

??? Linux/UNIX ???????????? vmstat ??????????????????

???

#>vmstat 2

Tip: ?2???????

????CPU & RAM ???

[root@deki ~]# vmstat 2

```
procs -----memory----- --swap-- -----io----- --system-- -----cpu-----
r b swpd free buff cache si so bi bo in cs us sy id wa st
0 0 60 163016 252108 363996 0 0 4 172 23 16 2 3 94 0 0
0 0 60 163016 252108 363996 0 0 0 60 1025 248 0 0 100 0 0
0 0 60 163016 252108 364000 0 0 0 0 1073 416 3 4 94 0 0
0 0 60 163016 252108 364000 0 0 0 0 1042 248 0 0 100 0 0
0 0 60 163016 252108 364000 0 0 0 54 1030 249 0 0 99 0 0
0 0 60 163016 252108 364000 0 0 0 0 1032 247 0 1 100 0 0
0 0 60 163016 252108 364000 0 0 0 0 1035 228 0 0 100 0 0
0 0 60 162892 252108 364000 0 0 0 12 1041 516 12 68 21 0 0
0 0 60 162892 252108 364000 0 0 0 0 1020 240 0 0 100 0 0
0 0 60 162892 252108 364000 0 0 0 42 1024 249 0 0 100 0 0
0 0 60 162892 252108 364000 0 0 0 0 1035 248 0 0 100 0 0
0 0 60 162892 252108 364000 0 0 0 2 1029 267 0 1 99 0 0
0 0 60 163016 252108 364000 0 0 0 0 1018 219 0 0 100 0 0
0 0 60 163016 252108 364000 0 0 0 12 1026 603 7 8 85 0 0
1 0 60 163016 252108 364004 0 0 0 0 1044 270 0 0 100 0 0
0 0 60 163016 252108 364004 0 0 0 0 1025 267 0 0 100 0 0
7 0 60 162272 252108 364004 0 0 0 54 1026 1127 8 14 78 0 0
```

????CPU ????RAM ???

```
procs -----memory----- --swap-- -----io----- --system-- -----cpu-----
r b swpd free buff cache si so bi bo in cs us sy id wa st
13 0 0 204372 46688 3261856 0 0 0 3146 2024 5151 18 82 0 0 0
15 0 0 204248 46708 3261900 0 0 4 3920 1919 5839 17 83 0 0 0
11 1 0 204248 46716 3261956 0 0 6 2940 1868 4863 19 81 0 0 0
16 1 0 209212 46736 3262004 0 0 4 5142 2194 5447 17 83 0 0 0
8 0 0 210332 46776 3262248 0 0 122 3002 2267 5818 15 85 0 0 0
6 0 0 210704 46808 3262300 0 0 0 3090 1982 4658 17 83 0 0 0
11 1 0 211076 46872 3262384 0 0 2 2986 2102 4890 17 83 0 0 0
9 0 0 210952 46884 3262408 0 0 2 0 1815 4891 18 82 0 0 0
6 0 0 210952 46896 3262440 0 0 0 2978 1588 4877 23 77 0 0 0
3 0 0 210828 46920 3262468 0 0 0 2968 1859 4424 18 82 0 0 0
4 0 0 211324 46932 3262580 0 0 0 0 2182 5391 16 84 0 0 0
4 0 0 211324 46976 3262000 0 0 0 2992 1638 3973 17 83 0 0 0
3 0 0 211324 47008 3262060 0 0 0 5190 1838 4707 19 81 0 0 0
9 0 0 211324 47008 3262072 0 0 0 0 1688 5711 39 61 0 0 0
7 0 0 208968 47020 3262072 0 0 0 2974 1389 4076 24 76 0 0 0
```

```

2 0 0 206364 47020 3262080 0 0 0 0 1053 3283 40 60 0 0 0
11 0 0 204628 47028 3262080 0 0 0 3020 1995 6525 32 68 0 0 0
4 0 0 199668 47044 3262084 0 0 0 2946 1813 4977 21 79 0 0 0
4 0 0 193344 47064 3262120 0 0 0 2962 2455 6091 15 85 0 0 0
5 0 0 191608 47092 3262316 0 0 0 2980 2255 5560 18 82 0 0 0
10 0 0 188632 47132 3262248 0 0 0 2960 2591 6128 15 85 0 0 0
5 0 0 186524 47168 3262448 0 0 0 3026 2210 5305 19 81 0 0 0
3 0 0 186276 47192 3262328 0 0 0 4 1919 4915 24 76 0 0 0
4 0 0 186028 47216 3262372 0 0 0 2994 1878 4399 19 81 0 0 0
5 0 0 185780 47244 3262412 0 0 0 2970 2001 4915 18 82 0 0 0
5 0 0 185532 47276 3262400 0 0 0 3128 2159 5427 16 84 0 0 0
3 0 0 185532 47284 3262372 0 0 0 0 2173 5393 16 84 0 0 0
3 0 0 185408 47320 3262396 0 0 0 2966 2247 5286 15 85 0 0 0
4 0 0 185284 47340 3262464 0 0 0 2958 2237 5438 15 85 0 0 0

```

????? storage ? SAN switch ??????????????

- ???DB ??????
- ?????
 1. Linux ? top ??? Load Average ?????? 15 ??????
 2. ?? dmesg ? messages ??????????????
 3. ??????????????????????????????????????
 4. ?? Memory? ? Disk Swapping ???
 5. ?? CPU????? Idle ???
 6. ?? vmstat ??????

CPU - wa ??? 0 ???

IO - bi, bo ?????? o?bi ??????????

NOTE: ??? I/O ?????????? bi ? bo ?????????????????? 0

- ???????? vmstat ???????? I/O ?????????? bi ? bo ?????????????????? 0?

Tips:

r - ??????????????

b - ?????????????????? IO????? Swaping

swpd - ??????????(KB)

free - ??????????????(KB)

buff - ??????????/?????????(KB)

cache - ??????????????????(KB)

si - ? swap disk ??? RAM(KB)

so - ? RAM ?? swap disk(KB)

bi - ?????? swap disk ??????

bo - ? RAM ?? swap disk ?????

CPU:

us - User ?? CPU %
 sy - System ?? CPU %
 id - Idle ?? CPU %
 wa - ?? I/O Waiting CPU %
 st - ????? CPU % (kernel 2.6.1 ?????)

????

1. r ????? 1 ????????? id ??? 40%??? CPU ?????
2. ????????????? free ?????? cache ????????????????? swap disk (so,bo)?
3. cache ?????? bi ?????????????
4. ?? swapd ??? 0?? si, so ??? 0????????????
5. ?? bi, bo ????????? si, so ????? 0????? IO ?????????????????
6. ?? bi, bo ? si, so ????????????? swapping ???RAM ???
7. kswapd ????????????????????????????? 32 ? pages???????????????????? pages_high(????)?
8. pdflush ?????????????????????????????????????
9. bi ? bo ?? 0 ????????????????????????? I/O ?????????????storage?HBA ????????

???: NetApp storage ?? IO bottleneck

- ????: ??????????AP ?? SQL ????
- ????:
 1. ?????? CPU?Memeory ????
 2. ????????????????? AP ?????
 3. ????????? nmon ??? IO??? Read ????? 100%?? IOPS ????????? (?? 100 KB)
 4. ? vmstat ?? bi ? bo??? IO ????????????????????? ????10???????????????????? 100 - 200 ??????