0  0.2  0:17.56 /usr/bin/vmtoolsd -n vmusr --blockFd 3
859  root        20    0  495M 162M 57180 S  0.0  1.0  0:10.30 /usr/lib/xorg/Xorg -core :0 -seat seat0 -auth /var/run/lightdm/
606  root        20    0  243M 7872 6596 S  0.0  0.0  0:16.99 /usr/bin/vmtoolsd
1109 belozhi    20    0  277M 31304 24860 R  0.0  0.2  0:02.53 xfce4-panel
1267 belozhi    20    0  195M 13980 11832 S  0.0  0.1  0:00.22 xfce4-power-manager
1145 belozhi    20    0  248M 42340 30924 S  0.0  0.3  0:01.48 /usr/lib/x86_64-linux-gnu/xfce4/panel/wrapper-2.0 /usr/lib/x86_
1160 belozhi    20    0  506M 41180 33600 S  0.0  0.3  0:05.01 /usr/lib/x86_64-linux-gnu/xfce4/panel/wrapper-2.0 /usr/lib/x86_
976  belozhi    20    0  7824 4964 3880 S  0.0  0.0  0:03.50 /usr/bin/dbus-daemon --session --address=systemd: --nofork --no
9204 belozhi    39   19  397M 19496 13532 S  0.0  0.1  0:00.06 /usr/lib/x86_64-linux-gnu/tumbler-1/tumblerd
1096 belozhi    20    0 232M 26596 21120 S  0.0  0.2  0:00.85 /usr/bin/xfce4-screensaver --no-daemon
1091 belozhi    20    0  159M 7732 6952 R  0.0  0.0  0:00.95 /usr/libexec/at-spi2-registryd --use-gnome-session
1075 belozhi    20    0  7380 4336 3860 S  0.0  0.0  0:00.33 /usr/bin/dbus-daemon --config-file=/usr/share/defaults/at-spi2/
1087 belozhi    20    0  224M 5960 5128 S  0.0  0.0  0:00.08 /usr/lib/x86_64-linux-gnu/xfce4/xfconf/xfconf
1133 belozhi    20    0  587M 246M 36584 S  0.0  1.5  0:00.02 Thunar --daemon
1222 belozhi    20    0  242M 6984 6284 S  0.0  0.0  0:00.01 /usr/libexec/gvfs-gphoto2-volume-monitor
1154 belozhi    20    0  389M 38964 31900 S  0.0  0.2  0:00.02 /usr/lib/x86_64-linux-gnu/xfce4/panel/wrapper-2.0 /usr/lib/x86_
584  systemd-r  20    0 24036 13072 8956 S  0.0  0.1  0:00.24 /lib/systemd/systemd-resolved

```

Рисунок 2 – Загрузка ОЗУ при записи 10М хэшей

4. Сохраните на диск аватарку из любой социальной сети и, воспользовавшись результатами из предыдущих пунктов, рассчитайте сколько таких картинок может вместить ОЗУ вашего компьютера, модифицируйте скрипт и попробуйте записать в redis в виде простых ключей. Посмотрите результаты.



Рисунок 3 – Фото для загрузки в Redis

```

Terminal - belozhi@ubuntu: ~
File Edit View Terminal Tabs Help
GNU nano 4.8 UploadPictures.sh Modified
#!/bin/bash

echo "[ INFO ] Start image uploader script...."
img="$(cat suricata.jpg | base64 -w 0)"
LOG_DISABLE=1

function clean {
    [[ -z "$LOG_DISABLE" ]] && echo "[ INFO ] Start clean"
    redis-cli KEYS "user:*" | xargs redis-cli DEL > /dev/null
    [[ -z "$LOG_DISABLE" ]] && echo "[ INFO ] Clean complete"
}

function generate {
    # Clean generated file
    > generation.txt
    for ((i = 1; i < END+1; i++)); do
        echo "SET user:${i} ${img}" >> generation.txt
    done
}

function upload {
    cat generation.txt | redis-cli --pipe > /dev/null
}

# Entry point
clean

echo "Time for upload 1_000 string row"
echo "-----"
END=1000
generate
time upload
echo "-----"
echo ""

echo "Time for upload 10_000 string row"
echo "-----"
END=10000
generate
time upload
echo "-----"
echo ""

echo "Time for upload 100_000 string row"
echo "-----"
END=100000
generate
time upload
echo "-----"
echo ""

```

| Count     | Time      | RAM     |
|-----------|-----------|---------|
| 1000      | 0m0,671s  | 32 Mb   |
| 10 000    | 0m6,368s  | 325 Mb  |
| 100 000   | 1m16,636s | 4343 Mb |
| 1 000 000 | 6m49,268s | 11,1 Gb |

