OmniPayments

OmniOffender
User's Guide
V2.4
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OmniOffender is licensed software from OmniPayments Inc. and can be purchased as a stand-alone version or integrated with OmniDashboards. Contact sales at +1 408 364-9915 or E-mail sales@OmniPayments.com for more information.

Contents

1 Introduction

OmniOffender is an easy to use, fast, interactive performance monitor. OmniOffender displays the CPU utilization of the system by CPU and process. OmniOffender will automatically detect and display potential system bottlenecks.

System resources monitored and displayed are:

- CPU time utilization by interrupt handler, system processes, and user processes.
- CPU resource usage by memory, IPC, interrupts, or TNS usage.
- Process utilization of CPU time, messages per second, pages of memory, page faults, receive queue depth.
- Disc utilization, request rate, I/O rates, receive queue depth by volume.
- File activity.

The displays may be bar graphs, or tabular, for all CPUs of the system, or a subset. OmniOffender may be used interactively in conversational mode or with automatic updates at specified intervals in multi screen block mode.

OmniOffender is a non-priv MEASURE application which is safe to use. It does not use privileged code to get measurement data. It does not MUTEX or access counters directly. It uses system and MEASURE callable procedures.

OmniOffender is much faster to use than MEASURE. It will automatically and very quickly configure the required measurement using MEASURE callable procedures.

1.1 Only Two Commands!

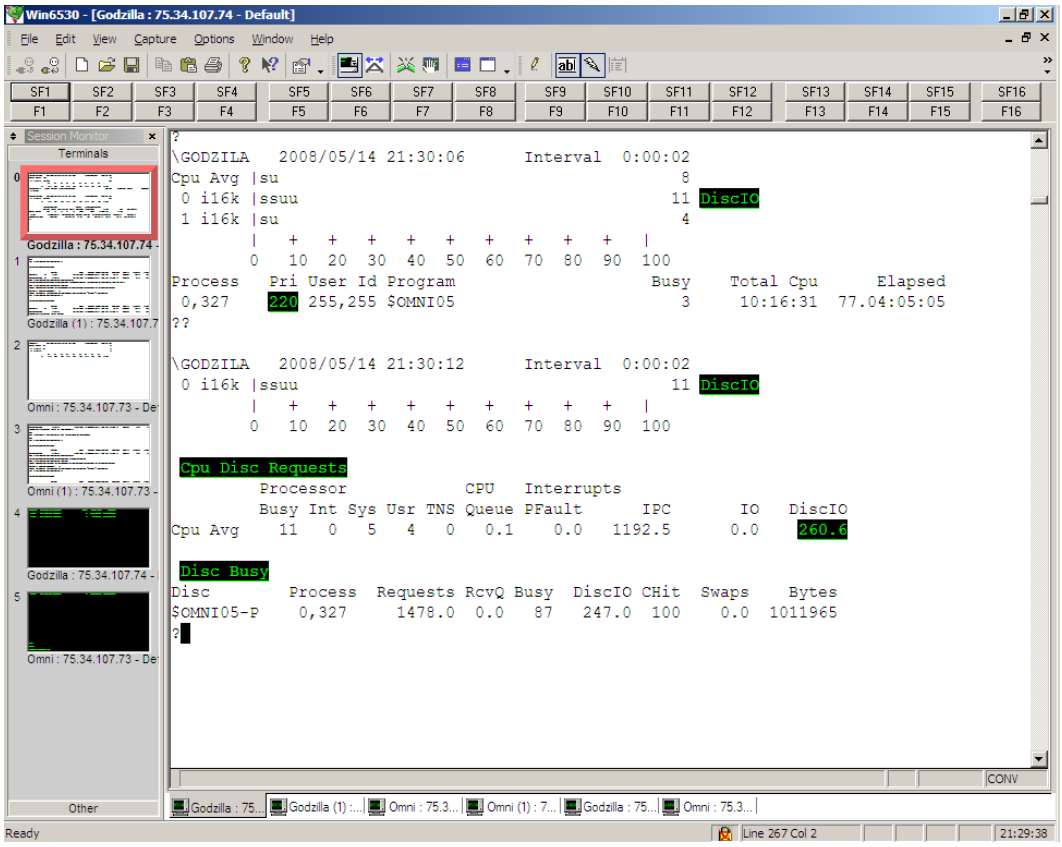
The only two commands necessary are the <ENTER> or <RETURN> key, and the "?" mark key.

<Enter> or <RETURN> will sample all CPUs and display the default report. The default report will display CPU busy, which processes are using the most CPU time, and any potential bottlenecks.

"?" will detail any bottleneck warnings. Bottleneck warnings are underlined on the terminal to the right of the CPU bar graph.

Monitored resources are: ready queue depth, memory queue depth, page life in seconds, send busy time, I/O rates, etc.

Note the "??" in the display below – the second "?" is the ? command requesting detail for the DiscIO warning.



1.2 HELP

Type 'HELP' for a general introduction.

Type 'HELP ALL' for a complete help listing.

Type 'HELP <command>' command specific help.

1.3 Command Overview

This section will give an overview of commands; detail command descriptions can be found in the next section.

Command entry is case insensitive.

The use of UPPER/lower case in command syntax is to indicate required characters.

Commands are:

Cpu, CPUS, DELAY, Disc, DISCS, ENV, EXIT, FC, File, FILES, GO, HELP, LOG, MEASURE, PRocess, QUIT, REPort, SAMple, STATS, STatus, Window, and '?'.

<RETURN>, <ENTER>, Cpu, Disc, or Process will sample the CPUs, processes, and discs and display the default report.

File will sample the CPUs, processes, discs, and files for the busiest processes AND display the file report.

SAMple will sample the CPUs, processes, discs, and files but displays nothing.

REPort can be used to display the most recent sample data collected by <RETURN>, Cpu, Disc, File, PRocess, or SAMple command.

Commands that control the displays:

REPort, DELAY, GO, Window, CPUS, DISCS, FILES

To display CPU activity:

Cpu [BAR | BUSY | INTS | IPC | IPU | MEM | TMF | TNS]
[(<cpu-list>)]

To change the CPU selection criteria:

CPUS (<cpu-list>)

To display CPU info:

Cpu INFO

To display program activity:

```
PRocess [ BUSY | FLTS | MEM | MSGS | RCVQ | TIME ] [(<cpu-
    list>)]

STatus { cpu | cpu, pin }
```

To display disc activity:

```
Disc [ BAR | BUSY ] [(<cpu-list>)] [(<disc-list>)]
```

To display DISC path info:

```
Disc INFO
```

To change the disc selection criteria:

```
DISCS { BUSY > <number> | RESET | (<disc-list>) }
```

To display file activity:

```
File [ ACCESSED | BUSY | BYTES | DISC | ESCALATIONS | INFO |
     LOCKS | MSGS | READS | RECORDS | TIMEOUTS | UPDATES
     | WRITES | WRITEREADS
    ]
```

To change file selection criteria:

```
FILES { ALL | NONE | [ (<device-type-list> ]) }
```

Typing '?' after a warning will present the detailed report with the appropriate statistics.

The process busy time is displayed as a percent of a CPU's available processor time.

CPU time in the bar graph is displayed as:

'i' = interrupt handler process time.
's' = process time of processes at priority 200 and above.
'u' = user process time
't' = TNS time.

DISC time in the bar graph is displayed as:

'w' = write qbusy time
'r' = read qbusy time

More detailed information can be obtained with one of the display commands, or the default report can be changed.

Commands generally display either events per second, percent of a CPU per sample, or Queue counters. Queue counters (state time counters) display the number of items times how long each item was queued, each second.

The display commands can be restricted to search only certain CPUs or discs. Each command accepts a CPU list and/or a disc list at the end of the line, or a default CPU or disc list can be specified with the CPUS or DISCS command.

The syntax is for a <cpu-list> and <disc-list>:

<cpu-list> ::= { * | <cpu> [, <cpu> ...] | <cpu>/<cpu> }

<disc-list> ::= { $* | $<vol> [, $<vol> ...] }

For example:

Cpu BUSY, MEM (0/3)

will display CPU busy and memory statistics for CPUs 0, 1, 2 and 3;

Disc BUSY (0, 1) ($*)

will display all discs in CPUs 0 and 1 overriding the default CPU and disc lists.

1.4 Understanding Windows

A window is a 6530 conversational page. Eight windows of 24 lines are allowed. Conversational page mode is used when periodic sampling is enabled with the 'GO' command.

For VT100 only Window 1 is available.

Windows are used to create multiple reports which can be viewed by paging with the terminals next and previous page keys.

For example, the following specifies 6 windows. W 1, which matches the default, followed by the other CPU display options. “delay 60” specifies a 60 Second update interval when the GO command is used.

```
w 1, 24, cpu bar *, pr busy *
w 2, 24, cpu busy
w 3, 24, cpu int
w 4, 24, cpu ipc
w 5, 24, cpu mem
w 6, 24, cpu tns
delay 60
```

After entering “GO”, OmniOffender will, every 60 Seconds (the interval was specified in the earlier “DELAY 60” command), display the specified 6 reports beginning with W 1, which matches the default report. Use the page up/down keys to view the remaining 5 reports. Each time the reports are displayed, the display will be homed to the first report.

To display the current report configuration enter “w”. Assuming the above, the following is displayed

```
?w
Window[ 1 ]   24 lines
   Cpu BAR                *
   PRocess BUSY           *
Window[ 2 ]   24 lines
   Cpu BUSY               *
Window[ 3 ]   24 lines
   Cpu INT                *
Window[ 4 ]   24 lines
   Cpu IPC                *
Window[ 5 ]   24 lines
   Cpu MEM                *
?
```

To reset a report enter “w <window-number>”. For example, the following will reset window 6 and display the report configuration:

```
?w 5; w
Window[ 1 ]   24 lines
   Cpu BAR                *
   PRocess BUSY           *
Window[ 2 ]   24 lines
   Cpu BUSY               *
Window[ 3 ]   24 lines
   Cpu INT                *
Window[ 4 ]   24 lines
   Cpu IPC                *
?
```

The following will display a good summary of the system.

```
w 1, 24, cpu bar *, pr busy *
w 2, 24, pr busy
w 3, 24, disc busy
w 4, 24, file busy
delay 60
```

1.5 Sampling Explained

<RETURN>, <ENTER>, Cpu, Disc, or Process will sample CPUs, processes, and discs and then display the default report. File activity is NOT sampled in these instances to reduce CPU consumption by OFFENDER.

File will sample CPUs, processes, discs, and files for the busiest processes AND display the file report.

SAMple will sample the CPUs, processes, discs, and files but displays nothing. Option NOFiles will suppress file sampling.

Periodic sampling (initiated by the GO command), will always sample CPUs, processes, and discs. Files are only sampled if one or more of the windows displays a file report.

REPort can be used to display the most recent sample data collected by <RETURN>, Cpu, Disc, File, PRocess, SAMple command or by periodic sampling.

Displayed report values are computed by taking the difference between the current sample and the previous sample. As files are not sampled by <RETURN>, Cpu, Disc, or PRocess, there may be no values to display or the displayed values may be very misleading.

To examine file activity use:

- SAMple and REPort File or
- REPort File immediately after periodic sampling which includes one or more file reports.

2 Commands

Command entry is case insensitive.

The use of UPPER/lower case in command syntax is to indicate required characters.

For example, “CPU” in the CPU command may be entered as “C” or “CPU” using any mix of upper and lower case.

2.1 Cpu [<cpu-report-option-list>] [(<cpu-list>)]

Displays the selected CPU activity report/s for the specified CPUs.

```
<cpu-report-option> ::= { BAR | BUSY | INFO | INTs | IPC | IPU |
                          MEM | TMF | TNS
                        }

<cpu-list> ::= { * | <cpu> [ , <cpu> ... ] | <cpu>/<cpu> }
```

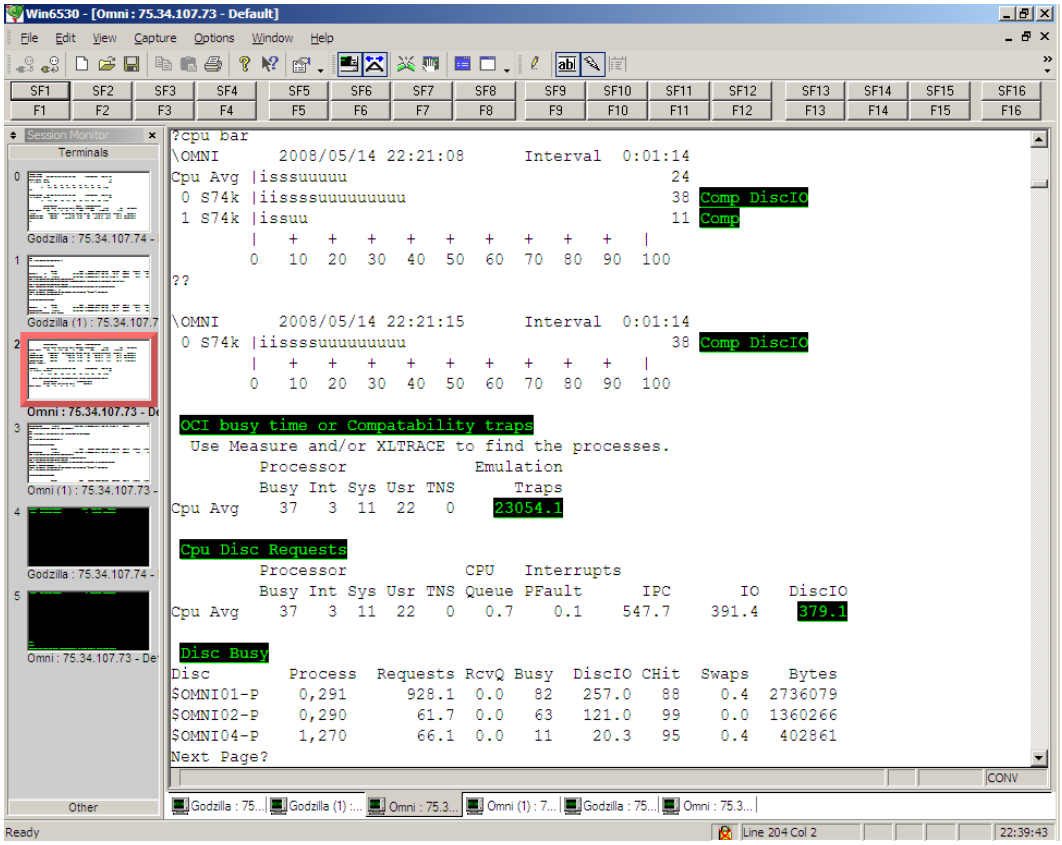
- BAR (default) a bar graph of CPU time as follows:

  i – interrupt handler process time.
  s – process time for priority 200+ processes.
  u – process time below priority 200.
  t – TNS time.

- BUSY displays summary of key queues and CPU times.
- INFO displays CPU info. This may NOT be used in periodic sampling.
- INTs displays CPU interrupt rates.
- IPC displays local node message system statistics.
- IPU displays CPU IPU statistics (J-Series only).
- MEM displays CPU and process memory statistics.
- TMF displays CPU TMF statistics.
- TNS displays CPU time and emulation trap rate.

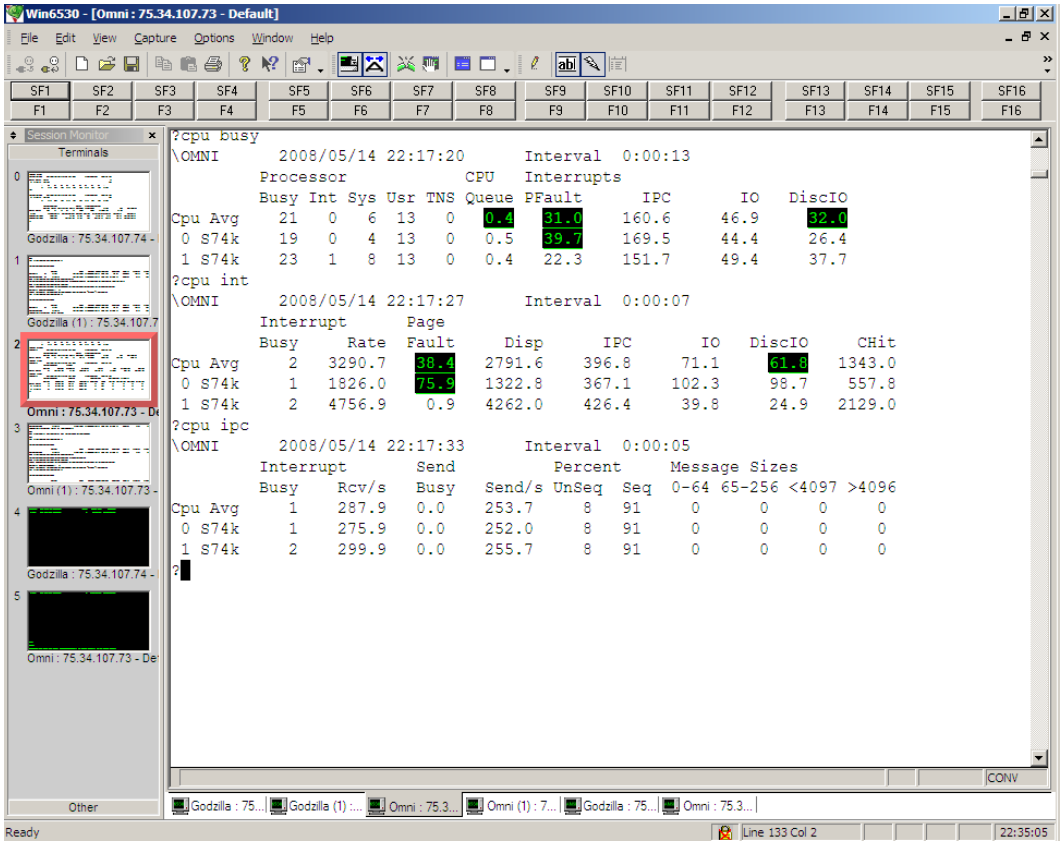
Sample outputs are shown below.

Cpu BAR report.

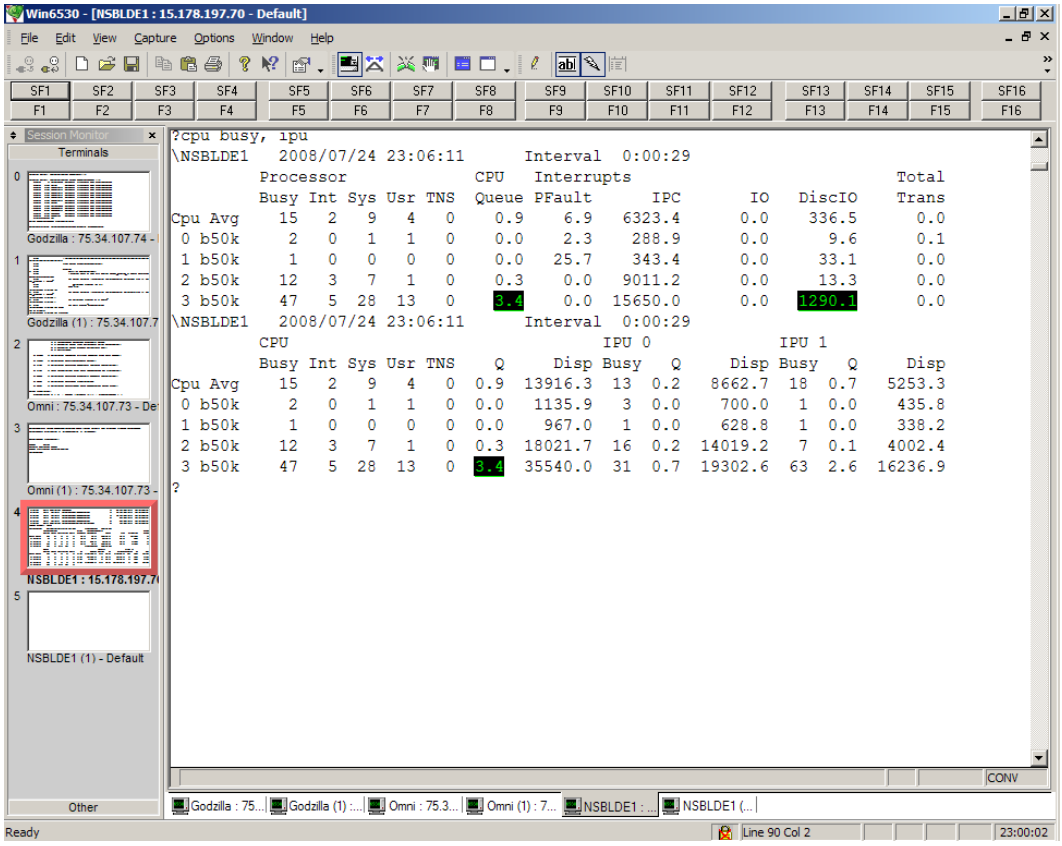


The underlined values for CPU 1 are potential performance issues. Use the '?' command as in the above example for additional information.

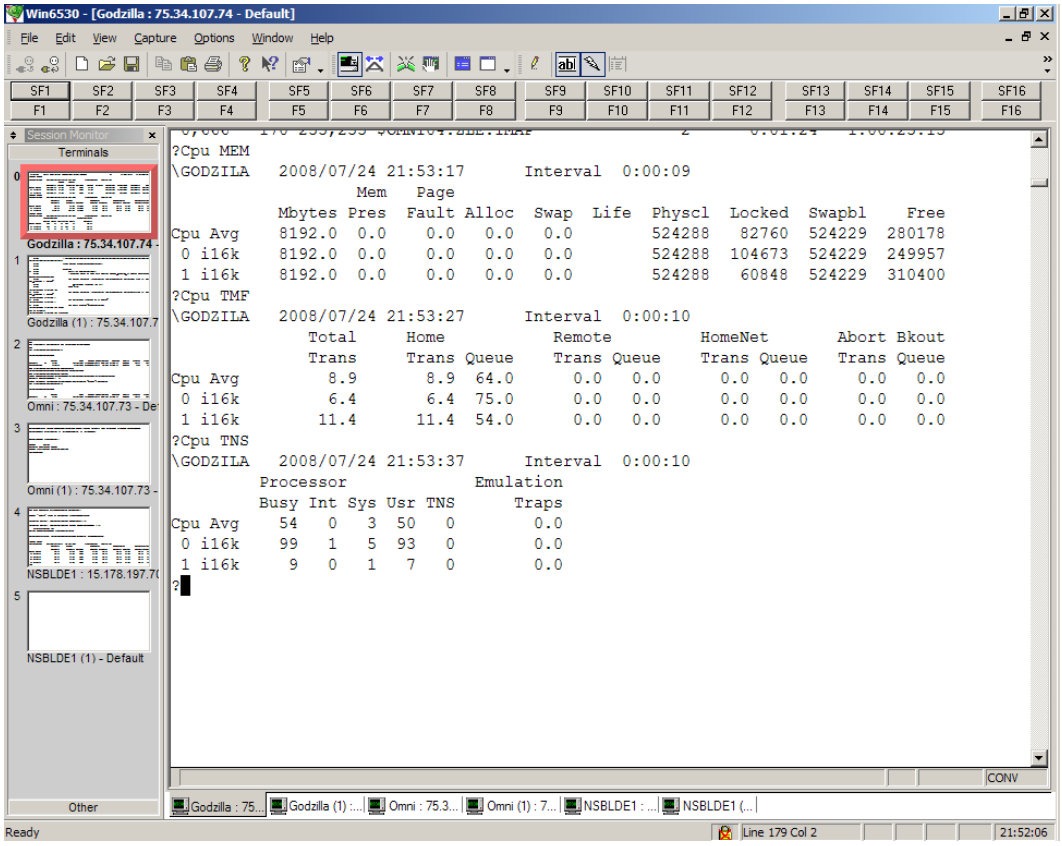
Cpu BUSY, INTs, and IPC reports.



Cpu BUSY and IPU report; the IPU report is not available on H-Series.



Cpu MEM, TMF, and TNS reports.



Cpu INFO report.

```
?cpu info

    CPU Type SubT  Name     Memory    Page  Sysname   Internal Info
      0   11    3  NSX-D  65400 MB   16 KB  NS7 X1    11   3  1(X86)
      1   11    3  NSX-D  65400 MB   16 KB  NS7 X1    11   3  1(X86)
      2   11    3  NSX-D  65400 MB   16 KB  NS7 X1    11   3  1(X86)
      3   11    3  NSX-D  65400 MB   16 KB  NS7 X1    11   3  1(X86)
      4   *** down ***
      5   *** down ***
      6   *** down ***
      7   *** down ***
      8   *** down ***
      9   *** down ***
     10   *** down ***
     11   *** down ***
     12   *** down ***
     13   *** down ***
     14   *** down ***
     15   *** down ***
```

2.2 CPUS

Displays the list of CPUs to be sampled.

```
?cpus
Cpus : 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
?cpus
```

2.3 CPUS (<cpu-list>)

Establishes the list of CPUs to be sampled.

<cpu-list> ::= { * | [-] <cpu> [, <cpu> ...] | [-] <cpu>/<cpu> }

- * Marks all CPUs to be sampled.
- - Subtracts CPUs from the already established list. This is used when there are configured down CPUs that should be ignored.

```
?cpus

Cpus : 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
?cpus (-2)
Cpus : 0, 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
?cpus (-10/14)
Cpus : 0, 1, 3, 4, 5, 6, 7, 8, 9, 15
? cpus (*)
Cpus : 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

?
```

2.4 DELAY <number>

Establishes the default sample interval in seconds which is activated by GO.

The sample interval should be >= 10 seconds although the lower limit is one second.

A delay of zero will turn off sampling.

2.5 Disc [<disc-report-option-list>] [(<cpu-list>)] [(<disc-list>)]

Displays the selected disc activity report/s:

<disc-report-option> ::= { BAR | BUSY | INFO }

<disc-list> ::= { $* | $<vol> [, $<vol> ...] }

<cpu-list> ::= { * | <cpu> [, <cpu> ...] | <cpu>/<cpu> }

- BAR (default) a bar graph of disc busy time.

  w – disc write qbusy time.
  r – disc read qbusy time.

- BUSY Displays the following disc volume statistics.

  Disc Busy – Total time that the disc was reading or writing.

  IOs – Physical IOs per second. Includes reads, writes, and control operations

  Bytes – Bytes transferred per second to and from the disc.

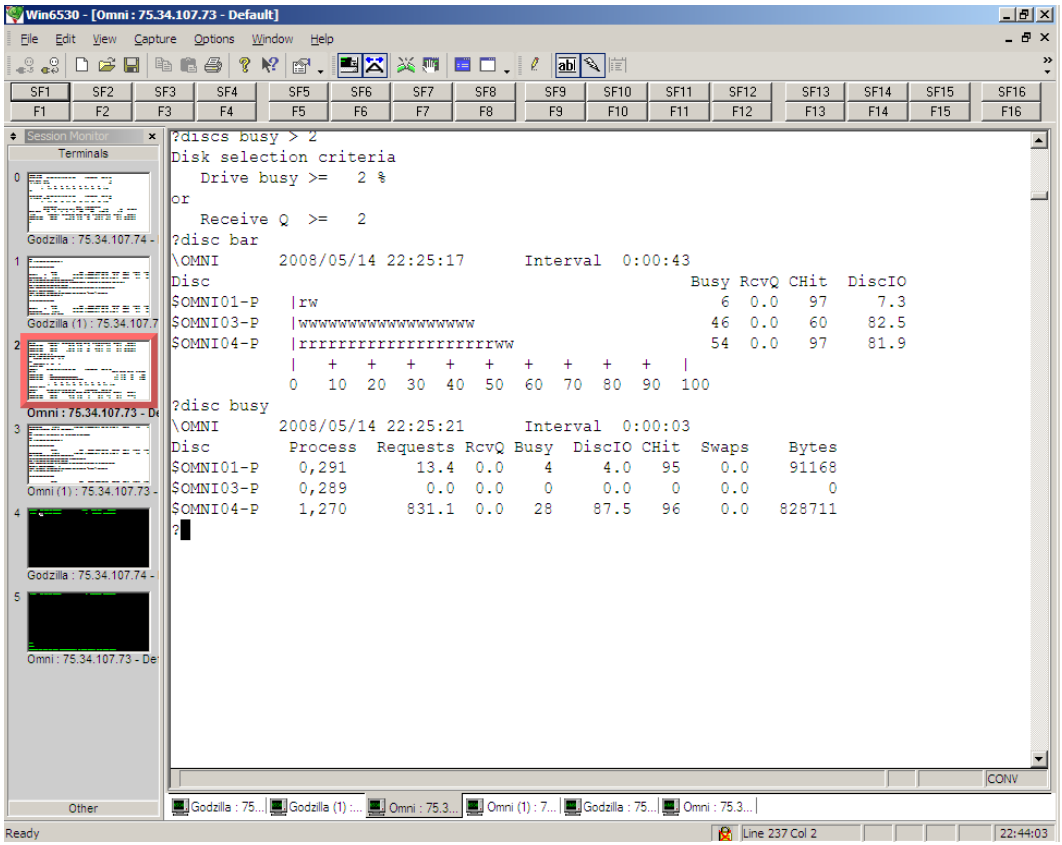
  Reqs – Logical disc requests. May not result in a physical IO if it was for control information or a hit in the disc cache.

  Chits – Cache Hits. Percentage of cache hits for both reads and writes on all four DP2 disc caches.

  RcvQ – the receive queue average depth of the head disc process. Queue length, not queue time is displayed.

- INFO Will display DISC path info.

Disc BAR and BUSY reports. Note the command “discs busy > 2”, this overrides the default threshold of 20% and was done so as to create output.



2.6 DISCS

Displays disc selection criteria.

```
?discs

Disk selection criteria
   Drive busy >=  20 %
or
   Receive Q  >=   2
Discs : $*

?
```

2.7 DISCS (<disc-list>)

Establishes the list of disc volumes to measure.

```
<disc-list> ::= { $* | <vol> [ , $<vol> ... ] }

?discs ($system $oss $omni03)

Disk selection criteria
   Drive busy >=  20 %
or
   Receive Q  >=   2
Discs : $SYSTEM, $OSS, $OMNI03

?
```

2.8 DISCS <discs-control>

Disks are displayed if they exceed the configurable amount of disk busy or if the receive Q is greater than 2.

Each selected disk and its mirror remain in the disk display until reset.

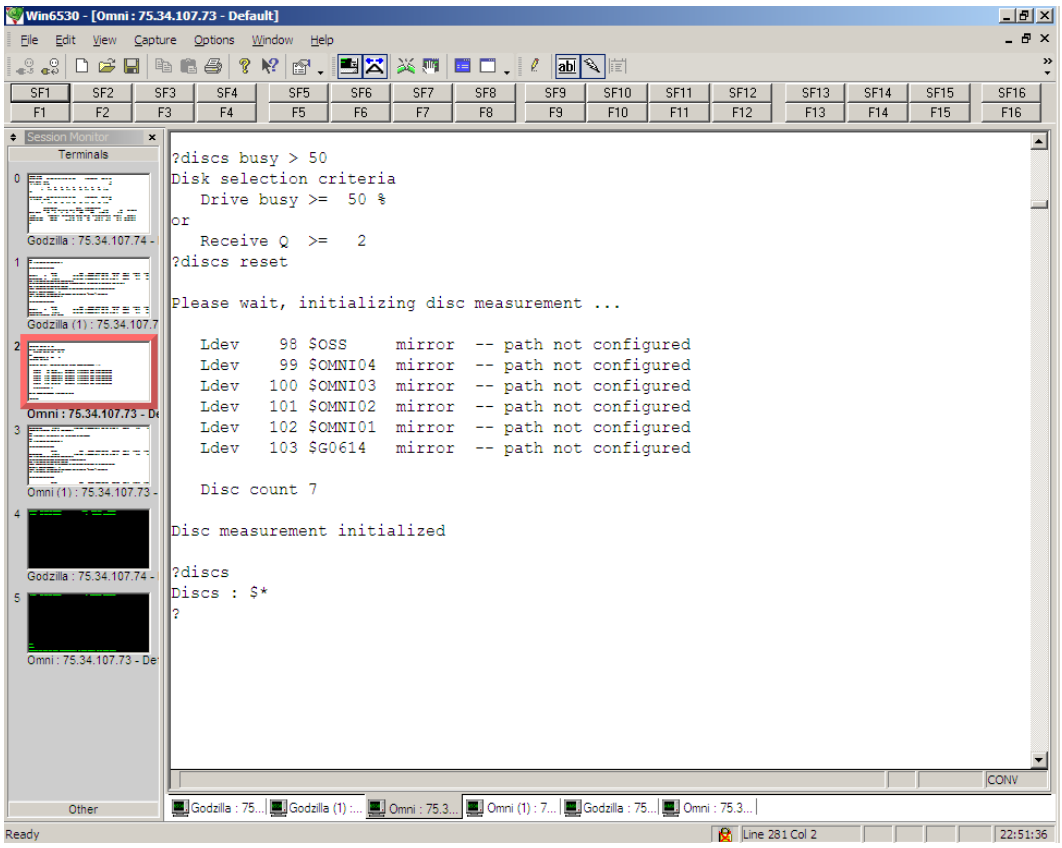
Selected discs are listed by LDEV.

The list can be reset using the RESET control which empties the disk display list.

```
<discs-control> ::= { BUSY > <number> | RESET }
```

- BUSY > <percent> Only disks busier than <percent> will be displayed. The default is 20%.
- RESET Resets the disk display, disks will be added again when they meet the selection criteria controlled by the BUSY control

```
?discs busy > 50

Disk selection criteria
   Drive busy >=  50 %
or
   Receive Q  >=   2
Discs : $SYSTEM, $OSS, $OMNI03

?
```



2.9 ENV

Displays OFFENDER VPROC, measure status, logging status, and setting by CPUS, DISCS, and FILES commands.

```
?env
OmniOffender T0658L06^10NOV15
System: \OMNI2    DJR 078153 L15.02.00
Measure File: $SYSTEM.OFFENDER.DOFF24, permanent.
Logging is off
Cpus : 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
Disk selection criteria
   Drive busy >=  20 %
or
   Receive Q  >=   2
Discs : $*
File device type selection
  COMM     : off
  DISC     : on
  OPERATOR : off
  PRINTER  : off
  PROCESS  : off
  RECEIVE  : off
```

```
    SCSI     : off
    SYSTEM   : off
    TAPE     : off
    TERMINAL : off
?
```

2.10 EXIT

Terminates OFFENDER.

2.11 FC

Allows correction of the previous command.

2.12 File [<file-report-option-list>]

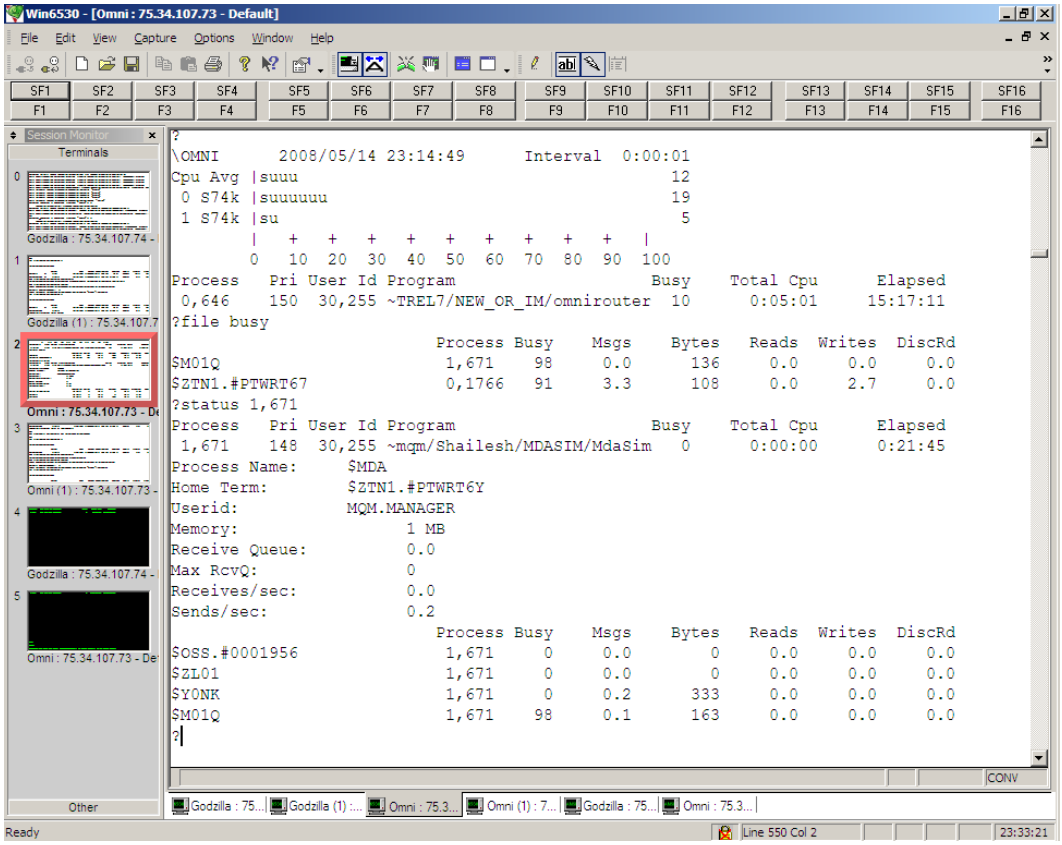
Displays FILE activity sorted by the specific FILE entity counter; FILE reports are available only for the busiest processes.

```
<file-report-option> ::= { ACCESSED | BUSY | BYTES | DISC |
                           ESCALATIONS | INFO | LOCKS | MSGS |
                           READS | RECORDS | TIMEOUTS |
                           UPDATES | WRITES | WRITEREADS
                         }
```

- ACCESSED SQL records accessed per second.
- BUSY (default) Displays files sorted by file busy percent.
- BYTES Message bytes send & received per second.
- DISC Physical disc reads per second.
- ESCALATIONS Number of locks escalating to a file level lock.
- INFO FILEINFO calls per second.
- LOCKS Number of lock requests that waited per second.
- MSGS Messages sent per second.
- READS File reads per second.
- RECORDS SQL records used per second.
- TIMEOUTS Number of timeouts or cancels per second.

- UPDATES File updates or replies per second.
- WRITES File writes per second.
- WRITEREADS File deletes or WRITEREADS per second.

Example File BUSY report.



Note the command “status 1,671” to obtain information regarding the process $M01Q.

2.13 FILES

Displays the device types for which file activity will be measured.

```
?files

File device type selection
  COMM     : off
  DISC     : on
  OPERATOR : off
```

```
PRINTER  : off
PROCESS  : off
RECEIVE  : off
SCSI     : off
SYSTEM   : off
TAPE     : off
TERMINAL : off

?
```

2.14 FILES [<device-type-list>]

Establishes the device types for which file activity will be measured.

```
<device-type> ::= { ALL | NONE | PROCESS | OPERATOR |
                    RECEIVE | DISK | TAPE | PRINTER |
                    TERMINAL | COMM | SCSI }
```

- ALL Selects all device types.
- NONE Clears the list.

2.15 GO

Starts cyclic sampling and reporting.

q or <break> will terminate cyclic sampling and reporting.

Space bar or <enter> will report immediately.

Reports will be displayed in conversational page mode.

The first WINDOW will be at the 6530's page 0, the second at the next page and so forth.

For VT100 only one screen is available.

Multiple pages of reports can be specified with the WINDOW command and viewed with the terminal's local <page up> or <page down> keys.

2.16 HELP [ALL | <command>]

Use the “help” command to obtain syntax for ALL commands

HELP ALL

or a specific command

HELP <command>

```
   <command> ::= { Cpu | CPUS | DELAY | Disc | DISCS | ENV |
                   EXIT | FC | File | FILES | GO | HELP | LOG |
                   MEASURE | PRocess | REPort | SAMple | STATS
                   | STatus | Window | '?'
                 }
```

2.17 LOG

Reports logging status.

```
?log
Logging is off
?
```

2.18 LOG [TO] <log-file>

Starts logging to <log-file>.

```
?log logfile
Logging to $OMNI01.BILLD.LOGFILE
?
```

2.19 LOG STOP

Stops logging.

```
?log stop
Logging is off
?
```

2.20 MEASURE

Displays measure status.

```
?measure
Measure File: $SYSTEM.OFFENDER.DOFF24, permanent.
?
```

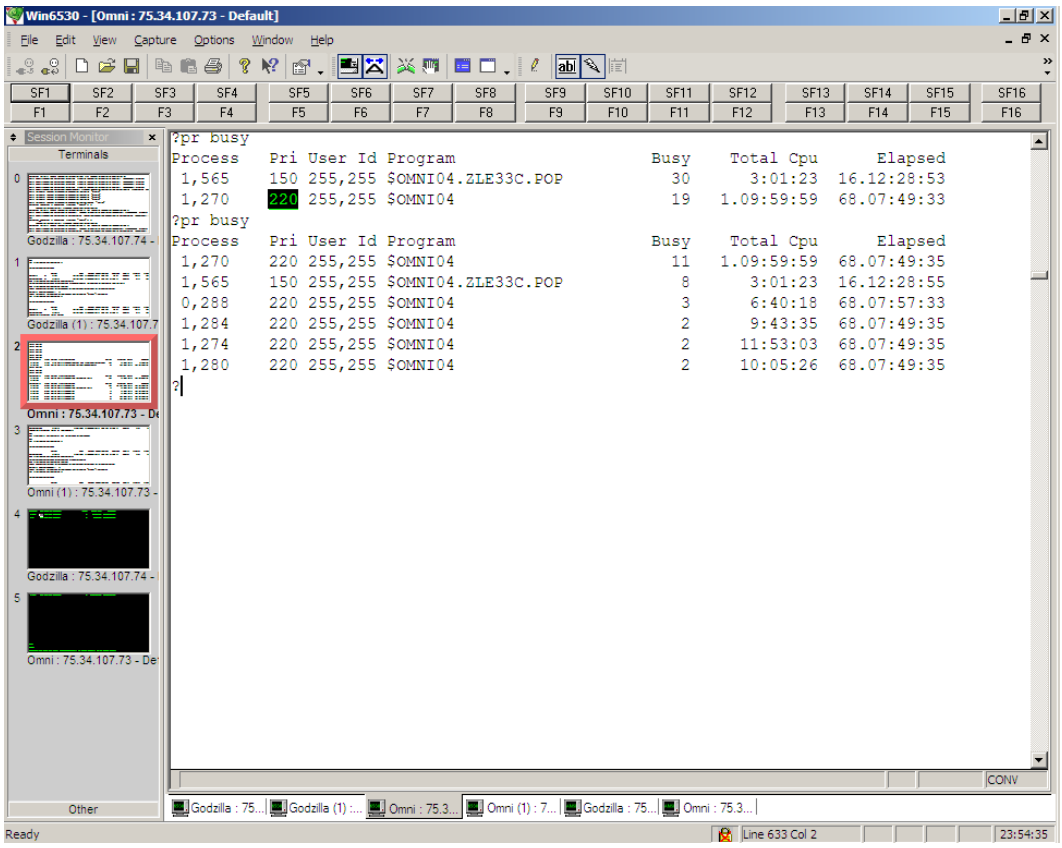
2.21 PRocess [<process-report-option-list>] [(<cpu-list>)]

Displays processes sorted by the requested metric.

```
<process-report-option> ::= { BUSY | FLTS | MEM | MSGS | RCVQ
                              | TIME
                            }

<cpu-list> ::= { * | { <cpu> [ , <cpu> ... ] | (<cpu>/<cpu> }
```

- BUSY (default) CPU busy is >= 2 percent
- FLTS process fault rate is >= 1/second
- MEM total number of pages of memory currently in use
- MSGS messages sent or received/Sec is >= 1/Second
- RCVQ average receive queue depth
- TIME total process time; this tends to favor I/O processes

Sample PRocess BUSY report.



Priority is highlighted when it has changed since previous measurement interval.

2.22 QUIT

Terminates OFFENDER.

2.23 REPort <report-option>

In previous versions REPort was equivalent to Window 1, 24, <report-list>.

REPort is used to display the most recent sample data collected by <RETURN>, Cpu, Disc, File, PRocess, SAMple command or by periodic sampling.

REPort <report-option>

< report-option > ::= { '?' | Cpu | Disc | File | PRocess | STatus }

- REPort Cpu must be issued before REPort ?.
- REPort File will produce no output if file sampling has not occurred.

2.24 SAMple <sample-option>>

SAMple will sample the CPUs, processes, discs, and files but displays nothing.

SAMple [<sample-option>]

< sample-option > ::= { Files | NOFiles }

- Files, which is the default, will cause file sampling.
- NOFiles will suppress file sampling. In this case REPort File will produce no or misleading output. Using this option is discouraged.

2.25 STATS

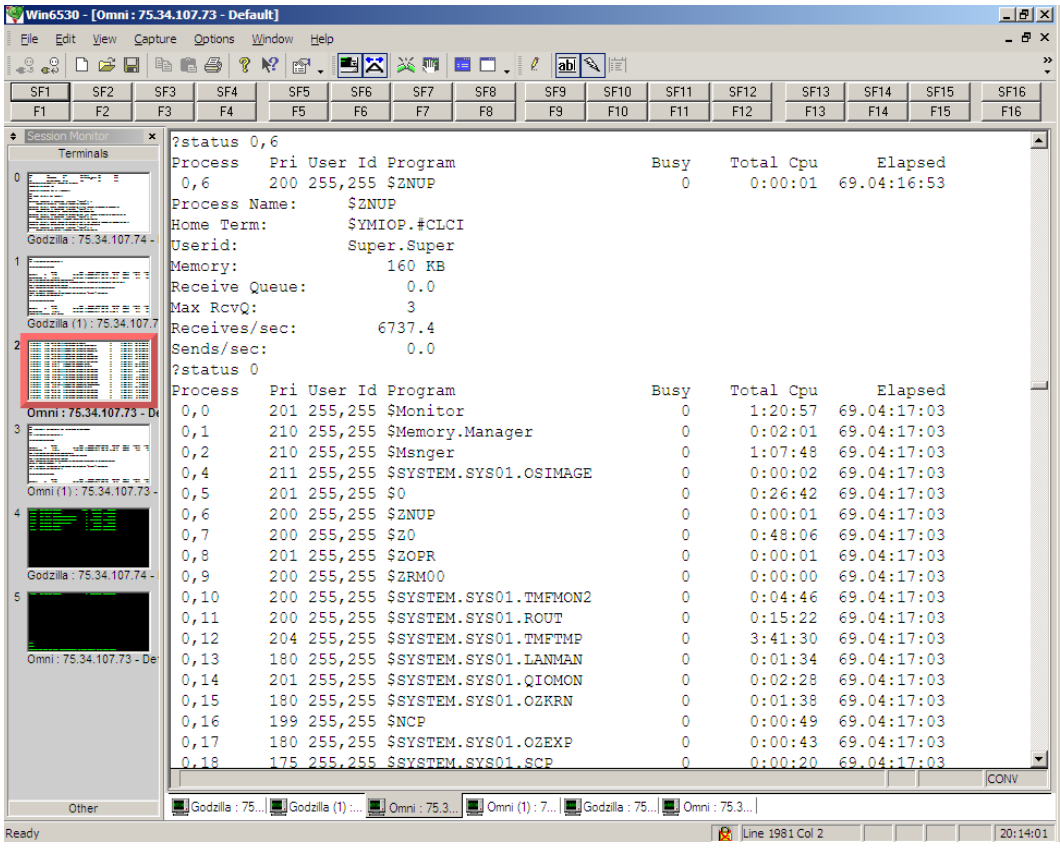
Displays current sampling statistics -- this is developer info.

```
?stats

Stats -- this is developer info.

    Errors are "normal" and expected!

        0   CONFIG_GETINFO_BYNAME_ errors
        0   MEASREADACTIVE errors
        0   MEASREADACTIVE warnings

        4   CPU records
        4   TMF records
     1115   PCBs in use
     1115      sampled
        0      new
        0      changed
        0      deleted
        6      PROCESS_GETINFOLIST_ calls
        0      PROCESS_GETINFO_ calls
        0      MEAS_READACTIVE_ calls
        0   File lists in use
        0      new
        0      deleted
        0   Files in use
        0      sampled Processes
        0      MEAS_READACTIVE_ calls
        0      sampled
        0      new
        0      changed
        0      deleted
       30   Disk volumes
       60      sampled paths
        0      updated paths

?
```

2.26 STatus <cpu> [, <pin>]

Displays detailed statistics for all processes in a CPU or for the specified process.

Sample STatus reports.



Max RcvQ has been deleted as it is always 0 (Measure support was deleted long ago).

2.27 Window

Displays the configured reports.

```
?Window
Window[ 1 ]   24 lines
   Cpu Interrupts        *
   PRocess Busy          *
?
```

“Window 1, 24, CPU BAR *, PR BUSY *” is the default report for window 1.

2.28 Window <number>

Clears the reports for the specified window.

Window <number>

```
?w                                  ß display current windows
Window[ 1 ]   24 lines
   Cpu Interrupts        *
   PRocess Busy          *
?w 2 24 cpu ipc 24                  ß add 2nd window
Window[ 2 ]   24 lines
   Cpu IPC              24
?W                                  ß display
Window[ 1 ]   24 lines
   Cpu Interrupts        *
   PRocess Busy          *
Window[ 2 ]   24 lines
   Cpu IPC              24
?W 2                                ß clear 2nd window
?W                                  ß display
Window[ 1 ]   24 lines
   Cpu Interrupts        *
   PRocess Busy          *
?
```

2.29 Window <number> <window-size>

Changes the specified window size.

```
 Window <number> <window-size>

?W                                  ß display current windows
Window[ 1 ]   24 lines
   Cpu Interrupts          *
   PRocess Busy            *
?w 1 48                             ß change window size
Window[ 1 ]   48 lines
   Cpu Interrupts          *
   PRocess Busy            *
?W                                  ß display
Window[ 1 ]   48 lines
   Cpu Interrupts          *
   PRocess Busy            *
?
```

2.30 Window <number> <window-size> <report-list>

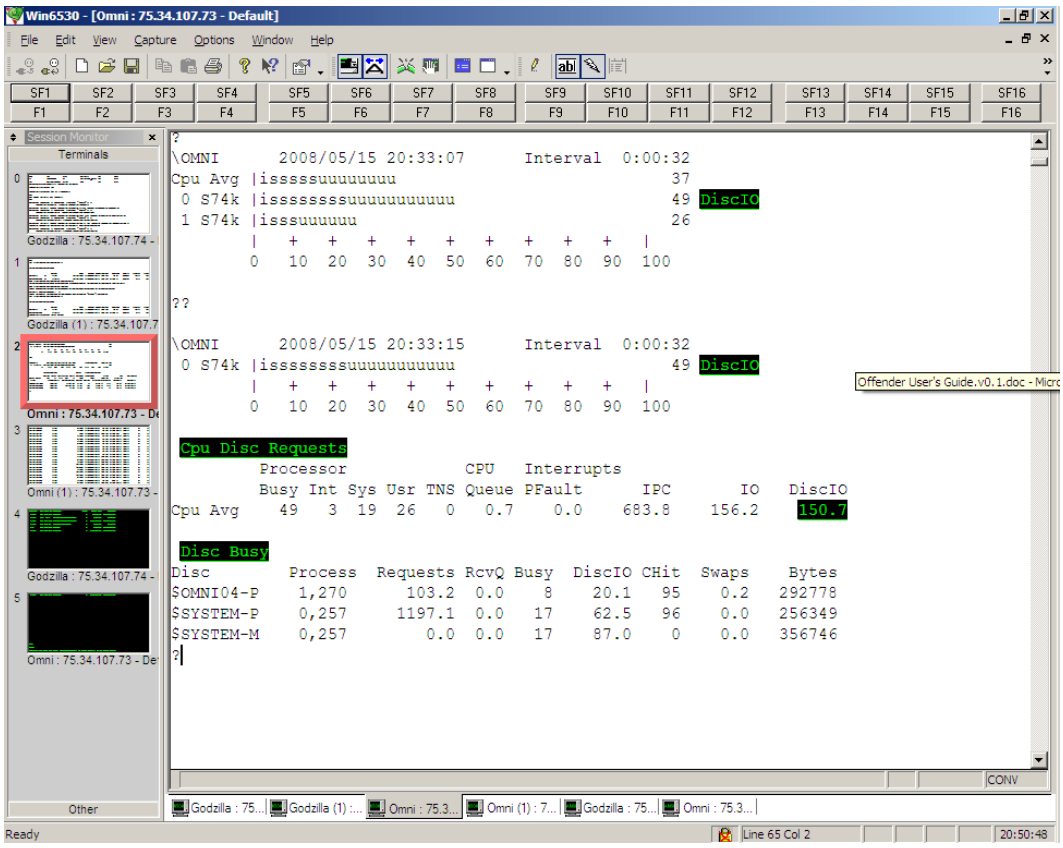
For VT100 only Window 1 is available.

```
<number> ::= { 1, 2, ... 8 }

<window-size> ::= { 1, 2, ... } Note: best if a multiple of 24

<report> ::= <item> [ , <size> ]
      Note: a <report-list> is limited to 10 reports

<item> ::= { Cpu <cpu-report-option>
             | Disc  <disc-report-option>
             | File <file-report-option>
             | PRocess <process-report-option>
           }

<size> ::= { * | 1, 2, ... }

            Note: best if a multiple of 24.   * indicates use the rest of
            the window for the report.
```

More help information is available for CPU, DISC , FILE, or PROCESS.

2.31 ?

'?' will report any problems noted during previous measurement cycle.



Note the use of '?' to obtain information regarding disc I/Os.

3 Installation

OmniOffender is a MEASURE application which is safe to use. It does not use privileged code to get measurement data. It does not MUTEX, access counters itself, or fire up samplers. No calls to debug will be made.

OmniOffender is installed in $SYSTEM.OFFENDER and needs to be progid'd to the super group if non-super group users are allowed to start the required measurement. Any operator id is fine. SUPER.SUPER should not be used.

Be sure to install the correct binary; there is a different binary for the H, J, and L releases of Guardian.

Use file and/or SAFEGUARD security to restrict access as is appropriate for the installation.

OmniOffender requires a license file which must be installed in $SYSTEM.OFFENDER.LICENSE. The license file must be secured so OmniOffender can read it.

3.1 Support

E-mail: sales@OmniPayments.com

Phone: 1-408-364-9915.

4 About OmniOffender

4.1 Version 2.1

```
Version procedure:  T0658G06^24JUL08
Version procedure:  T0658H06^24JUL08
Version procedure:  T0658J06^24JUL08
```

- Added support J-Series.
- Added Cpu IPU option (only supported on J-Series).
- Added Cpu TMF option.
- Cpu, Disc, File, and PRrocess options will default to BAR, BAR, BUSY, and BUSY respectively.
- Reports will print in the order input; for example Cpu BUSY, TMF will print the BUSY report first and TMF last. Previously the order was reversed.
- ENV command will report release and offender version.

4.2 Version 2.2

```
Version procedure:  T0658G06^26AUG08
Version procedure:  T0658H06^26AUG08
Version procedure:  T0658J06^26AUG08
```

- Changed to use standard Opsol License files.

4.2.1 Version 2.2.1

```
Version procedure:  T0658G06^17NOV08
Version procedure:  T0658H06^17NOV08
Version procedure:  T0658J06^17NOV08
```

- Fixed ABEND when license check fails.

4.3 Version 2.3

```
Version procedure:  T0658G06^07MAR11
```

```
Version procedure:  T0658H06^07MAR11
Version procedure:  T0658J06^07MAR11
```

- Cpu
  - Added support for quad-core NB54000c system.
  - IPU option output is changed to allow support of quad-core processors.
  - TMF option output is changed. Average Response Time is displayed in place of queue time.

- CPU INFO
  - A new command to display CPU info.

- Disc
  - Command output is changed. Discs will be listed in LDEV order. Previously the list was sorted in order the devices were added to the list.
  - Fixed command bug causing disc busy > 100%.
  - Fixed command on blade systems.

- Disc
  - A new command to display DISC info.

- PRocess
  - FLTS will not include processes waiting on a page fault.

- PRocess MEM
  - Bug fix – memory usage was incorrect.

- STatus
  - command will no longer report Max RcvQ; this is useless and not supported by MEASURE.

4.4 Version 2.4

```
Version procedure:  T0658H06^10NOV15
Version procedure:  T0658J06^10NOV15
Version procedure:  T0658L06^10NOV15
```

- Cpu
  Bug fix -- in calculation of system busy time when a new process was detected. The bug caused system busy time to be incorrect and if less than 0 resulted in OFFENDER ABENDing.

- Cpu INFO
  Added page size to display.

- Cpu TMF
  Bug fix -- in calculation of Average Response Time. The fractional part was truncated.

- ENV
  Command will display additional information.

- FILES
  A new command to select file types.

- PRocess
  Bug fix -- OSS file name > 28 characters caused 100% CPU busy. If the file name is > 28 characters, the Guardian file name will be displayed.

- PRocess
  Bug fix -- OSS file name > 28 characters caused 100% CPU busy. If the file name is > 28 characters, the Guardian file name will be displayed.

- PRocess FLTS and MEM
  Added fault rate to the FLTS and MEM reports.

- SAMple
  A new command to sample the system; see section 2.24.

- REPort
  A new command to display data from the most recent sample; see section 2.23.

- Memory foot print is greatly reduced.

- Other minor display changes.

- Documentation changes and corrections.

5 Index