Linux问题排查

pangbin

- CPU

- memory

- I/O

- network

CPU

- %CPU

- load average

%CPU

```
top - 17:11:27 up  6:22,  3 users,  load average: 0.45, 0.85, 1.07
Tasks: 119 total,   3 running,  79 sleeping,   0 stopped,   0 zombie
%Cpu0  : 98.7 us,   1.3 sy,   0.0 ni,   0.0 id,   0.0 wa,   0.0 hi,   0.0 si,   0.0 st
%Cpu1  : 98.0 us,   0.7 sy,   0.0 ni,   0.3 id,   0.0 wa,   0.0 hi,   1.0 si,   0.0 st
KiB Mem :  2041132 total,   369608 free,   150688 used,   1520836 buff/cache
KiB Swap:   969960 total,   969436 free,      524 used.   1701740 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
12945	nobody	20	0	104220	11216	6412	R	98.7	0.5	0:18.20	php-fpm
12946	nobody	20	0	104220	11216	6412	R	98.3	0.5	0:18.43	php-fpm
2941	avahi	20	0	49584	5980	3208	S	1.7	0.3	11:54.00	avahi-daemon
11744	www-data	20	0	143632	7480	5616	S	0.7	0.4	0:02.82	nginx
1	root	20	0	160092	9320	6792	S	0.0	0.5	0:20.95	systemd
2	root	20	0	0	0	0	S	0.0	0.0	0:00.01	kthreadd
4	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/0:0H
6	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	mm_percpu_wq

%CPU

- sudo **perf** record -g -p 12946

- sudo **perf** report

```
Samples: 9K of event 'cpu-clock', Event count (approx.): 2282500000
  Children      Self  Command  Shared Object           Symbol
-   99.98%     0.00%  php-fpm  [unknown]               [.] 0x2e96258d4c544155
    0x2e96258d4c544155
    __libc_start_main
  - main
    - 99.62% php_execute_script
      - zend_execute_scripts
        - 99.58% zend_execute
          - 96.53% execute_ex
            - 21.70% ZEND_ASSIGN_ADD_SPEC_CV_TMPVAR_HANDLER
              - 20.30% zend_binary_assign_op_simple_helper_SPEC_CV_TMPVAR
                  8.64% add_function
              17.38% zif_sqrt
              8.58% ZEND_IS_SMALLER_OR_EQUAL_SPEC_CV_CONST_HANDLER
              6.09% __sqrt
              6.09% ZEND_POST_INC_SPEC_CV_HANDLER
              2.44% ZEND_FREE_SPEC_TMPVAR_HANDLER
            0.93% ZEND_FREE_SPEC_TMPVAR_HANDLER
            0.66% ZEND_POST_INC_SPEC_CV_HANDLER
            0.59% ZEND_IS_SMALLER_OR_EQUAL_SPEC_CV_CONST_HANDLER
+   99.98%     0.00%  php-fpm  libc-2.27.so            [.] __libc_start_main
+   99.98%     0.00%  php-fpm  php-fpm                 [.] main
+   99.62%     0.00%  php-fpm  php-fpm                 [.] php_execute_script
```

%CPU

[View Full Callgraph]

Displaying top 100 functions: Sorted by Incl. Wall Time (microsec) [display all]

Function Name		Calls	Calls%	Incl. Wall Time (microsec)	IWall%	Excl. Wall Time (microsec)	EWall%
main()		1	0.1%	607	100.0%	9	1.5%
cccccc		1	0.1%	598	98.5%	3	0.5%
bbbbbb		1	0.1%	595	98.0%	5	0.8%
aaaaaa		1	0.1%	590	97.2%	524	86.3%
sqrt		1,001	99.5%	66	10.9%	66	10.9%
xhprof_disable		1	0.1%	0	0.0%	0	0.0%

https://github.com/longxinH/xhprof.git
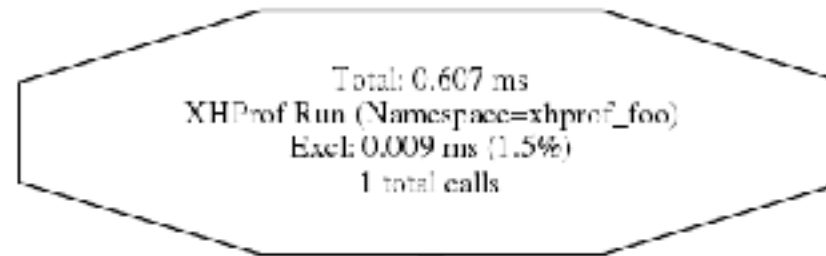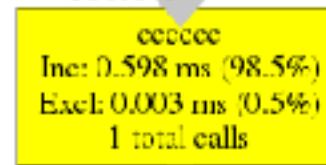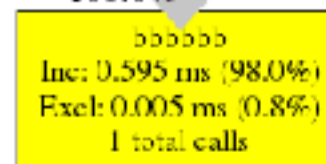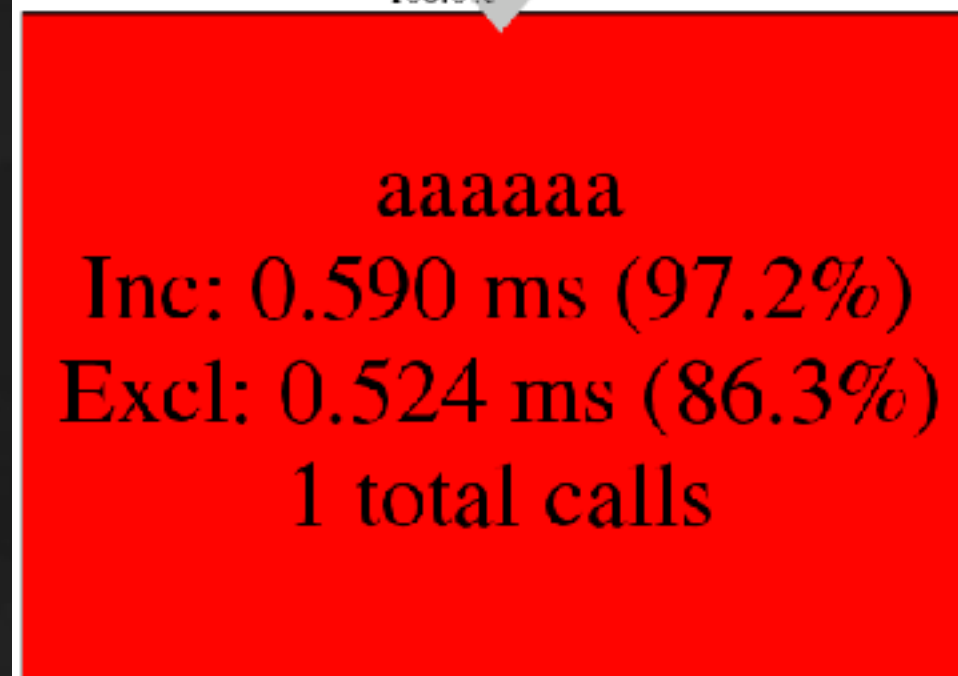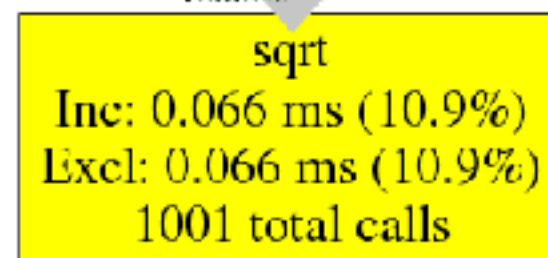
```
Samples: 16K of event 'cpu-clock', Event count (approx.): 4029000000
   Children        Self  Command  Shared Object       Symbol
-    95.66%       0.00%  demo     demo                [.] runtime.goexit
   - runtime.goexit
      - 95.30% net/http.(*conn).serve
         - 77.97% net/http.serverHandler.ServeHTTP
            - net/http.(*ServeMux).ServeHTTP
               - 77.77% net/http.HandlerFunc.ServeHTTP
                  - 77.75% main.helloHandler
                     - 13.39% swapgs_restore_regs_and_return_to_usermode
                           prepare_exit_to_usermode
                        - exit_to_usermode_loop
                           - 2.23% schedule
                                __schedule
                                finish_task_switch
                     + 0.66% ret_from_intr
                     + 0.65% fmt.Sprintf
         + 7.14% net/http.(*conn).serve.func1
         + 6.29% net/http.(*response).finishRequest
         + 2.67% net/http.(*conn).readRequest
         + 0.73% net.(*TCPAddr).String
+    95.30%       0.04%  demo     demo                [.] net/http.(*conn).serve
+    77.97%       0.01%  demo     demo                [.] net/http.serverHandler.ServeHTTP
+    77.97%       0.02%  demo     demo                [.] net/http.(*ServeMux).ServeHTTP
+    77.77%       0.00%  demo     demo                [.] net/http.HandlerFunc.ServeHTTP
```
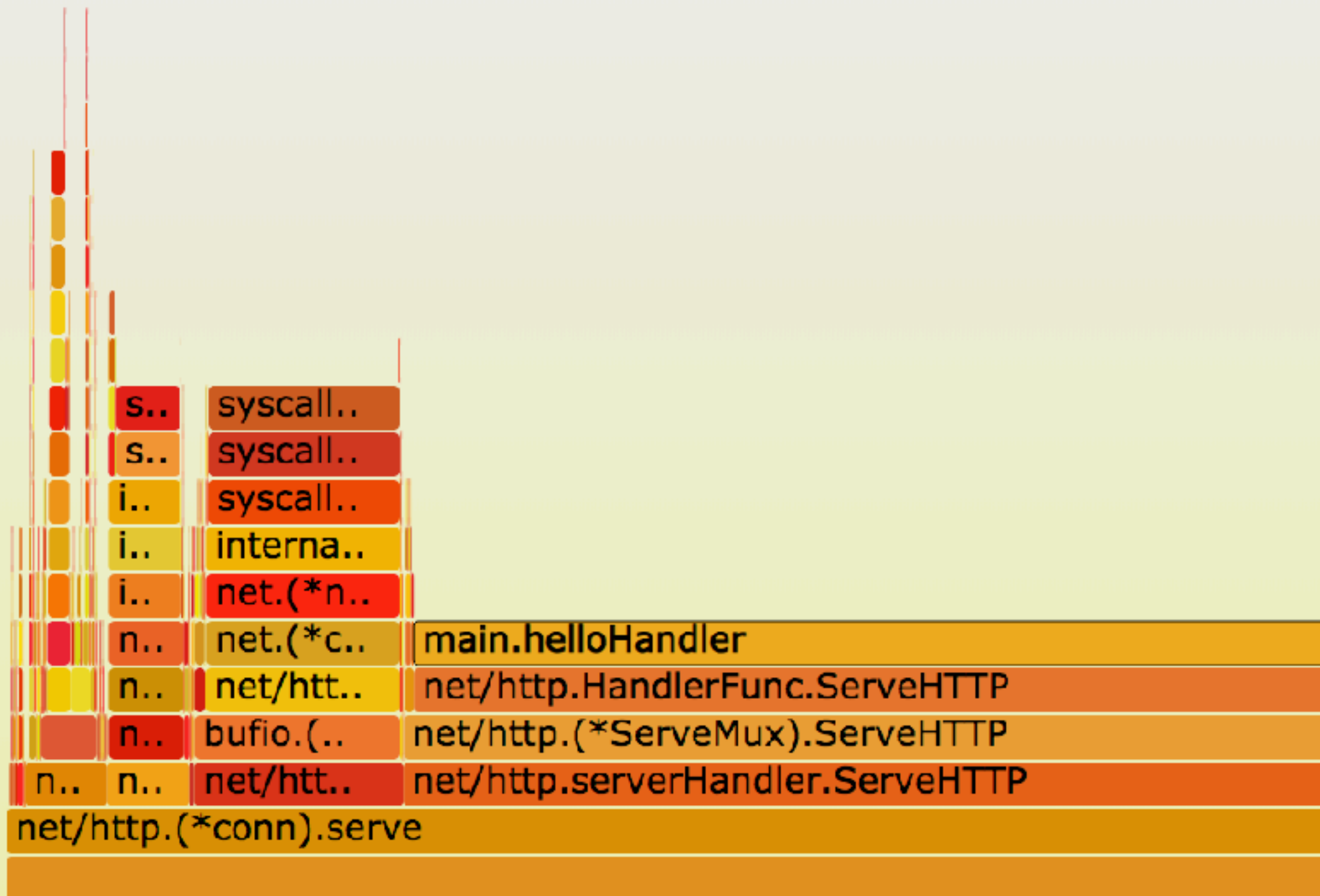
FlameGraph

Function: main.helloHandler (4,860 samples, 85.01%)

Compiler optimization

- PHP： Makefile
  CFLAGS_CLEAN = -I/usr/include **-g -O0** -fvisibility=hidden -DZEND_SIGNALS $(PROF_FLAGS)

- Go： go build **-gcflags '-N -l'** demo.go

load average

- define: System load averages is the average number of processes that are either in a runnable or uninterruptable state

- high?: load average: 4.90, 1.66, 0.59

- high?: how to do

memory

- memory leak

- large memory usage

memory leak

- memleak

- valgrind

- pprof

- xhprof

- ……

memory leak

```php
1 <?php
2
3 class Foo {
4         public $var = '3.14159265359';
5 }
6
7 $baseMemory = memory_get_usage();
8
9 for ($i = 0; $i <= 100000; $i++) {
10         $a = new Foo;
11         $a->self = $a;
12         if ($i % 500 === 0) {
13                 echo sprintf('%8d: ', $i), memory_get_usage() - $baseMemory, "\n";
14         }
15 }
16
17
18
19 
~
~
```
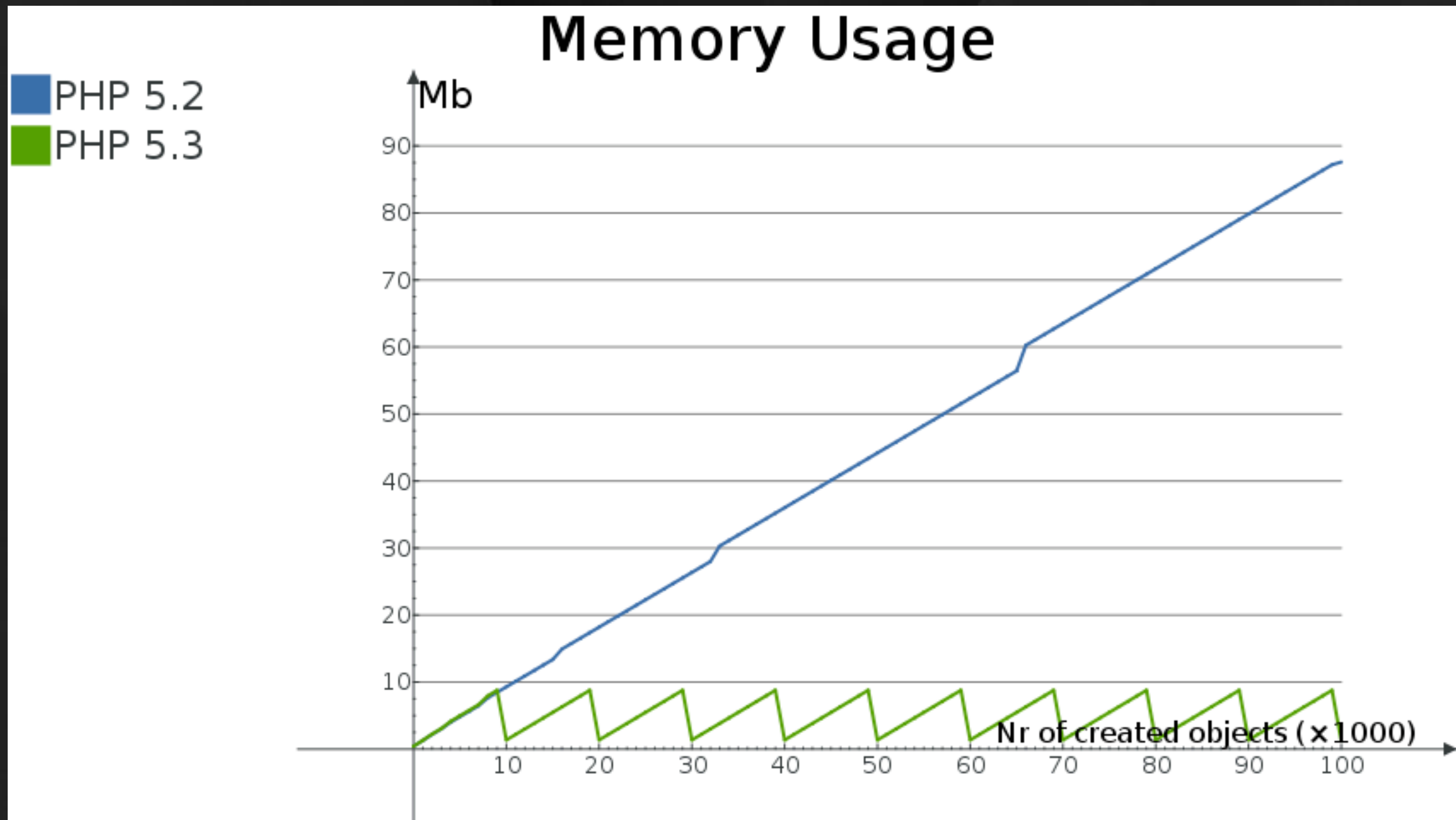
memory leak

large memory usage

```
top - 17:44:22 up  7:03,  5 users,  load average: 0.09, 0.04, 0.01
Tasks: 129 total,   1 running,  93 sleeping,   0 stopped,   0 zombie
%Cpu(s):  0.3 us,  0.2 sy,  0.0 ni, 99.3 id,  0.0 wa,  0.0 hi,  0.2 si,  0.0 st
KiB Mem :  2041132 total,   297968 free,   582152 used,  1161012 buff/cache
KiB Swap:   969960 total,   969960 free,        0 used.  1268772 avail Mem

  PID USER      PR  NI    VIRT    RES    SHR S  %CPU %MEM     TIME+ COMMAND
 4753 pangbin   20   0  529584 451468  10516 S   1.7 22.1   0:08.36 php
  590 root      20   0  777280  22440  12256 S   0.0  1.1   0:02.15 snapd
  220 root      19  -1  103072  21696  20892 S   0.0  1.1   0:00.33 systemd-journal
  589 root      20   0  177624  17648   9756 S   0.0  0.9   0:00.19 networkd-dispat
  721 root      20   0  297088  16940  13796 S   0.0  0.8   0:01.35 php-fpm7.2
  575 root      20   0  565620  16884  14092 S   0.0  0.8   0:00.79 NetworkManager
 1466 root      20   0  373672  13996  12300 S   0.0  0.7   0:00.15 packagekitd
  925 whoopsie  20   0  388416  12784  11160 S   0.0  0.6   0:00.03 whoopsie
 2015 root      20   0  303656  11008   9588 S   0.0  0.5   0:00.00 cups-browsed
  756 www-data  20   0  299728  10872   7360 S   0.0  0.5   2:55.45 php-fpm7.2
  755 www-data  20   0  299728  10624   7116 S   0.0  0.5   2:56.09 php-fpm7.2
    1 root      20   0  225444   9232   6784 S   0.0  0.5   0:02.52 systemd
  582 root      20   0  427260   8948   7588 S   0.0  0.4   0:00.06 ModemManager
 1350 pangbin   20   0   76724   7952   6772 S   0.0  0.4   0:00.03 systemd
```

php-memory-profiler

```php
<?php

memprof_enable();

    //your php code

    //maybe use max_execution_time and

    //register_shutdown_function

var_dump(memprof_dump_array());
```

```json
{
    "memory_size": 36456,
    "blocks_count": 302,
    "memory_size_inclusive": 553405,
    "blocks_count_inclusive": 606,
    "calls": 1,
    "called_functions": {
        "unknown": {
            "memory_size": 0,
            "blocks_count": 0,
            "memory_size_inclusive": 0,
            "blocks_count_inclusive": 0,
            "calls": 200,
            "called_functions": []
        },
        "UserCenter_User::GetUserInfo": {
            "memory_size": 0,
            "blocks_count": 0,
            "memory_size_inclusive": 0,
            "blocks_count_inclusive": 0,
            "calls": 200,
            "called_functions": {
                "str_repeat": {
                    "memory_size": 0,
                    "blocks_count": 0,
                    "memory_size_inclusive": 0,
                    "blocks_count_inclusive": 0,
                    "calls": 20000,
                    "called_functions": []
                }
            }
        },
        "str_repeat": {
            "memory_size": 516600,
            "blocks_count": 300,
            "memory_size_inclusive": 516600,
            "blocks_count_inclusive": 300,
            "calls": 300,
            "called_functions": []
        },
        "memprof_dump_array": {"memory_size": 349...}
```

- memory_size

- blocks_count

- memory_size_inclusive

- blocks_count_inclusive

- calls

- called_functions

I/O

```
top - 20:42:36 up 32 min,  2 users,  load average: 1.48, 1.63, 1.35
Tasks: 143 total,   2 running, 106 sleeping,   0 stopped,   0 zombie
%Cpu(s):  1.6 us,  3.8 sy,  0.0 ni, 56.2 id, 35.4 wa,  0.0 hi,  2.9 si,  0.0 st
KiB Mem :  2041132 total,  1045988 free,   320396 used,   674748 buff/cache
KiB Swap:   969960 total,   969960 free,        0 used.  1568636 avail Mem

  PID USER      PR  NI    VIRT    RES    SHR S  %CPU %MEM     TIME+ COMMAND
 1077 redis     20   0  140472   8176   2768 D  10.3  0.4   1:37.08 redis-server
 1666 root      20   0   61388  14756   7216 S   5.0  0.7   0:05.26 iotop
  184 root      20   0       0      0      0 R   3.3  0.0   0:34.38 jbd2/sda1-8
  164 root       0 -20       0      0      0 I   2.0  0.0   0:25.02 kworker/0:1H
    1 root      20   0  160004   9392   6796 S   0.0  0.5   0:01.89 systemd
    2 root      20   0       0      0      0 S   0.0  0.0   0:00.00 kthreadd
    4 root       0 -20       0      0      0 I   0.0  0.0   0:00.00 kworker/0:0H
    6 root       0 -20       0      0      0 I   0.0  0.0   0:00.00 mm_percpu_wq
    7 root      20   0       0      0      0 S   0.0  0.0   0:01.54 ksoftirqd/0
    8 root      20   0       0      0      0 I   0.0  0.0   0:01.31 rcu_sched
    9 root      20   0       0      0      0 I   0.0  0.0   0:00.00 rcu_bh
   10 root      rt   0       0      0      0 S   0.0  0.0   0:00.00 migration/0
```

I/O

```
Total DISK READ :         0.00 B/s | Total DISK WRITE :       1007.91 K/s
Actual DISK READ:         0.00 B/s | Actual DISK WRITE:          3.95 M/s
  TID  PRIO  USER     DISK READ   DISK WRITE   SWAPIN      IO>    COMMAND
  184 be/3 root       0.00 B/s     0.00 B/s  0.00 % 76.83 % [jbd2/sda1-8]
 1077 be/4 redis      0.00 B/s 1007.91 K/s  0.00 %  3.75 % redis-server *:6379
 1164 be/4 root       0.00 B/s     0.00 B/s  0.00 %  0.02 % [kworker/u4:0]
    1 be/4 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % init splash
    2 be/4 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [kthreadd]
    4 be/0 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [kworker/0:0H]
    6 be/0 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [mm_percpu_wq]
    7 be/4 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [ksoftirqd/0]
    8 be/4 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [rcu_sched]
    9 be/4 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [rcu_bh]
   10 rt/4 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [migration/0]
   11 rt/4 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [watchdog/0]
   12 be/4 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [cpuhp/0]
   13 be/4 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [cpuhp/1]
   14 rt/4 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [watchdog/1]
   15 rt/4 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [migration/1]
   16 be/4 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [ksoftirqd/1]
   18 be/0 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [kworker/1:0H]
   19 be/4 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [kdevtmpfs]
   20 be/0 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [netns]
   21 be/4 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [rcu_tasks_kthre]
   22 be/4 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [kauditd]
   24 be/4 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [khungtaskd]
   25 be/4 root       0.00 B/s     0.00 B/s  0.00 %  0.00 % [oom_reaper]
```

命令：iotop

I/O

```
pangbin@pangbin-VirtualBox:~$ sudo lsof -p 1077
COMMAND     PID  USER   FD     TYPE DEVICE SIZE/OFF    NODE NAME
redis-ser  1077 redis   cwd     DIR    8,1     4096  942111 /var/lib/redis
redis-ser  1077 redis   rtd     DIR    8,1     4096       2 /
redis-ser  1077 redis   txt     REG    8,1  1085080  399689 /usr/bin/redis-check-rdb
redis-ser  1077 redis   mem     REG    8,1 10281936  400281 /usr/lib/locale/locale-archive
redis-ser  1077 redis   mem     REG    8,1  2030544  137020 /lib/x86_64-linux-gnu/libc-2.27.so
redis-ser  1077 redis   mem     REG    8,1   144976  137153 /lib/x86_64-linux-gnu/libpthread-2.27.so
redis-ser  1077 redis   mem     REG    8,1   215656  399685 /usr/lib/x86_64-linux-gnu/libjemalloc.so.1
redis-ser  1077 redis   mem     REG    8,1    14560  137043 /lib/x86_64-linux-gnu/libdl-2.27.so
redis-ser  1077 redis   mem     REG    8,1  1700792  137083 /lib/x86_64-linux-gnu/libm-2.27.so
redis-ser  1077 redis   mem     REG    8,1   170960  136992 /lib/x86_64-linux-gnu/ld-2.27.so
redis-ser  1077 redis    0u     CHR    1,3      0t0       9 /dev/null
redis-ser  1077 redis    1u     CHR    1,3      0t0       9 /dev/null
redis-ser  1077 redis    2u     CHR    1,3      0t0       9 /dev/null
redis-ser  1077 redis    3r    FIFO   0,12      0t0   23258 pipe
redis-ser  1077 redis    4w    FIFO   0,12      0t0   23258 pipe
redis-ser  1077 redis    5u a_inode   0,13        0    9590 [eventpoll]
redis-ser  1077 redis    6u    IPv6  24487      0t0         TCP *:6379 (LISTEN)
redis-ser  1077 redis    7u    IPv4  24488      0t0         TCP *:6379 (LISTEN)
redis-ser  1077 redis    8w     REG    8,1 45979035  942147 /var/lib/redis/appendonly.aof
redis-ser  1077 redis    9u    IPv4  27546      0t0         TCP pangbin-VirtualBox:6379->10.106.10.202:62345 (ESTABLISHED)
```

```
[pid  1077] 20:50:43.466249 epoll_wait(5, [{EPOLLIN, {u32=9, u64=9}}], 10128, 39) = 1 <0.000596>
[pid  1077] 20:50:43.467412 read(9, "*3\r\n$3\r\nSET\r\n$16\r\nkey:0000153724"..., 16384) = 45 <0.000869>
[pid  1077] 20:50:43.468761 read(3, 0x7fff15267857, 1) = -1 EAGAIN (Resource temporarily unavailable) <0.0004
[pid  1077] 20:50:43.469858 write(8, "*3\r\n$3\r\nSET\r\n$16\r\nkey:0000153724"..., 45) = 45 <0.000481>
[pid  1077] 20:50:43.470813 fdatasync(8) = 0 <0.004323>
[pid  1077] 20:50:43.475391 write(9, "+OK\r\n", 5) = 5 <0.000953>
[pid  1077] 20:50:43.476894 epoll_wait(5, [{EPOLLIN, {u32=9, u64=9}}], 10128, 28) = 1 <0.000407>
```

network

- domain

- packet loss

- network traffic

```
pangbin@pangbin-VirtualBox:~$ traceroute example.com
traceroute to example.com (93.184.216.34), 30 hops max, 60 byte packets
 1   _gateway (192.168.119.254)  8.721 ms  8.672 ms  8.942 ms
 2   10.0.246.1 (10.0.246.1)  8.779 ms  9.311 ms  8.515 ms
 3   CVRouter.lan (10.106.144.1)  8.629 ms  8.609 ms  8.573 ms
 4   103.206.191.1 (103.206.191.1)  8.547 ms  8.524 ms  8.501 ms
 5   100.101.71.1 (100.101.71.1)  13.990 ms * *
 6   100.101.66.1 (100.101.66.1)  46.994 ms  39.488 ms  40.064 ms
 7   100.101.66.22 (100.101.66.22)  78.886 ms  80.786 ms  79.577 ms
 8   10.16.13.141 (10.16.13.141)  108.172 ms  75.100 ms  75.083 ms
 9   10.16.208.54 (10.16.208.54)  64.688 ms  64.665 ms  45.186 ms
10   ce-0-12-0-3.r03.tkokhk01.hk.bb.gin.ntt.net (203.131.240.241)  47.241 ms  47.233 ms
11   ae-11.r24.tkokhk01.hk.bb.gin.ntt.net (129.250.6.99)  48.434 ms  48.265 ms  49.107 ms
12   ae-12.r30.tokyjp05.jp.bb.gin.ntt.net (129.250.2.50)  89.742 ms  96.745 ms  97.445 ms
13   ae-4.r23.snjsca04.us.bb.gin.ntt.net (129.250.5.78)  200.103 ms  204.808 ms  204.984
14   ae-45.r01.snjsca04.us.bb.gin.ntt.net (129.250.3.175)  214.820 ms  198.385 ms  204.76
15   ae-0.edgecast-networks.snjsca04.us.bb.gin.ntt.net (129.250.193.134)  204.243 ms  199
93.250)  204.524 ms
16   152.195.84.133 (152.195.84.133)  200.338 ms 152.195.85.133 (152.195.85.133)  199.959
17   93.184.216.34 (93.184.216.34)  201.285 ms  204.090 ms  204.944 ms
18   93.184.216.34 (93.184.216.34)  204.604 ms  200.445 ms  201.615 ms
```

domain

- nslookup

- dig

- ping

packet loss

```
pangbin@pangbin-VirtualBox:~$ sar -n EDEV 1 5
Linux 4.15.0-20-generic (pangbin-VirtualBox)       2019年06月10日   _x86_64_       (2 CPU)

22时23分11秒     IFACE   rxerr/s   txerr/s   coll/s   rxdrop/s   txdrop/s   txcarr/s   rxfram/s   rxfifo/s   txfifo/s
22时23分12秒    enp0s3     0.00      0.00     0.00      0.00       0.00       0.00       0.00       0.00       0.00
22时23分12秒        lo     0.00      0.00     0.00      0.00       0.00       0.00       0.00       0.00       0.00

22时23分12秒     IFACE   rxerr/s   txerr/s   coll/s   rxdrop/s   txdrop/s   txcarr/s   rxfram/s   rxfifo/s   txfifo/s
22时23分13秒    enp0s3     0.00      0.00     0.00      0.00       0.00       0.00       0.00       0.00       0.00
22时23分13秒        lo     0.00      0.00     0.00      0.00       0.00       0.00       0.00       0.00       0.00

22时23分13秒     IFACE   rxerr/s   txerr/s   coll/s   rxdrop/s   txdrop/s   txcarr/s   rxfram/s   rxfifo/s   txfifo/s
22时23分14秒    enp0s3     0.00      0.00     0.00      0.00       0.00       0.00       0.00       0.00       0.00
22时23分14秒        lo     0.00      0.00     0.00      0.00       0.00       0.00       0.00       0.00       0.00

22时23分14秒     IFACE   rxerr/s   txerr/s   coll/s   rxdrop/s   txdrop/s   txcarr/s   rxfram/s   rxfifo/s   txfifo/s
22时23分15秒    enp0s3     0.00      0.00     0.00      0.00       0.00       0.00       0.00       0.00       0.00
22时23分15秒        lo     0.00      0.00     0.00      0.00       0.00       0.00       0.00       0.00       0.00

22时23分15秒     IFACE   rxerr/s   txerr/s   coll/s   rxdrop/s   txdrop/s   txcarr/s   rxfram/s   rxfifo/s   txfifo/s
22时23分16秒    enp0s3     0.00      0.00     0.00      0.00       0.00       0.00       0.00       0.00       0.00
22时23分16秒        lo     0.00      0.00     0.00      0.00       0.00       0.00       0.00       0.00       0.00

Average:         IFACE   rxerr/s   txerr/s   coll/s   rxdrop/s   txdrop/s   txcarr/s   rxfram/s   rxfifo/s   txfifo/s
Average:        enp0s3     0.00      0.00     0.00      0.00       0.00       0.00       0.00       0.00       0.00
Average:            lo     0.00      0.00     0.00      0.00       0.00       0.00       0.00       0.00       0.00
```

packet

```
pangbin@pangbin-VirtualBox:~$ sar -n DEV 1 5
Linux 4.15.0-20-generic (pangbin-VirtualBox)        2019年06月10日    _x86_64_        (2 CPU)

22时23分20秒      IFACE    rxpck/s    txpck/s    rxkB/s    txkB/s    rxcmp/s   txcmp/s   rxmcst/s   %ifutil
22时23分21秒     enp0s3     945.00     473.00     81.65     32.80       0.00      0.00       0.00      0.07
22时23分21秒         lo       0.00       0.00      0.00      0.00       0.00      0.00       0.00      0.00

22时23分21秒      IFACE    rxpck/s    txpck/s    rxkB/s    txkB/s    rxcmp/s   txcmp/s   rxmcst/s   %ifutil
22时23分22秒     enp0s3    4499.00    2250.00    388.85    156.57       0.00      0.00       0.00      0.32
22时23分22秒         lo       0.00       0.00      0.00      0.00       0.00      0.00       0.00      0.00

22时23分22秒      IFACE    rxpck/s    txpck/s    rxkB/s    txkB/s    rxcmp/s   txcmp/s   rxmcst/s   %ifutil
22时23分23秒     enp0s3    5757.00    2879.00    497.53    200.17       0.00      0.00       0.00      0.41
22时23分23秒         lo       0.00       0.00      0.00      0.00       0.00      0.00       0.00      0.00

22时23分23秒      IFACE    rxpck/s    txpck/s    rxkB/s    txkB/s    rxcmp/s   txcmp/s   rxmcst/s   %ifutil
22时23分24秒     enp0s3    6127.00    3064.00    529.51    213.00       0.00      0.00       0.00      0.43
22时23分24秒         lo       0.00       0.00      0.00      0.00       0.00      0.00       0.00      0.00

22时23分24秒      IFACE    rxpck/s    txpck/s    rxkB/s    txkB/s    rxcmp/s   txcmp/s   rxmcst/s   %ifutil
22时23分25秒     enp0s3    5548.00    2775.00    479.45    192.96       0.00      0.00       0.00      0.39
22时23分25秒         lo       0.00       0.00      0.00      0.00       0.00      0.00       0.00      0.00

Average:         IFACE    rxpck/s    txpck/s    rxkB/s    txkB/s    rxcmp/s   txcmp/s   rxmcst/s   %ifutil
Average:        enp0s3    4575.20    2288.20    395.40    159.10       0.00      0.00       0.00      0.32
Average:            lo       0.00       0.00      0.00      0.00       0.00      0.00       0.00      0.00
```

socket

```
Tcp:
    6 active connection openings
    6 passive connection openings
    0 failed connection attempts
    4 connection resets received
    2 connections established
    537926 segments received
    434182 segments sent out
    0 segments retransmitted
    0 bad segments received
    4 resets sent
Udp:
    262 packets received
    3 packets to unknown port received
    0 packet receive errors
    224 packets sent
    0 receive buffer errors
    0 send buffer errors
    IgnoredMulti: 81
UdpLite:
TcpExt:
    4 delayed acks sent
    Quick ack mode was activated 9 times
    430 packet headers predicted
```

命令：**netstat -s**

network traffic

No.	Time	Source	Destination	Protocol	Length	Info
477	3.631282	10.106.10.202	10.106.10.204	TCP	78	56950 → 80 [SYN] Seq=0 Win=655
478	3.631547	10.106.10.204	10.106.10.202	TCP	74	80 → 56950 [SYN, ACK] Seq=0 Ad
479	3.631584	10.106.10.202	10.106.10.204	TCP	66	56950 → 80 [ACK] Seq=1 Ack=1 W
480	3.631684	10.106.10.202	10.106.10.204	HTTP	143	GET / HTTP/1.1
481	3.631885	10.106.10.204	10.106.10.202	TCP	66	80 → 56950 [ACK] Seq=1 Ack=78
482	3.632112	10.106.10.204	10.106.10.202	HTTP	925	HTTP/1.1 200 OK (text/html)
483	3.632136	10.106.10.202	10.106.10.204	TCP	66	56950 → 80 [ACK] Seq=78 Ack=86
484	3.632292	10.106.10.202	10.106.10.204	TCP	66	56950 → 80 [FIN, ACK] Seq=78 A
485	3.632498	10.106.10.204	10.106.10.202	TCP	66	80 → 56950 [FIN, ACK] Seq=860
486	3.632547	10.106.10.202	10.106.10.204	TCP	66	56950 → 80 [ACK] Seq=79 Ack=86

▶ Frame 480: 143 bytes on wire (1144 bits), 143 bytes captured (1144 bits) on interface 0
▶ Ethernet II, Src: Apple_ba:35:30 (3c:15:c2:ba:35:30), Dst: PcsCompu_60:82:e0 (08:00:27:60:82:e0)
▶ Internet Protocol Version 4, Src: 10.106.10.202, Dst: 10.106.10.204
▶ Transmission Control Protocol, Src Port: 56950, Dst Port: 80, Seq: 1, Ack: 1, Len: 77
▼ Hypertext Transfer Protocol
  ▶ GET / HTTP/1.1\r\n
    Host: 10.106.10.204\r\n
    User-Agent: curl/7.63.0\r\n
    Accept: */*\r\n
    \r\n
    [Full request URI: http://10.106.10.204/]
    [HTTP request 1/1]
    [Response in frame: 482]

thanks

- https://www.ostechnix.com/the-top-command-tutorial-with-examples-for-beginners/

- https://github.com/BitOne/php-meminfo

- https://medium.com/@malith.jayasinghe/network-monitoring-using-sar-37bab6ce9f68