AIX a Quick Look at Performance

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Contents

1 Introduction

1.1 Things you will need

1. Access to server with command shell.
2. Patience.
3. Root access to the server username=root password=?
4. Terminal emulator or access to the console. Emulation works best with:
   a) vt100
   b) vt220

2 Background

The IBM AIX operating system has several tools that will allow you to look at the current performance of the system. Older systems require more patience because some of the modern tools did not exist and to my knowledge have not been compiled to run on AIX 4.3 and earlier.

The References section contains a list of publications from IBM. These Redbooks are free and provide a wealth of information about AIX performance tuning. Make sure you visit this site. The books are available as pdf documents and as a HTML manual.

2.1 Preparation

1. Open a window to your server. This window may be from your desktop with a terminal emulator, from the console or from an ASCII terminal.
2. Login as root. You will see a # prompt.

3 The commands

3.1 Monitoring File Systems

Refer to Mastering Unix Shell Scripting chapter 5 and 11 for more detail.

3.1.1 The df command

Used to display the status of your file-systems.
  df -k

3.1.2 The lsvg command

Used to display volume groups and their contents.
  lsvg – to list all the volume groups present in the configuration
  lsvg volumegroup
  lsvg -p volumegroup
  lsvg -l volumegrou

3.2 Monitoring Paging space

Refer to Mastering Unix Shell Scripting chapter 6 for more detail.

3.2.1 The lsps command

Used to display the status of all swap space.
  lsps -a
  lsps -s

3.3 System load

Refer to Mastering Unix Shell Scripting chapter 7 for more detail.

3.3.1 The uptime command

Used to display time since last system reboot and load averages.

The load average is the average number of runnable processes over the preceding 5, 10 and 15 minute intervals.

uptime

```
# uptime
  09:56AM   up 313 days,  14:50,  2 users,  load average: 0.02, 0.17, 0.18
```

3.3.2 The iostat command

This command reports 4 vital pieces of information regarding the status of your machine. The percentage of CPU load divided into 4 categories.

1. Percentage of user application use
2. Percentage of system
3. Percentage of system idle
4. Percentage of iowait time

iostat -t 10 2

```
# iostat -t 10 3

tty:      tin         tout   avg-cpu:  % user    % sys     % idle    % iowait
         -0.0         -0.4              -0.1     -0.9      101.0      -0.1
          0.0         16.2               0.1      2.0       97.5       0.5
          0.0          8.1               0.1      0.7       99.2       0.0
#
```

3.3.3 The sar command

The sar Command Collects, reports, or saves system activity information.

sar 10 4

```
# sar 10 4

AIX europa 1 5 00049860A000    03/26/08
```

```
09:21:58    %usr    %sys    %wio   %idle
09:22:08       0       1       0      99
09:22:18       0       1       0      99
09:22:28       0       1       0      99
09:22:38       0       1       0      99

Average        0       1       0      99
```

3.3.4 The sar data collection

The sar command and related cousins may be setup on your system to run on a periodic basis. Convention is to run every 20 minutes between 8 A.M. and 5 P.M. Monday through Friday. The process is run hourly outside the work week.

Are the sar statistics being captured?

Enter the command "crontab -l adm" to see the crontab entry for the user adm. The display should look like:

```
# crontab -l adm
# @(#)20        1.9  src/bos/usr/sbin/cron/adm, cmdcntl, bos510 9/9/91 06:03:17
#
# COMPONENT_NAME: (CMDCNTL) commands needed for basic system needs
#
# FUNCTIONS:
#
# ORIGINS: 27,18
#
# (C) COPYRIGHT International Business Machines Corp. 1989,1991
# All Rights Reserved
# Licensed Materials - Property of IBM
#
# US Government Users Restricted Rights - Use, duplication or
# disclosure restricted by GSA ADP Schedule Contract with IBM Corp.
#
#
#
#====================================================================
#      SYSTEM ACTIVITY REPORTS
#  8am-5pm activity reports every 20 mins during weekdays.
#  activity reports every an hour on Saturday and Sunday.
#  6pm-7am activity reports every an hour during weekdays.
#  Daily summary prepared at 18:05.
#====================================================================
0 8-17 * * 1-5 /usr/lib/sa/sa1 1200 3 &
0 * * * 0,6 /usr/lib/sa/sa1 &
0 18-7 * * 1-5 /usr/lib/sa/sa1 &
5 18 * * 1-5 /usr/lib/sa/sa2 -s 8:00 -e 18:01 -i 3600 -ubcwyaqvm &
```

```
#==============================================================
#      PROCESS ACCOUNTING:
#  runacct at 11:10 every night
#  dodisk at 11:00 every night
#  ckpacct every hour on the hour
#  monthly accounting 4:15 the first of every month
#==============================================================
#10 23 * * 0-6 /usr/lib/acct/runacct 2>/usr/adm/acct/nite/accterr > /dev/null
#0 23 * * 0-6 /usr/lib/acct/dodisk > /dev/null 2>&1
#0 * * * * /usr/lib/acct/ckpacct > /dev/null 2>&1
#15 4 1 * * /usr/lib/acct/monacct > /dev/null 2>&1
#==============================================================
```

Notice the only lines without the # comment. These lines run the background processes to build the sar database. If they are active, you can use the following commands to see a 20 minute slice of your server performance throughout the day.

3.3.5 The sar command

Entering the sar command without options will print the collected statistics;
sar

```
# sar

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00:00:01    %usr    %sys    %wio   %idle
01:00:01       0       1       0      99
02:00:01       0       1       0      99
03:00:02       0       1       0      99
04:00:02       0       1       0      99
05:00:01       0       1       0      99
06:00:02       0       1       0      99
07:00:01       0       1       0      99
08:00:01       0       1       0      99
08:20:01       0       1       0      99
08:40:01       0       1       0      99
09:00:01       0       1       0      99
09:20:01       0       1       0      99

Average        0       1       0      99
```

3.3.6 The vmstat command

The vmstat command reports virtual memory statistics.
vmstat 20 3

```
# vmstat 20 34
kthr     memory             page              faults        cpu
----- ----------- ------------------------ ------------ -----------
 r  b   avm   fre  re  pi  po  fr   sr  cy  in   sy  cs us sy id wa
 1  1 24247 30104   0   0   0   0    0   0  72  245 263  0  1 99  0
 0  1 24254 30097   0   0   0   0    0   0 249  403 297  0  1 98  0
 0  0 24254 30097   0   0   0   0    0   0 246  391 295  0  1 99  0
```

Note the first line is the average since reboot. The last line is the most current sample.

The information we are interested in regarding performance are the last four columns which are again user, system idle and iowait time. The information about paging may also be relevant. Refer to the man page for vmstat for further details.

3.3.7 The topas command

The topas command reports selected local system statistics.

This is a dashboard for performance monitoring. It is not available on earlier versions of AIX.

The topas command reports selected statistics about the activity on the local system. The command uses the curses library to display its output in a format suitable for viewing on an 80x25 character-based display or in a window of at least the same size on a graphical display. The topas command requires the perfagent.tools fileset to be installed on the system.

```
Topas Monitor for host:    europa                EVENTS/QUEUES    FILE/TTY
Wed Mar 26 09:42:38 2008   Interval:  2          Cswitch     300  Readch      884
                                                 Syscall     344  Writech    1816
Kernel    1.5   |#                           |  Reads         1  Rawin         0
User      0.8   |#                           |  Writes        2  Ttyout      884
Wait      0.0   |                            |  Forks         0  Igets         0
Idle     97.7   |############################|  Execs         0  Namei         0
                                                 Runqueue    0.0  Dirblk        0
Network  KBPS   I-Pack  O-Pack   KB-In  KB-Out  Waitqueue   0.0
en0       0.7      1.5     1.5     0.1     0.6
lo0       0.0      0.0     0.0     0.0     0.0  PAGING           MEMORY
                                                 Faults         0  Real,MB     255
Disk    Busy%     KBPS     TPS KB-Read KB-Writ  Steals         0  % Comp     33.8
hdisk0    0.0      0.0     0.0     0.0     0.0  PgspIn         0  % Noncomp  21.6
hdisk1    0.0      0.0     0.0     0.0     0.0  PgspOut        0  % Client    0.5
cd0       0.0      0.0     0.0     0.0     0.0  PageIn         0
                                                 PageOut        0  PAGING SPACE
Name            PID  CPU%  PgSp Owner           Sios           0  Size,MB     960
topas         14864   0.8   2.1 root                             % Used      2.1
prodpick      17980   0.6   0.1 mfritter         NFS (calls/sec)  % Free     97.8
rpc.lock      10064   0.3   0.0 root             ServerV2       0
syncd          4934   0.0   0.2 root             ClientV2       0   Press:
gil            2064   0.0   0.1 root             ServerV3       0   "h" for help
rmcd          11108   0.0   2.3 root             ClientV3       0   "q" to quit
```

```
IBM.Audi      13712   0.0   2.2 root
ctcasd        13164   0.0   1.7 root
IBM.CSMA      14208   0.0   2.5 root
IBM.ERrm      15738   0.0   2.6 root
init              1   0.0   1.8 root
cleanupd      15446   0.0   0.2 root
```

Things to keep an eye on are obviously the percentage graph in the upper left. Again Kernel or system, user, iowait and idle. You can see percentage busy on disk drives, net work and paging space activity. Refer to the man page for additional information.

3.3.8 The nmon tool

From the web site: nmon performance: A free tool to analyze AIX and Linux performance

`http://www.ibm.com/developerworks/aix/library/au-analyze_aix/index.html`

This free tool gives you a huge amount of information all on one screen. Even though IBM doesn't officially support the tool and you must use it at your own risk, you can get a wealth of performance statistics. Why use five or six tools when one free tool can give you everything you need?

Usage notes: This nmon tool is NOT OFFICIALLY SUPPORTED. No warrantee is given or implied, and you cannot obtain help with it from IBM. If you have a question on nmon, please go on the Performance Tools Forum site (see Resources) so that others can find and benefit from the answers.

The nmon tool runs on:

1. AIX 4.1.5, 4.2.0 , 4.3.2, and 4.3.3 (nmon Version 9a: This version is functionally established and will not be developed further.)
2. AIX 5.1, 5.2, and 5.3 (nmon Version 10: This version now supports AIX 5.3 and POWER5. processor-based machines, with SMT and shared CPU micro-partitions.)
3. Linux SUSE SLES 9, Red Hat EL 3 and 4, Debian on pSeries p5, and OpenPower.
4. Linux SUSE, Red Hat, and many recent distributions on x86 (Intel and AMD in 32-bit mode)
5. Linux SUSE and Red Hat on zSeries or mainframe

4 Resources

1. Mastering Unix Shell Scripting; Wiley Publishing; Randal K. Michael; ISBN 0-471-21821-9
2. The AIX Survival Guide; Addison-Wesley; Andreas Siegert; ISBN 0-201-59388-2
3. AIX Version 4 System and Administration Guide; McGraw-Hill; Jay Ranade; ISBN 0-07-036688-8
4. AIX 5L Administration; Osborne; Randal K. Michael; ISBN 0-07-222255-7
5. Network Warrior; O'Reilly; Gary A Donahue; ISBN 0-596-10151-1
6. System Performance Tuning; O'Reilly; Gian-Paolo D. Musumeci & Mike Loukides; ISBN 0-596-00284-X
7. Accelerating AIX Performance Tuning for Programmers and System Administrators; Addison-Wesley; Rudy Chukran; ISBN 0-201-63382-5

Web References you will want to look at are:

```
Jaqui's AIX Performance and Security Blog (Note: this site has moved beyond AIX 4)
http://www.circle4.com/blosxomjl.cgi

AIX Performance tuning slide presentation.
http://www.circle4.com/papers/cmgperf.pdf

IBM publishes a large amount of documentation in the form of "Redbooks".
Visit their web site for access.
http://www.redbooks.ibm.com/

AIX 5L Practical Performance Tools and Tuning Guide
http://www.redbooks.ibm.com/abstracts/sg246478.html?Open

AIX 5L Performance Tools Handbook
http://www.redbooks.ibm.com/abstracts/tips0434.html?Open

Database Performance Tuning on AIX
http://www.redbooks.ibm.com/abstracts/sg245511.html?Open

Customizing Performance Toolbox and Performance Toolbox Parallel Extensions for AIX
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http://www.redbooks.ibm.com/abstracts/sg242011.html?Open

IBM eServer Certification Study Guide - AIX 5L Performance and System Tuning
http://www.redbooks.ibm.com/abstracts/SG246184.html?Open