

vmstat

Case #1: 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
```

Case #2: 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

Case #3:?? storage ? SAN switch ???????????????

?????DB ??????

?????

- Linux ? top ???? Load Average ??????? 15 ???????
- ?? dmesg ? messages ??????????????
- ?????????????????????????????????
- ?? Memory? ? Disk Swapping ???
- ?? CPU????? Idle ???

?? vmstat ???????:

- CPU - wa ???? 0 ?????
- IO - bi, bo ??????? 0?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. ?? swpd ????? 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
?????????

Case #4:NetApp storage ?? IO bottleneck

?????: ??????????AP ?? SQL ??????

?????:

- ?????? CPU?Memeory ?????
- ?????????????????? AP ??????
- ????????? nmon ???? IO??? Read ?????? 100%?? IOPS ?????????? (?? 100 KB)
- ? vmstat ?? bi ? bo??? IO ?????????????????? ???10????????????????? 100 - 200 ??????

Revision #3

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