nmon Command

Purpose

Displays local system statistics in interactive mode and records system statistics in recording mode.

Syntax

Interactive mode:

nmon [**-h**]

nmon [**-s** < *seconds* >] [**-c** < *count* >] [**-b**] [**-B**] [**-g** < *filename* >] [**-k** *disklist*] [**-C** < process1:process2:..:processN >]

Recording mode:

nmon [**-f** | **-F** *filename* | **-x** | **-X** | **-z**] [**-r** < *runname* >] [**-t** | **-T** | **-Y**] [**-s** *seconds*] [**-c** *number*] [**-w** *number*] [**-l** *dpl*] [**-d**] [**-g** *filename*] [**-k** *disklist*] [**-C** <process1:process2:..:processN >] [**-G**] [**-K**] [**-o** *outputpath*] [**-D**] [**-E**] [**-J**] [**-V**] [**-P**] [**-M**] [**-N**] [**-W**] [**-S**] [**-^**] [**-O**] [**-L**] [**-l** *percent*] [**-A**] [**-m** < *dir* >] [**-Z** *priority*]

Note:
In recording mode, specify only one of the **-f**, **-F**, **-z**, **-x**, or **-X** flags as the first argument.

Description

The **nmon** command displays and records local system information. The command can run either in interactive or recording mode. If you specify any of the **-F**, **-f**, **-X**, **-x**, and **-Z** flags, the **nmon** command is in recording mode. Otherwise, the **nmon** command is in interactive mode.

The **nmon** command provides the following views in interactive mode:

- System resource view (using the **r** key)
- Process view (using the **t** and **u** keys)
- AIO processes view (using the **A** key)
- Processor usage small view (using the **c** key)
- Processor usage large view (using the **C** key)
- Shared-processor logical partition view (using the **p** key)
- NFS panel (using the **N** key)
- Network interface view (using the **n** key)
- WLM view (using the **W** key)
- Disk busy map (using the **o** key)
- Disk groups (using the **g** key)
- ESS vpath statistics view (using the **e** key)
- JFS view (using the **j** key)
- Kernel statistics (using the **k** key)

- Long term processor averages view (using the **l** key)
- Large page analysis (using the **L** key)
- Paging space (using the **P** key)
- Volume group statistics (using the **V** key)
- Disk statistics (using the **D** key)
- Disk statistics with graph (using the **d** key)
- Memory and paging statistics (using the **m** key)
- Adapter I/O statistics (using the **a** key)
- Shared Ethernet adapter statistics (using the **O** key)
- Verbose checks OK/Warn/Danger view (using the **v** key)
- Detailed Page Statistics (using the **M** key)
- Fibre channel adapter statistics (using the **^** key)

In the recording mode, the command generates the **.nmon** files. You can view these files directly by opening them or with post processing tools such as nmon analyzer. The **nmon** tool disconnects from the shell during the recording, ensuring that the command continues running even if you log out.

If you use the same set of keys every time the **nmon** command is started, you can place the keys in the NMON shell variable. For example, you can run the following command:

```
export NMON=mcd
```

Then, run the **nmon** command.

To stop the **nmon** command from the command line, use the **kill -USR2** with the nmon process ID.

To print the background process IDs of the nmon recording, run the **nmon** command with the **-p** flag.

To limit the processes that the **nmon** command lists (online and to a file), you can either set the program names in environment variables from **NMONCMD0** to **NMONCMD63**, or use the **-C** flag with *cmd:cmd:cmd* parameter. For example, you can enter the following command:

```
nmon -C ksh:vi:syncd
```

To limit the disks that the **nmon** lists to a maximum of 64 (online only) , use the **-k** flag with the *diskname* parameter. For example, you can enter the following command:

```
nmon -k hdisk2,hdisk0,hdisk3
```

The **nmon** tool disconnects from the shell during the recording, ensuring that the command continues running even if you log out. This is not true in the case of recordings triggered using the On demand recording facility.

Recording or monitoring journaled file system (JFS) statistics in nmon can prevent unloading a file system because the file system is in use while collecting statistics.

Inside workload partitions (WPAR), the **nmon** command shows global values for processors and memory statistics. The rest of the values are WPAR specific. The following statistics cannot be retrieved inside a WPAR, and the **nmon** screen does not support them inside a WPAR:

- Disks, disk I/O graphs, disk busy map, disk groups

- Disk adapters
- Paging space
- Volume group
- ESS/vpaths
- Fibre channel adapters
- VIOS Shared Ethernet adapters

Flags in Interactive Mode

You can use the following flags in the interactive mode.

-s < *seconds* >	Time interval between refreshing the screen. The default value is two seconds.
-c < *count* >	Number of times the screen must be refreshed.
-g < *filename* >	A file that contains user-defined disk groups that can be specified using the *filename* parameter. Each line in the file begins with a group name. The list of hard disks follows the group name and is separated by spaces. The file can contain a maximum of 64 disk groups. A hard disk can belong to various disk groups.
-b	Displays the view in black and white mode.
-B	Does not include boxes in the view. By default, the command displays boxes.
-h	Displays help information.
-k < *disklist* >	Reports only the disks in the disk list.

Flags in Recording Mode

-A	Includes the Asynchronous I/O section in the view.
-c	Specifies the number snapshots that must be taken by the command. The default value is 10000000.
-d	Includes the Disk Service Time section in the view.
-D	Skips the Disk Configuration section.
-E	Skips the ESS Configuration section.
-f	Specifies that the output is in spreadsheet format. By default, the command takes 288 snapshots of system data with an interval of 300 seconds between each snapshot. The name of the output file is in the format of *hostname_YYMMDD_HHMM* **.nmon**.
-F	Specifies that the output is in spreadsheet format and the name of the output file is *filename*. The *filename* parameter specifies the name of the output file.
-g	Specifies the file that contains the user-defined disk groups, using the *filename* parameter. Each line in the file begins with a group name. The list of disks follows the group name and is separated with spaces. The file can contain a maximum of 64 disk groups. A disk can belong to various disk groups.
-G	Uses Greenwich mean time (GMT) instead of local time. This is helpful when you compare nmon files from many LPARs of one machine for processor view but the LPARs are in different time zones.
-I	Specifies the percentage of process threshold at which the command ignores the TOP processes statistics. The default percentage is zero. The command does not save the TOP processes statistics if the process is using less processor than the given percentage.
-J	Skips the JFS section.

-k	Specifies a list of disks to be recorded.
-K	Includes the RAW Kernel section and the LPAR section in the recording file. The **-K** flag dumps the raw numbers of the corresponding data structure. The dump is readable and can be used when the command is recording the data.
-l	Specifies the number of disks to be listed on each line. By default, 150 disks are listed per line. For EMC disks, specify a value of 64.
-L	Includes the large page analysis section.
-m	Changes the directory before the command saves the data to a file.
-M	Includes the MEMPAGES section in the recording file. The MEMPAGES section displays detailed memory statistics per page size.
-N	Includes the NFS section in the recording file. To collect the NFSv4 statistics, specify **-NN**.
-o	Specifies the file name or directory to which the recorded file is to be stored.
-O	Includes the Shared Ethernet Adapter (SEA) VIOS sections in the recording file.
-P	Includes the Paging Space section in the recording file.
-r	Specifies the value for the *runname* field written to the spreadsheet file. By default, the value is the hostname.
-s	Specifies the interval in seconds between two consecutive recording snapshots.
-S	Includes WLM sections with subclasses in the recording file.
-t	Includes the top processes in the output. You cannot specify the **-t**, **-T**, or **-Y** flags with each other.
-T	Includes the top processes in the output and saves the command line arguments into the UARG section. You cannot specify the **-t**, **-T**, or **-Y** flags with each other.
-V	Includes disk volume group section.
-w	Specifies the size of timestamp (Tnnnn) to be recorded. The timestamp is recorded in the **.csv** file. The value of the *number* parameter ranges from 4 through 16. For NMON analyzer, use the values 4 or 8.
-W	Includes the WLM sections into the recording file.
-x	Specifies the sensible spreadsheet recording for duration of one day for capacity planning. By default, the recording is done every 900 seconds for 96 times. This flag is equivalent to **-ft -s 900 -c 96**.
-X	Specifies the sensible spreadsheet recording for duration of one hour for capacity planning. By default, the recording is done every 30 seconds for 120 times. This flag is equivalent to **-ft -s 30 -c 120**.
-Y	Includes the top process in the recording with all of the commands of the same name added together and recorded. You cannot specify the **-t**, **-T**, or **-Y** flags together.
-z	Specifies the sensible spreadsheet recording for duration of one day for capacity planning. By default, the recording is done every 900 seconds for 96 times. This flag is equivalent to **-f -s 900 -c 96**.
-Z	Specifies the priority of the **nmon** command that is running. A value of -20 means important. A value of 20 means not important. Only root user can specify negative value.
-^	Includes the Fibre Channel (FC) sections.

Parameters

disklist	Specifies a list of disks.
dir	Specifies a directory.
dpl	Specifies the number of disks to list on each line.
filename	Specifies a file that contains the disk group you select.

number	Specifies the number of refreshes.
count	Specified the number of times to record.
percent	Specifies the percentage of processor usage.
priority	Specifies the priority of processes to be run.
runname	Specifies the value for the *runname* field in the spreadsheet file to be run.
seconds	Specifies the interval, in seconds, of refreshing the snapshot.
outputpath	Specifies the path for the output file.

Subcommands

space	Refreshes the screen immediately.
.	Displays only busy disks and processes.
~	Switches to the topas screen.
^	Displays the Fibre Channel Adapter statistics
+	Doubles the screen refresh time.
-	Decreases the screen refresh time by half.
0	Resets the peak values of statistics (displayed on the screen) to zero. Applicable only for panels that display peak values.
a	Displays the I/O statistics of the adapters.
A	Summarizes the Async I/O (aioserver) processes.
b	Displays the view in black and white mode.
c	Displays processor statistics with bar graphs.
C	Displays processor statistics. It is useful for comparison when the number of processors ranges from 15 to 128.
d	Displays the I/O information of disks. To display specific disks only, specify the **-k** flag.
D	Displays the I/O statistics of disks. To get more statistics of the disks, press the **D** key more than once.
e	Displays the I/O statistics of the ESS virtual path logical disks.
g	Displays the I/O statistics of the Disk Group. You must specify the **-g** flag with this key.
h	Displays the online help information.
j	Displays the JFS statistics.
k	Displays the internal statistics of the kernel.
l	Displays the processor statistics in long format. More than 75 snapshots are displayed with bar graphs.
m	Displays the memory and paging statistics.
M	Displays multiple page size statistics in pages. If you press the **M** key twice, the statistics are displayed in megabytes.
n	Displays the network statistics.
N	Displays the statistics of the NFS Network Filesystem. If you press the **N** key twice, you will see the NFSv4 statistics.
o	Displays the map of Disk I/O.
O	Displays only the Shared Ethernet Adapter VIOS.
p	Displays the statistics of the partitions.
P	Displays the statistics of the paging space.
q	Quits. You can also use the **x**, or Ctrl+C key sequence.
r	Displays the resource type, machine name, cache details, AIX® version, and the LPAR information.
S	Displays the WLM with subclasses.
t	Displays the statistics of top processes. You can press the following keys with this subcommand: • 1: Displays basic details. • 2: Displays accumulated process information.

	• 3: Sorts the view by processor. • 4: Sorts the view by size. • 5: Sorts the view by I/O information.
u	Displays the top processes with the command arguments. To refresh the arguments for new processes, press the **u** key twice.
U	Displays the top processes with the command arguments, and the workload class or workload partition information.
v	Highlights current status of pre-defined system resources and categorizes them as either danger, warnings, or normal.
V	Displays the statistics of the Disk Volume Group.
w	Displays the wait processes when used with the top processes.
W	Displays the statistics of the Workload Manager (WLM).
[	Triggers a custom on demand recording. The recording initiated exits along with the interactive **nmon** if not stopped earlier.
]	Stops a custom recording triggered by **]**.

Output Details

This section provides explanations to the metrics that are displayed on nmon screen.

System resources view

This view provides general information about the system resources. To display this view, press the **r** key. It contains information about the following resources:

- The number of processors in the system.
- The number of online processors that are active in the system.
- The frequency of the processors.
- The version of AIX® and its technical level.
- The type of the running kernel.
- The logical partition.
- The power savings mode of the logical partition.
- The model of the hardware.
- The processor architecture of the system.
- The type of the platform bus.
- The cache information of processors.
- The number of active events.
- The old serial number. This number is the machine ID of the partition before the dynamic configuration event.
- The current serial number. This number is the current machine ID or the machine ID of the partition after the dynamic configuration event.
- The local time of the last dynamic reconfiguration event. This information is labeled with the "When" keyword.

AIO Processes View

The AIO processes view provides information about the asynchronous I/O (AIO) processes. To display this view, press the **A** key. The following columns are displayed on the screen:

Total AIO Processes	The total number of AIO processes.
Actually in use	The number of AIO processes that consume more than 0.1% of the processor.
CPU Used	The percentage of the processor that is used by all of the kernel processes.
All time peak	The maximum number of kernel processes that are running since the system starts.
Recent peak	The recent maximum number of kernel processes that are consuming more than 0.1% of the processor.
Peak	The maximum percentage of the processor that is used by all of the kernel processes.

Process View

The **Process View** provides details of the processes in the system. To display this view, press the **t** key or the **v** key. It contains the following columns are displayed on the screen:

pid	The ID of the process.
ppid	The ID of the parent process.
User	The user ID of the process.
Proc Group	The ID of the process group.
Nice	The initial priority of a process. This value is set by the **nice** command.
Priority	The base schedule priority of a process.
Status	The status of a program.
Proc_Flag	The flag of a process.
Thrds	The number of threads.
Files	The maximum file index that is in use.
Foreground	Foreground process or background process.
Command	The name of the command.
Time Start	The time when the command started.
CPU-Total	The total time that the process takes since it starts.
Child Total	The total time that the child process takes since it starts.
Delta-Total	The total time that the process consumes in the interval.
%CPU Used	The percentage of the processor that is consumed in the last interval.
Size KB	The size of the pages in kilobytes.
Res Size	The sum of real-memory data (resident set) and real-memory (resident set) text size of the process.
Res Set	The sum of real-memory data (resident set) and real-memory (resident set) text size of the process.
Res Text	The real-memory text size of the process.
Res Data	The real-memory data size of the process.
Char I/O	The number of I/O characters per second from the last interval.
RAM Use	The percentage of the RAM that is used.
Paging I/O	The I/O page faults per second in the last interval.
Paging Other	The non-I/O page faults per second in the last interval.
Paging Repages	The number of repage faults per second in the last interval.
Class	The Workload Manager class name of the process.

Processor Usage Small View

The Processor Usage Small View provides a brief summary of the user, system, idle and wait time of logical processors, the corresponding entitlement, and the virtual processor consumption. You can generate the Processor Usage Small View using the **c** key.

Processor Usage Large View

The Processor Usage Large View displays the use of logical processor in a graph. To display this view, you can press the **C** key.

The following labels are used to identify time spent in different modes:

- **s**: Labels the percentage of time spent in system mode
- **u**: Labels the percentage of time spent in user mode

Shared-Processor Logical Partition View

The Shared-Processor Logical Partition View includes flags that indicate the following information of a partition:

- Whether the partition is an LPAR or not
- Whether the partition can be an LPAR or not
- Whether the partition is shared or dedicated
- Whether the SMT is turned on or off
- Whether the shared-partition is capped or uncapped

To display this view, you can press the **p** key.

Processors:

The following metrics of the processor status are displayed in this view:

Max Phys in Sys	Maximum number of physical processors in the system
Phys CPU in system	Number of physical processors in the system
Virtual Online	Number of online virtual processors
Logical online	Number of online logical processors
Physical pool	Number of shared physical processors in the shared pool ID that this partition is assigned to
SMT threads/CPU	Number of SMT threads per processor

Capacity:

The following capacity information about the processors are displayed:

Cap. Processor Min	Minimum number of processing units that are defined for this LPAR
Cap. Processor Max	Maximum number of processing units that are defined for this LPAR
Cap. Increment	Granularity at which changes to the entitled capacity can be made
Cap. Unallocated	Sum of the number of processor units that are unallocated from shared LPARs in an LPAR group
Cap. Entitled	Entitled capacity
MinReqVirtualCPU	Minimum required virtual processors for this LPAR

ID Memory:

The following metrics of the ID memory are displayed:

LPAR ID Group:Pool	ID of an LPAR group and its pool ID

Memory (MB/GB) Min:Max	Minimum and maximum memory that is defined for this LPAR in megabytes or gigabytes
Memory(MB/GB) Online	Online real memory in megabytes or gigabytes
Memory Region LMB	Size in bytes of one logical memory block (LMB)

Time (in seconds):

Time Dispatch Wheel	Interval during which each virtual processor receives its entitlement
MaxDispatch Latency	Maximum latency in seconds between the dispatch of the LPAR on the physical processors
Time Pool Idle	Time in seconds that the shared processor pool is idle
Time Total Dispatch	Total time in seconds that the LPAR dispatches

Minimum and Maximum Values of Processors

The following minimum and maximum values of processors are displayed:

Virtual CPU (Min - Max)	Minimum number and maximum number of virtual processors in the LPAR definition
Logical CPU (Min - Max)	Minimum number and maximum number of logical processors

Weight

The following information about the weight of the processor is displayed:

Weight Variable	Variable weight of the processor capacity
Weight Unallocated	Unallocated variable weight available for this partition

NFS Panel

The NFS Panel provides information about the Network File System (NFS). To display this view, press the **N** key. The following metrics are included in the view:

Root	NFS V2 server and client root requests
Wrcache	NFS server and client write cache requests
Null	NFS server and client write cache requests
Getattr	NFS server and client get attributes requests
Setattr	NFS server and client set attributes requests
Lookup	NFS server and client filename lookup requests
Readlink	NFS server and client read link requests
Read	NFS server and client read requests
Write	NFS server and client write requests
Create	NFS server and client file creation requests
Mkdir	NFS server and client directory creation requests
Symlink	NFS server and client symbolic link creation requests
Remove	NFS server and client file removal requests
Rmdir	NFS server and client directory removal requests
Rename	NFS server and client file renaming requests
Link	NFS server and client link creation requests
Readdir	NFS server and client read-directory requests
Fsstat	NFS server and client file-status requests
Access	NFS V3 server and client access requests
Mknod	NFS V3 server and client **mknod** creation requests
readdir+	NFS V3 server and client read-directory plus requests
Fsinfo	NFS V3 server and client file information requests
Pathconf	NFS V3 server and client path configuration requests
Commit	NFS server and client commit requests

Bad calls	NFS server and client failed calls
Calls	NFS server and client requests

The following NFS V4 client/server statistics are printed when you press the **N** key twice.

Access	NFS V4 server and client access requests
acl_read	NFS V4 client reading access control list (ACL)
acl_stat_l	NFS V4 client retrieving long ACL information
acl_write	NFS V4 client write access control list (ACL)
Clntconfirm	NFS V4 client confirm operations
Close	NFS V4 client closing files
Commit	NFS V4 server and client committed
Compound	NFS V4 server compound calls
Create	NFS V4 server and client creating a non-regular object
Delegpurge	NFS V4 server purge delegations awaiting recovery
Delegreturn	NFS V4 server and client returning delegation
Finfo	NFS V4 client obtaining file information
getattr	NFS V4 server and client retrieving attributes
getfh	NFS V4 server retrieving file handles
Link	NFS V4 server and client linking operations
Lock	NFS V4 server and client locking operations
lockt/test	NFS V4 server testing the specified lock or NFS V4 client lock test
locku/unlock	NFS V4 server or NFS V4 client unlock operations
lookup	NFS V4 server and client looking up filenames
lookupp	NFS V4 server looking up parent directories
mkdir	NFS V4 client creating directories
mknod	NFS V4 client creating special files
Null	NFS V4 server null calls or NFS V4 client null calls
nverify	NFS V4 server verifying difference in attributes
openattr	NFS V4 server opening named attribute directories
openconfirm	NFS V4 server and client confirming the open for usage
opendowngrade	NFS V4 server and client downgrading the access for a given file
Open	NFS V4 server and client open operations
operations	NFS V4 server and client operations
pcl_read	NFS V4 client extracting numeric data from printer control language (PCL) files
pcl_readstat_l	NFS V4 client **pcl_stat** long operations
pcl_stat	NFS V4 client **pcl_stat** operations
pcl_write	NFS V4 client **pcl_write** operations
putfh	NFS V4 server setting current file handles
putpubfh	NFS V4 server setting public file handles
putrootfh	NFS V4 server setting root file handles
readdir	NFS V4 server and client reading directories
readlink	NFS V4 server and client reading symbolic links
Read	NFS V4 server and client reading data from files
release	NFS V4 server and client **release_lock** operations
remove	NFS V4 server and client removing file system object
rename	NFS V4 server and client renaming object names
renew	NFS V4 server and client renewing leases
replicate	NFS V4 client replicate operations
restorefh	NFS V4 server restoring file handles
rmdir	NFS V4 client removing directories
savefh	NFS V4 server saving file handles
secinfo	NFS V4 server and client obtaining security information

setattr	NFS V4 server and client setting object attributes
setclient	NFS V4 server and client **setclient** operations
statfs	NFS V4 client file statistics requests
symlink	NFS V4 client symbolic link operations
verify	NFS V4 client verifying same attributes
write	NFS V4 server and client writing to files

Network Interface View

The Network Interface View shows the statistics errors for the network. You can view this information by pressing the **n** key.

If the screen is updated hree times with no network errors, the Network Interface View will not contain the network error statistics.

The following metrics are displayed in this view:

I/F Name	Interface name
Recv-KB/s	Data received in kilobytes per second in the interval
Trans-KB/s	Data transmitted in kilobytes per second in the interval
Packin	Number of packets received in the interval
Packout	Number of packets sent in the interval
Insize	Average size of packet received in the interval
Outsize	Average size of packet sent in last interval
Peak->Recv	Peak value of received data in kilobytes per second
Peak->Trans	Peak value of sent data in kilobytes per second
Total Recv	Total received data in megabytes per second
Total Sent	Total sent data in megabytes per second
MTU	Maximum size of transport unit in bytes
Ierror	Number of input errors
Oerror	Number of output errors
Collision	Number of collision
Mbits/s	Adapter bit rate in megabits per second
Description	Description of the interface

WLM View

The WLM View displays the information about workload management. You can display this view using the **W** key. To turn on the subclasses section, press the **S** key from WLM View. To turn off the subclasses section, press the **S** key again.

The following metrics are displayed in this view:

CPU	Percentage of processor use of the class.
MEM	Percentage of physical memory use of the class.
BIO	Percentage of disk I/O bandwidth use for the class.
Process (Procs)	Number of processes in the class.
Tier (T)	Tier number. The value ranges from zero through nine.
Inheritance (I)	Values of the inheritance attribute. A value of zero means no. A value of one means yes.
Location	Values of location. A value of one means avoiding transfer of segments to shared classes. Otherwise, a value of zero is displayed.

Disk Busy Map

The Disk Busy Map shows the use statistics of disks. To display this map, press the **o** key. A maximum of 100 disks is shown per screen. Only the disks with the names ranging from hdisk0 through hdisk100 are displayed. The following table shows the symbols for the ranges of names.

Symbols	Names
_	Less than 5
.	Less than 10
-	Less than 20
+	Less than 30
o	Less than 40
0	Less than 50
O	Less than 60
8	Less than 70
X	Less than 80
#	Less than 90
@	Less than 100 and equal to 100

Disk Groups

Multiple disks can be monitored by placing them in groups. To display this view, press the **g** key.

You need to create a group configuration file containing the lines as shown in the following example:

```
<Group_name1> <disk_name1> <disk_name2> ....
<Group_name2> <disk_nameA> <disk_nameB> ...
```

In the example, <Group_name1> is the name of the first disk in the group; <disk_name1> and <disk_name2> are the first and second disks in the group.

To see the Disk Group I/O, run the **nmon** command with the **-g** flag and a group file, and then press the **g** key. The following metrics are shown in this view:

Name	Disk Group name. You can specify a maximum of 64 groups. A disk can be in multiple groups.
Disks	Number of disks in the group.
Read/Write-KB/s	Data transfer rate of read and written data in kilobytes per second in the interval.
TotalMB/s	Sum of read and written data in megabytes per second in the interval.
Xfers/s	Number of read and written data transfers per second in the interval.
BlockSizeKB	Block size in kilobytes read or written per transfer operation.

ESS Vpath Statistics View

This view provides the ESS Vpath Statistics. To display this view, press the **e** key. The following metrics are included in this view:

Name	Name of the virtual path.
Size	Size of the ESS path.
AvgBusy	Average busy use of the disk.
Write-KB/s	Transfer rate of written data in kilobytes per second in the interval.
Read-KB/s	Transfer rate of read data in kilobytes per second in the interval.
Xfers/s	Number of read and write transfers per second.
Total vpaths	Number of virtual paths.

JFS View

This view provides the Journaled File System (JFS) statistics. To display this view, press the **j** key. The following statistics are recorded in this view:

FileSystem	Name of the file system.

Size (MB)	Size in megabytes for the file system.
Free (MB)	Available free space in megabytes in the file system.
%Used	Percent of file system used.
%Inodes	Percent of file system used by i-nodes.
Mount point	Local mount point.

Kernel Statistics

This view contains the statistics of the kernel. To display this view, press the **k** key. The following statistics are displayed in this view:

runqueue	Average number of threads that are ready to run but are waiting for an available processor.
pswitch	Number of processor switches per second in the interval.
fork	Number of forks per second in the interval.
exec	Number of execs per second in the interval.
msg	Number of interprocess communication (IPC) messages sent and received per second in the interval.
sem	Number of semaphore operation system calls per second in the interval.
hw intrp	Number of device interrupts per second in the interval.
sw intrp	Number of off-level handlers called per second in the interval.
Swapin	Number of processes in swap queue per second in the interval.
Syscall	Number of system calls per second in the interval.
read	Number of read calls per second in the interval.
write	Number of write calls per second in the interval.
readch	Number of characters transferred through read system call per second in the interval.
Writech	Number of characters transferred through write system call per second in the interval.
R + W (MB/s)	Number of read and write characters in megabytes per second in the interval.
Uptime	Time duration for which the system is up.
iget	Number of inode lookups per second in the interval.
dirblk	Number of 512-byte block reads by the directory search routine to locate an entry for a file per second in the interval.
namei	Number of vnode lookup from a path name per second in the interval.
ksched	Number of kernel processes created per second in the interval.
koverf	Number of kernel process creation attempts where the user has forked to the maximum limit or the configuration limit of processes has been reached per second in the interval.
kexit	Number of kernel processes that become zombies per second in the interval.

Long Term Processor Averages View

This view provides information about the instantaneous system. To display this view, press the **l** key. You can use the following labels to identify the time spent in different modes:

- **s**: Labels the percentage of the time spent in system mode.
- **u**: Labels the percentage of the time spent in user mode.
- **w**: Labels the percentage of the time spent in wait mode.

The following metrics are displayed on this view:

EntitledCPU	Entitled capacity of the partition.
UsedCPU	Number of physical processors consumed by the partition.

Large Page Analysis

This view provides analysis of the large page. To display this view, press the **L** key. The following information is displayed:

Count	Number of large pages and their total size.
Free	Percentage of free large pages and their size.
In Use	Percentage of large pages in use and their size.
Size	Size of a large page.
High water mark	Large page high watermark.

Paging Space

This view prints the paging-space statistics. To display this view, press the **p** key. The following metrics are displayed in the view:

PagingSpace	Number of paging space.
Volume-Group	Number of volume groups.
Type	Type of logical volumes. The types can be NFS or LV.
LPs	Size of logical partitions.
MB	Size in megabytes.
Used	Percentage of use for volume groups.
IOpending	Number of pending I/O in the paging space.
Active / Inactive	Active or inactive paging space.
Auto / NotAuto	Indicates if the paging space is auto loaded or not.

Volume Group Statistics

This view provides statistics for the volume group. To display this view, press the **V** key. The following information is displayed in the view:

Name	Volume group name.
Disks	Number of disks in the group.
AvgBusy	Average busy of the disks in the volume group.
Read / Write-KB / s	Data transfer rate of read and written data in kilobytes per second in the interval.
TotalMB / s	Sum of read and written data in megabytes per second in the interval.
Xfers / s	Number of read and written transfers per second in the interval.
BlockSizeKB	Block size read or written per transfer in kilobytes per second in the interval.

Disk Statistics

This view provides statistics for disks. To display this view, press the **D** key. You can press the **D** key for the following times to view various metrics:

- Once: Shows disk numbers
- Twice: Shows disk descriptions
- Three times: Shows service times
- Four times: Shows disk statistics with graphs similar to the graph shown on pressing the **d** key

Disk Numbers (Pressing the **D** key once)

The following metrics are shown in this view:

Name	Name of the disks.
Busy	Average busy of the disks.

Read-KB/s	Data transfer rate of read data in kilobytes per second in the interval.
Write-KB/s	Data transfer rate of written data in kilobytes per second in the interval.
Transfers/sec	Number of read and written transfer per second in the interval.
SizeKB	Block size read or written per transfer in kilobytes per second in the interval.
Peak	Peak percentage of average busy.
Peak KB/s	Peak read and written data in kilobytes per second.
qDepth	Number of requests sent to disk and are not completed.
Totals Size (GB)	Total size of disks in gigabytes.
Totals Free (GB)	Total free space left in disks in gigabytes.
Totals Read (MB/s)	Total data transfer rate of read data from all disks in megabytes per second.
Totals Write (MB/s)	Total data transfer rate of written data to all disks in megabytes per second.

Disk Descriptions (Pressing the **D** key twice)

The following metrics are shown in this view:

Name	Disk names.
Size (GB)	Size of disks in gigabytes.
Free (GB)	Free space left in disk in gigabytes.
Disk Paths	Number of paths defined to the disk.
Disk Adapter	Name of disk adapters.
Volume Group	Volume group that the disk belongs to.
Disk Description	Description of the disk.
Totals Size (GB)	Total size of disks in gigabytes.
Totals Free (GB)	Total free space left in disks in gigabytes.
Totals Read (MB/s)	Total data transfer rate of read data from all disks in megabytes per second.
Totals Write (MB/s)	Total data transfer rate of written data to all disks in megabytes per second.

Service Times (Pressing the **D** key three times)

The following metrics are displayed in the view:

Disk	Name of the disk.
Service (in msecs)	Average service time per request in milliseconds.
Wait (in msecs)	Average waiting time per request in milliseconds.
ServQ size	Average number of requests in service queue.
WaitQ size	Average number of requests waiting to be accomplished.
ServQ Full	Number of times the disk is not accepting any coming requests.
Totals Size (GB)	Total size of disks in gigabytes.
Totals Free (GB)	Total free space left in disks in gigabytes.
Totals Read (MB/s)	Total data transfer rate of read data from all disks in megabytes per second.
Totals Write (MB/s)	Total data transfer rate of written data to all disks in megabytes per second.

Disk Statistics With Graphs (Pressing the **D** key four times)

This view displays disk statistics with graphs. To display this view, press the **d** key. The following metrics are displayed in this view:

Name	Name of the disk.
Busy	Average percentage of busy for the disk.
Read-KB/s	Data transfer rate of read data in kilobytes per second.

Write-KB/s	Data transfer rate of written data in kilobytes per second.

Memory and Paging Statistics

The view provides information about the memory and paging statistics. To display this view, press the **m** key. The following metrics are included in this view:

%Used	Percentage of used space in physical memory and paging space.
%Free	Percentage of free space in physical memory and paging space.
MB Used	Physical memory and paging space that are used in megabytes.
MB Free	Physical memory and paging space that are free in megabytes.
Pages/sec to Paging Space	Number of I/O pages transferred to or from the paging space per second.
Pages/sec to File System	Number of I/O pages transferred to or from the file system per second.
Page Scans	Number of page scans by clock.
Page Faults	Number of page faults.
Page Cycles	Number of page replacement cycles.
Page Steals	Number of page steals.
Numperm	Number of frames used for files (in 4 KB pages).
Process	Percentage of real memory used by process segments.
System	Percentage of real memory used by system segments.
Free	Percentage of real memory that is free.
Total	Percentage of total real memory used.
Min/Maxperm	The **minperm** and **maxperm** values for page steals.
Min/Maxfree	The **minfree** and **maxfree** pages free list.
Min/Maxpgahead	Minimum and maximum number of pageahead pages.
Total Virtual	Total virtual memory.
Accessed Virtual	Active virtual memory.
Numclient	Number of client frames.
Maxclient	Maximum number of client frames.
User	Real memory used by non-system segments.
Pinned	Real memory that is pinned.

Adapter I/O Statistics View

This view provides the adapter I/O statistics. To display this view, press the **a** key. The following metrics are displayed in this view:

Adapter	Name of the adapter.
Busy%	Bandwidth use of the adapter.
Read-KB/s	Data transfer rate of read data in kilobytes per second.
Write-KB/s	Data transfer rate of written data in kilobytes per second.
Transfers	Number of read and write transfers.
Disks	Number of disks.
Adapter-Type	Type of the adapter.

Shared Ethernet Adapter

This view provides shared Ethernet adapter statistics in a Virtual I/O Server (VIOS). To display this view, press the **O** key. The following metrics are displayed in this view:

Number	Serial number.
Name	Name of the shared Ethernet adapter.
Recv-KB/s	Data transfer rate of received data in kilobytes per second.
Trans-KB/s	Data transfer rate of sent data in kilobytes per second.
Packin	Number of packets received per second in the interval.

Packout	Number of packets sent per second in the interval.
Insize	Average size per second for received packet in the interval.
Outsize	Average size per second for outgoing packet in the interval.

Verbose Checks OK / Warn / Danger

This view prints the statistics for processor, memory, and disks. It also prints the status message, such as OK, Warn, or Danger, based on the system metrics exceeding pre-defined threshold values. To display this view, press the **v** key.

Detailed Page Statistics

This view provides page statistics. To display this view, press the **M** key.

If you press the **M** key once, the view contains the statistics in pages. If you press the **M** key twice, the page statistics are shown in megabytes.

The following metrics are shown in this view:

Numframes	Number of real memory frames of this page size.
Numfrb	Number of pages on free list.
Numclient	Number of client frames.
Numcompress	Number of frames in compressed segments.
Numperm	Number of frames in non-working segments.
Numvpages	Number of accessed virtual pages.
Minfree	Minimum free list.
Maxfree	Maximum free list.
Numpout	Number of page-outs.
Numremote	Number of remote page-outs.
Numwseguse	Number of pages in use for working segments.
Numpseguse	Number of pages in use for persistent segments.
Numclseguse	Number of pages in use for client segments.
Numwsegpin	Number of pages pinned for working segments.
Numpsegpin	Number of pages pinned for persistent segments.
Numclsegpin	Number of pages pinned for client segments.
numpgsp_pgs	Number of allocated page space.
numralloc	Number of remote allocations.
pfrsvdblks	Number of system reserved blocks.
Pfavail	Number of pages available for pinning.
Pfpinavail	Application level number pages available for pinning.
system_pgs	Number of pages on segment control blocks (SCB) that are marked with **V_SYSTEM.**
nonsys_pgs	Number of pages on SCBs not marked with **V_SYSTEM.**
Numpermio	Number of pageouts in non-working storage.
Pgexct	Number of page faults.
Pgrclm	Number of page reclaims.
Pageins	Number of paged-in pages.
Pageouts	Number of paged-out pages.
Pgspgins	Number of paged-in pages from page space.
Pgspgouts	Number of paged-out pages from page space.
Numsios	Number of I/O started.
Numiodone	Number of I/O completed.
Zerofills	Number of zero-filled pages.
Exfills	Number of exec-filled pages.
Scans	Number of page scans by clock.
Cycles	Number of clock hand cycles.
pgsteals	Number of page steals.

Fibre Channel Adapter Statistics

This view contains information about the Fibre Channel adapter. You can see this view by pressing the caret (**-^**) key. The following metrics are included in this view:

Number	Serial number.
Name	Name of the Fibre Channel adapter.
Receive-KB/s	Data transfer rate of received data in kilobytes per second.
Transmit-KB/s	Data transfer rate of sent data in kilobytes per second.
Requests In	Number of requests received per second in the interval.
Requests Out	Number of requests sent per second in the interval.
Outsize	Average outgoing packet size per second in the interval.

Environment Variables

Environment variables **NMON_START**, **NMON_END**, **NMON_SNAP**, and **NMON_ONE_IN** are used for collecting external data while recording in nmon format.

NMONCMD0, NMONCMD1, ..., NMONCMD63	You can monitor only the processes that are set in these variables when these environment variables are set. Alternatively, you can use the **-C** flag to restrict the commands in the process listing of the **nmon** command. For example, you can run the **nmon -C db2:websm:nmon:topas** command.
NMON	Contains the set of key strokes corresponding to the initial set of panels to be displayed when the **nmon** command is started.
TIMESTAMP	You can specify the **TIMESTAMP** variable to the following values: **TIMESTAMP = 0** The recorded lines contain the `nmon Tnnnn` timestamps at the beginning of the line and work with the nmon data file. **TIMESTAMP = 1** The lines contains timestamps that have the hours, minute, seconds, day, month, and year. This value can be used if you do not want to merge the data with the nmon file for analysis.
NMON_START	External command to be invoked when the **nmon** recording begins.
NMON_END	External command to be invoked when the **nmon** recording ends.
NMON_SNAP	External command to be invoked periodically to record metrics.
NMON_ONE_IN	You can specify the **NMON_ONE_IN** variable to the following values: **NMON_ONE_IN=1** Runs the **snap** command every time the recording is done. **NMON_ONE_IN=*n*** Runs the **snap** command after the number of recordings specified by the *n* parameter is done.

Examples

1. To generate the **nmon** recording in the current directory for two hours, capturing data every 30 seconds, enter the following command:

```
nmon -f -s 30 -c 240
```

2. To display the memory and processor statistics immediately after the **nmon** command is started, do the following steps:
   a. Enter the following command:
      ```
      export NMON=mc
      ```
   b. Run the **nmon** command.
3. To run the **nmon** command for 20 seconds with the screen refreshing at 10 seconds, enter the following command:
   ```
   nmon -c 10 -s 2
   ```
4. To run nmon in black and white mode, enter the following command:
   ```
   nmon -b
   ```
5. To view the process information, do the following steps:
   a. Run the **nmon** command.
   b. Press the **t** key.
6. To view the list of views that nmon provides , press the key **h**.
7. The following sample explain the steps to collect external data. In the sample, the `mystart` file, the mysnap file, and the myend file are executable and are in the path that the $PATH defines.
   a. Set the environment variables as indicated the following:
      ```
      $export TIMESTAMP=0
      $export NMON_START="mystart"
      $export NMON_SNAP="mysnap"
      $export NMON_END="myend"
      $export NMON_ONE_IN=1
      ```
      In the previous example, the value of one is the default value for the NMON_ONE_IN environment variable. It generates one set of external recorded data for every snapshot of nmon recording.
   b. Modify the content of the `mystart` file as the following:
      ```
      ps -ef >start_ps.xt
      echo "PROCCOUNT,Process Count, Procs" >ps.csv
      ```
   c. Modify the content of the mysnap file as the following:
      ```
      echo PROCCOUNT,$1,`ps -ef | wc -l` >>ps.csv
      ```
   d. Modify the content of the myend file as the following:
      ```
      echo PROCCOUNT,$1,`ps -ef | wc -l` >>ps.csv
      ```
   e. Run the **nmon** command as follows:
      ```
      nmon -f -s 2 -c 10
      ```
      The recording will finish in 20 seconds.

   The output of the `ps.csv` file will be similar to the following sample:

   ```
   PROCCOUNT,Process Count, Procs
   PROCCOUNT,T0001, 43
   PROCCOUNT,T0002, 43
   ```

```
PROCCOUNT,T0003, 43
PROCCOUNT,T0004, 43
PROCCOUNT,T0005, 43
PROCCOUNT,T0006, 43
PROCCOUNT,T0007, 43
PROCCOUNT,T0008, 43
PROCCOUNT,T0009, 44
PROCCOUNT,T0010, 44
PROCCOUNT,T0010, 44
```

You can concatenate the generated nmon file with the ps.csv file that is generated by external recording, enter the following command:

```
cat  filename.nmon ps.csv > c.csv
```

To get the graph, open the c.csv file in nmon analyzer.

Location

/usr/bin/nmon

/usr/bin/topasrec

Related Information

The **topas** Command.

SMIT panels for topas/topasout.

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