OmniOffender
User's Guide
V2.2
August 26, 2008

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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 either in conversational mode interactively, or in a multi screen block mode with automatic updates at specified intervals.

OmniOffender is a MEASURE application which is safe to use. It does not use privileged code to go behind the systems back to get measurement data. It does not MUTEX, access counters itself, or fire up samplers.

OmniOffender is much faster to use than MEASURE. It will automatically and very quickly configure the minimum necessary measurements.

1.1 Only Two Commands!

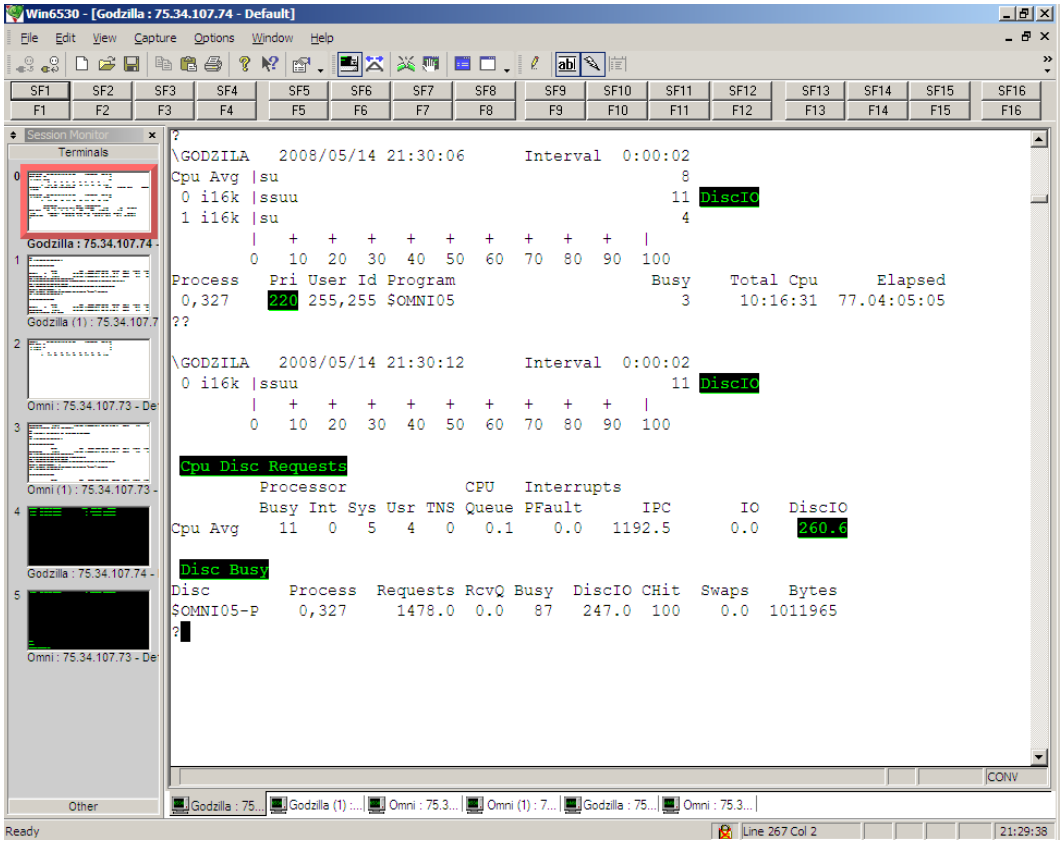
The only two commands necessary are the <ENTER> or <RETURN> key, and the "?" mark key.

<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/low case in command syntax is to indicate required characters.

Commands are:

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

Typing <RETURN>, <ENTER>, or an empty line will sample all the CPUs and display the default report.

Commands that control the displays:

REPort, DELAY, GO, Window, CPUS, DISCS

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 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 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
]

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 useful to create a 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                *
Window[ 6 ]   24 lines
   Cpu TNS                *
?
```

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

```
?w 6; 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                *
?
```

The following will display a good summary of a 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
```

2 Commands

Command entry is case insensitive.

The use of upper/low 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 | INTs | IPC | IPU | MEM | TMF
                        |TNS
                        }

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

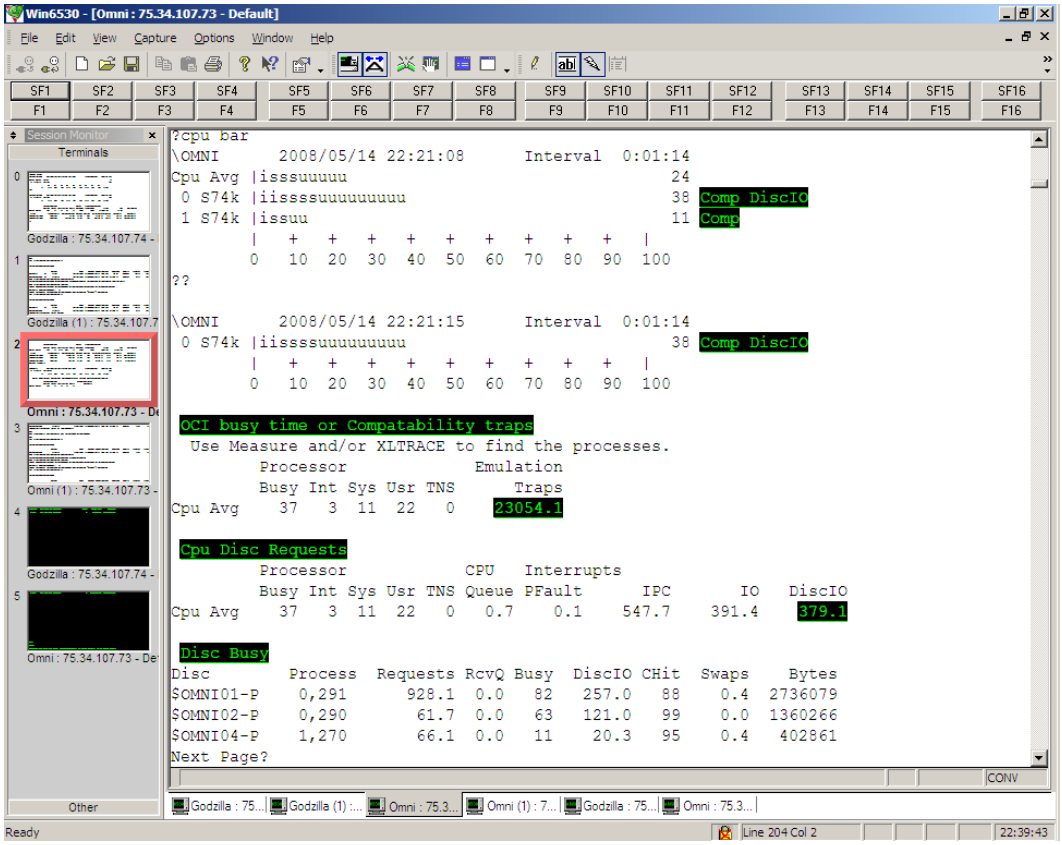
- BAR (default) a bar graph of CPU time as follows:

  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.
- INTs displays CPU interrupt rates.
- IPC displays CPU and message system statistics.
- IPU displays CPU IPU statistics (not supported on S-Series).
- MEM displays CPU and process memory statistics.
- TNS displays CPU time and emulation trap rate.
- TMF displays CPU TMF statistics.

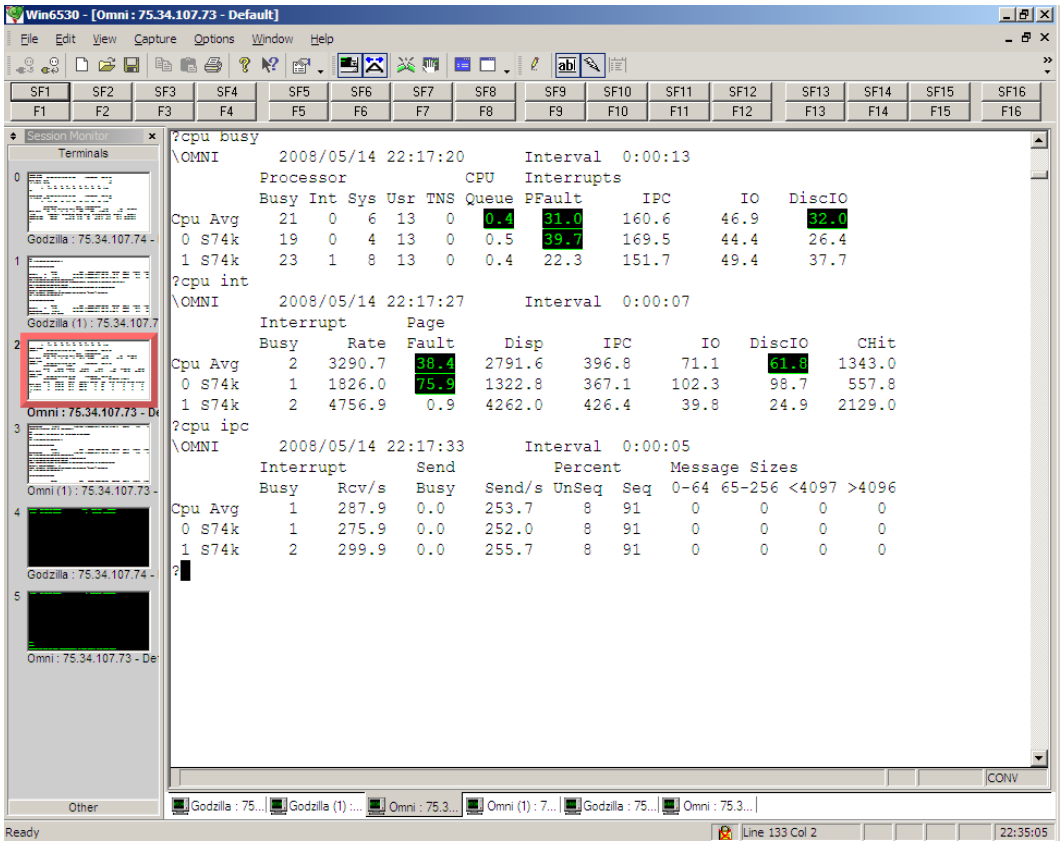
Sample outputs are shown below.

Cpu BAR report.

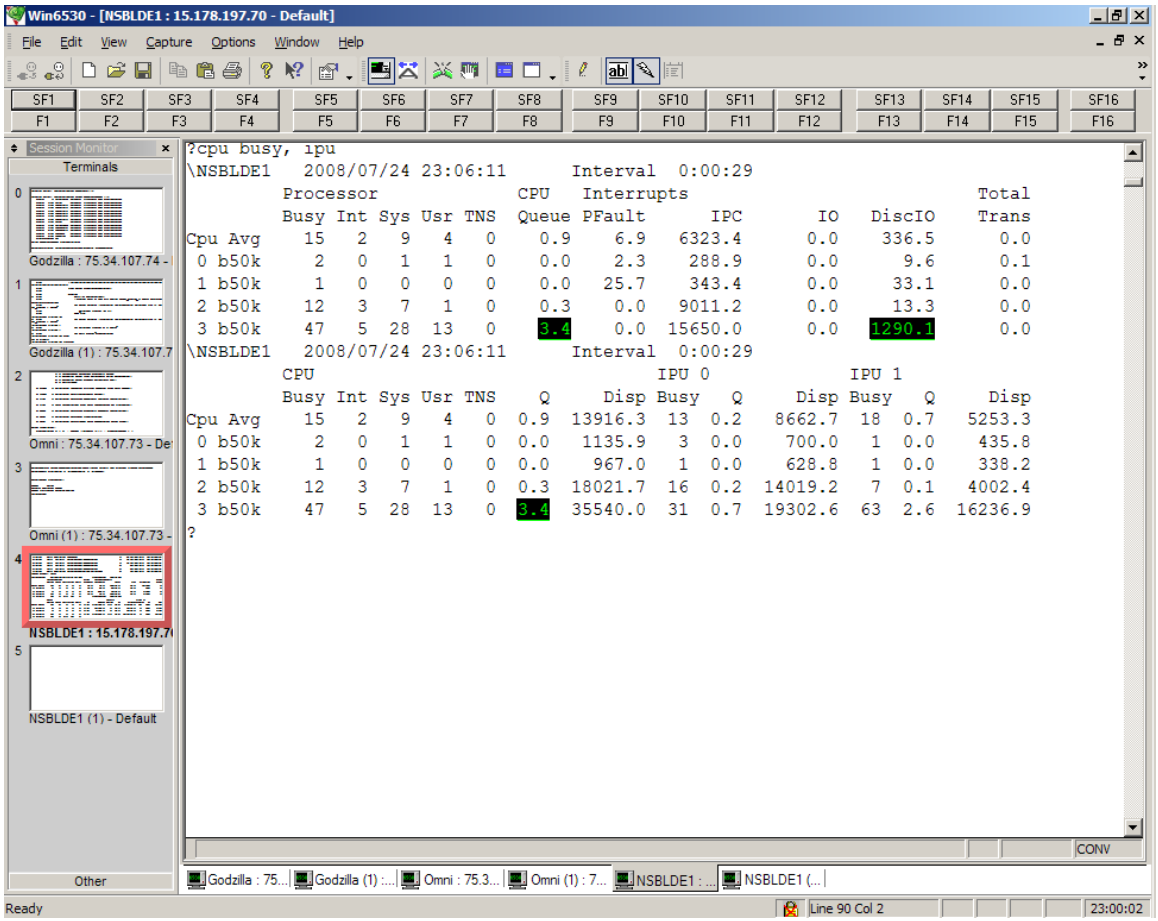


The underlined values for CPU 1 are potential performance issues. Use the '?' command as in the above example for additional information.

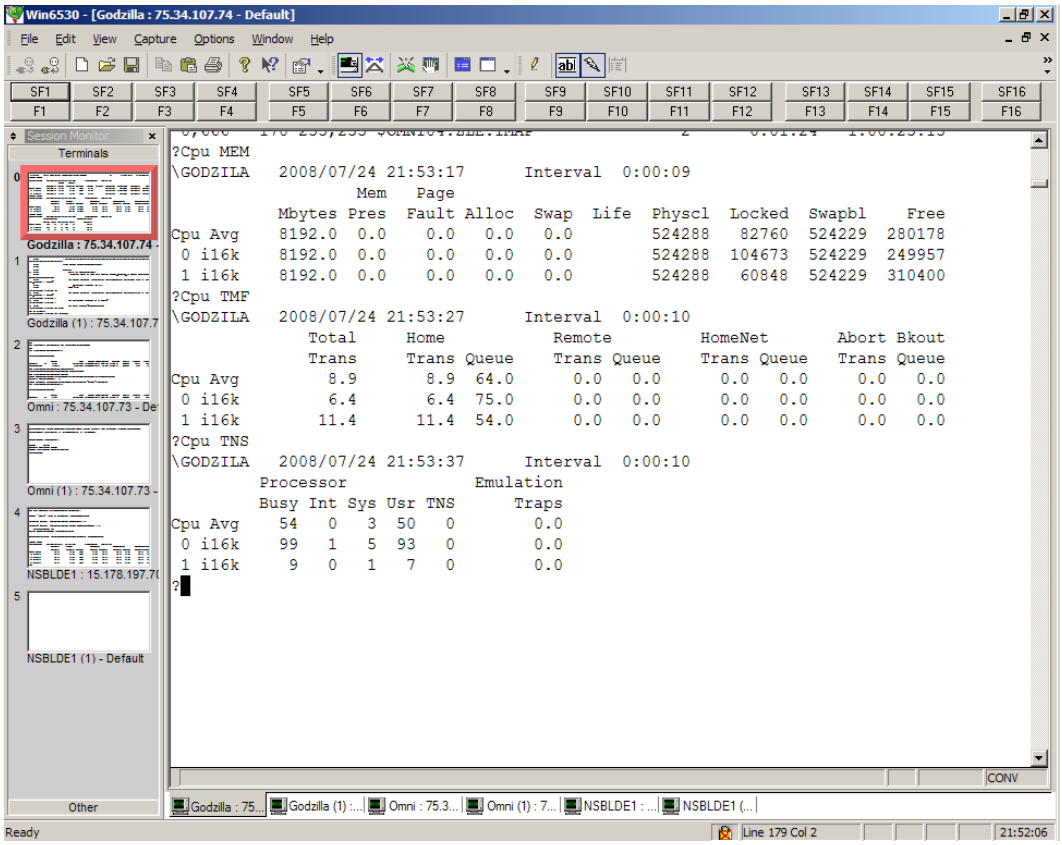
Cpu BUSY, INTs, and IPC reports.



Cpu BUSY and IPU report; the IPU report is only available on J-Series.



Cpu MEM, TMF, and TNS reports.



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 }

<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

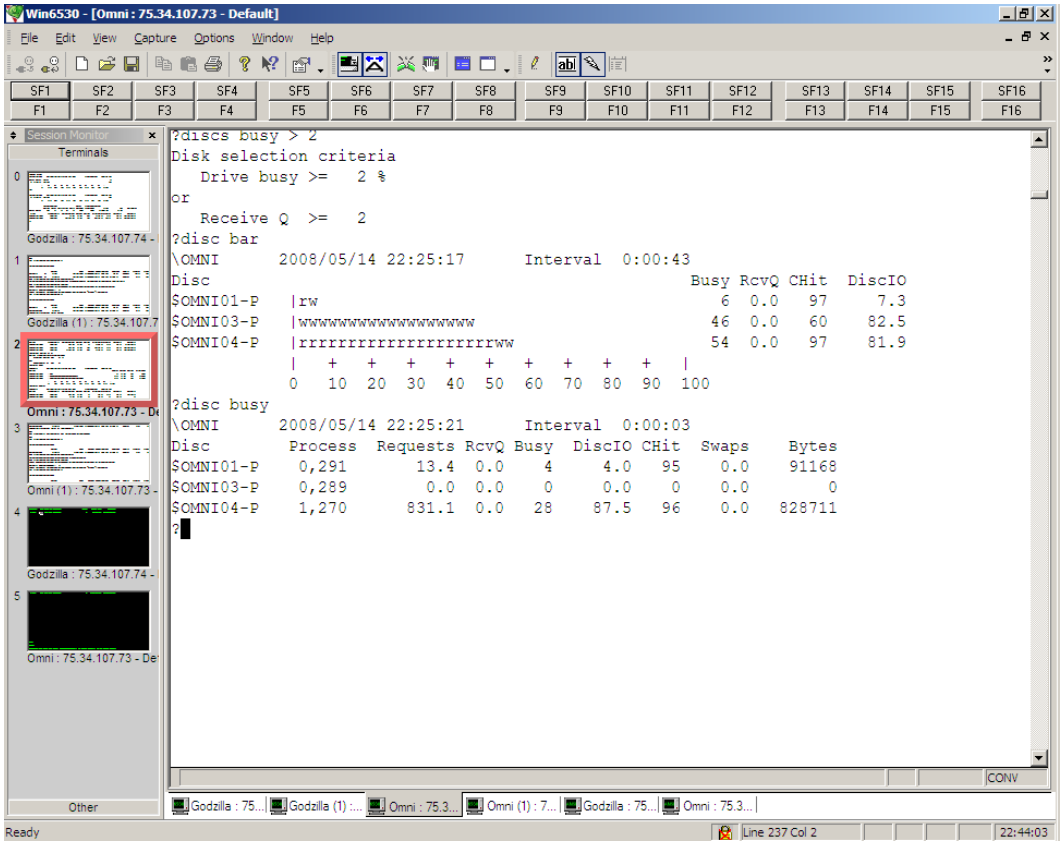
  Bytes – Bytes transferred per second to and from the disc.

  Reqs – Logical disc requests. May not result in an 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.

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 the list of disc volumes to measure.

```
?discs
Discs : $*
?
```

2.7 DISCS (<disc-list>)

Establishes the list of disc volumes to measure.

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

?DISCS ($OMNI04, $AUDIT)
Discs : $OMNI04, $AUDIT
?
```

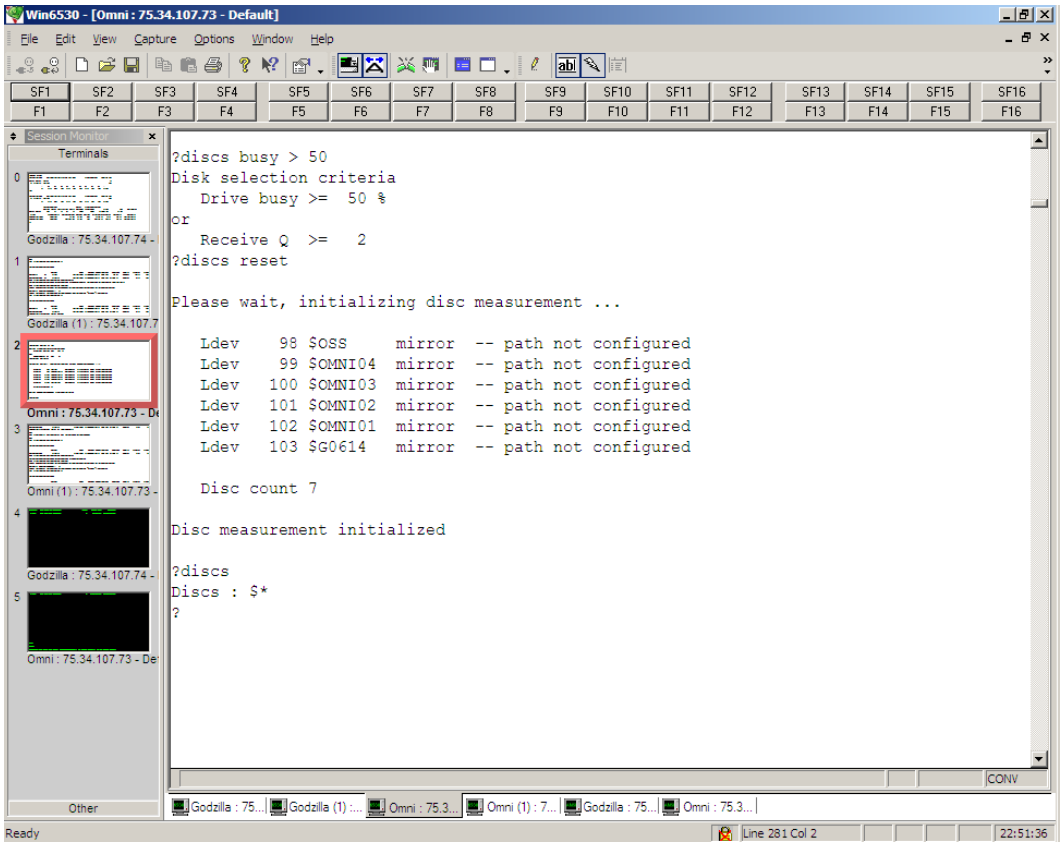
2.8 DISCS <discs-control>

Disks are displayed if they exceed the configurable amount of disk busy.

Each selected disk remains in the disk display, along with its mirror and the list is not sorted on busy, rather the disk's position is the order in which it met the selection criteria and was included in the display.
The display order 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



2.9 ENV

Displays measure status and logging status.

```
?env
OmniOffender T0658J06^24JUL08
System: \NSBLDE1  CFB 035120 J06.03.00
Measure File: $SYSTEM.OFFENDER.DOFF3, permanent.
Logging is off
?
```

2.10 EXIT

Terminates OFFENDER.

2.11 FC

Allows correction of the previous command.

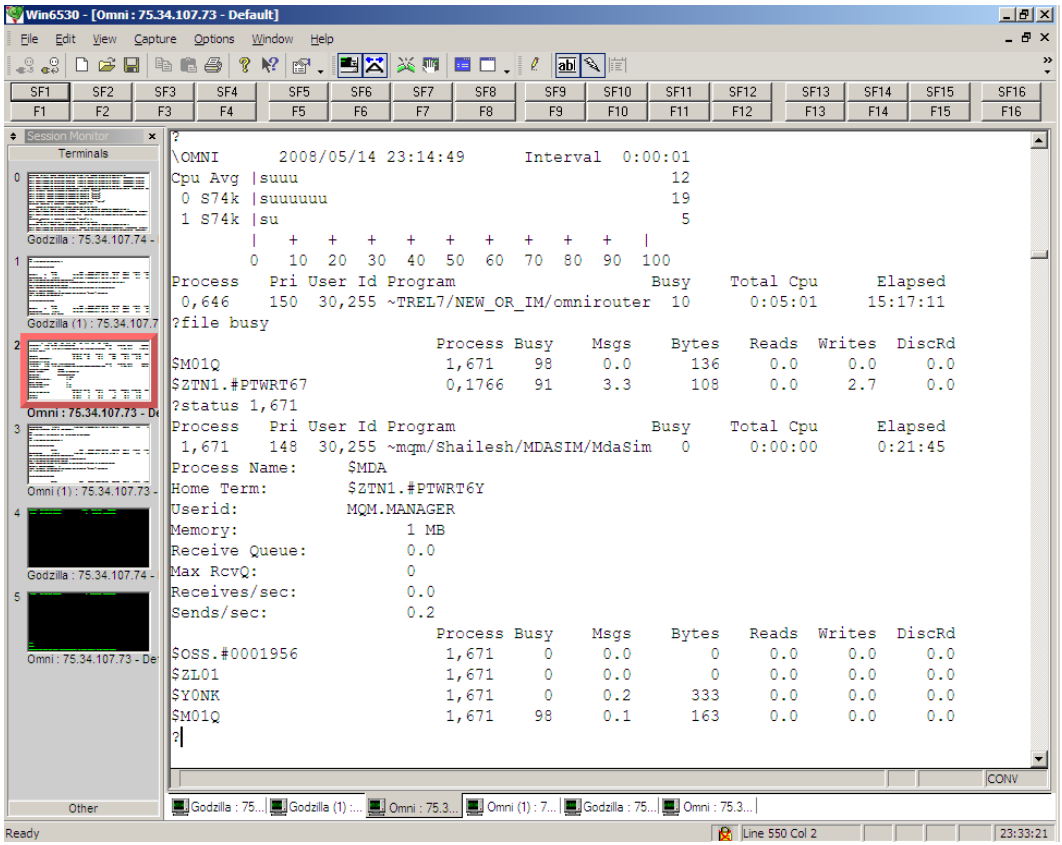
2.12 File [<file-report-option>]

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 time.
- 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 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.

2.14 HELP [ALL | <command>]

Use the “help” command to obtain syntax for all commands a specific command.

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

2.15 LOG

Reports logging status.

2.16 LOG [TO] <log-file>

Starts logging to <log-file>.

2.17 LOG STOP

Stops logging.

2.18 MEASURE

Displays measure status.

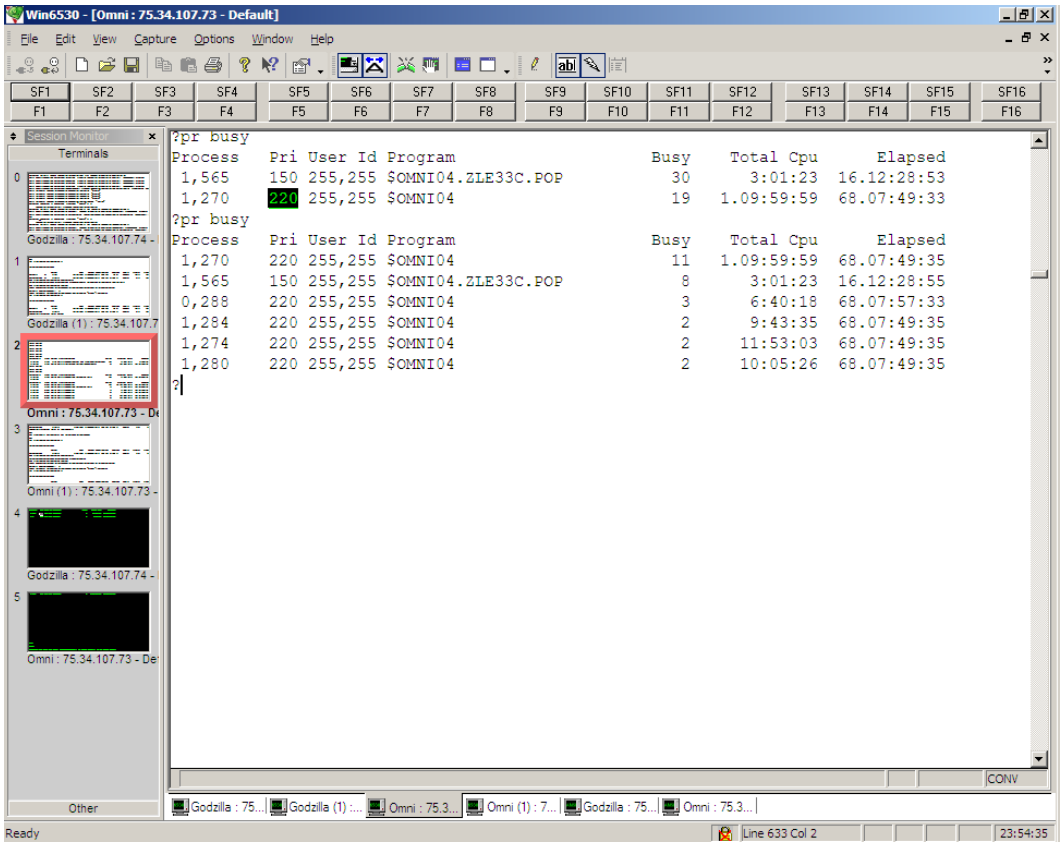
2.19 PRocess [<process-report-option-list>] [(<cpu-list>)]

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 is currently waiting on a page fault or process fault rate is >= 1/second
- MEM total number of pages of memory currently in use
- MSGS message send or receive rate is >= 1/second
- RCVQ receive queue depth
- TIME total process time; this tends to favor I/O processes

Sample PRocess BUSY report.



2.20 QUIT

Terminates OFFENDER.

2.21 REPort <report-list>

Is equivalent to Window 1, 24, <report-list>

See window for additional information.

2.22 STATS

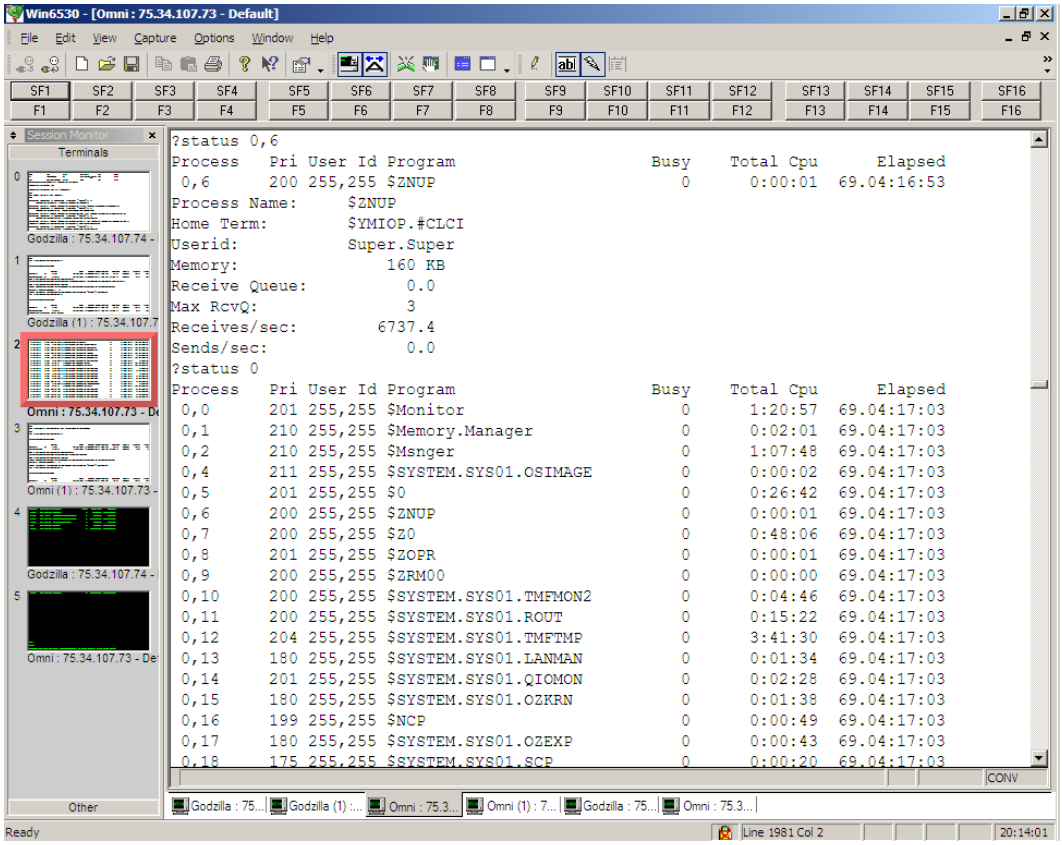
Displays current sampling statistics -- this is developer info.

```
?stats

Sampling stats -- this is developer info.

    Errors are "normal" and expected!

        0   CONFIG_GETINFO_BYNAME_ errors
        0   MEASREADACTIVE errors
        0   MEASREADACTIVE warnings

     1431   PCBs sampled
       14   Disk volumes
       14   Disk paths sampled
        0   Disk paths updated
        0   Files in use
        0   Files sampled
        0   Files created

?
```

2.23 STatus <cpu> [, <pin>]

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

Sample STatus reports.



2.24 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.

2.25 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 PIN              24
?W                                  ß display
Window[ 1 ]   24 lines
   Cpu Interrupts        *
   PRocess Busy          *
Window[ 2 ]   24 lines
   Cpu PIN              24
?W 2                                ß clear 2nd window
?W                                  ß display
Window[ 1 ]   24 lines
   Cpu Interrupts        *
   PRocess Busy          *
?
```

2.26 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          *
?
```

2.27 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>] [(<cpu-list>) | (<disc-list>)]
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.

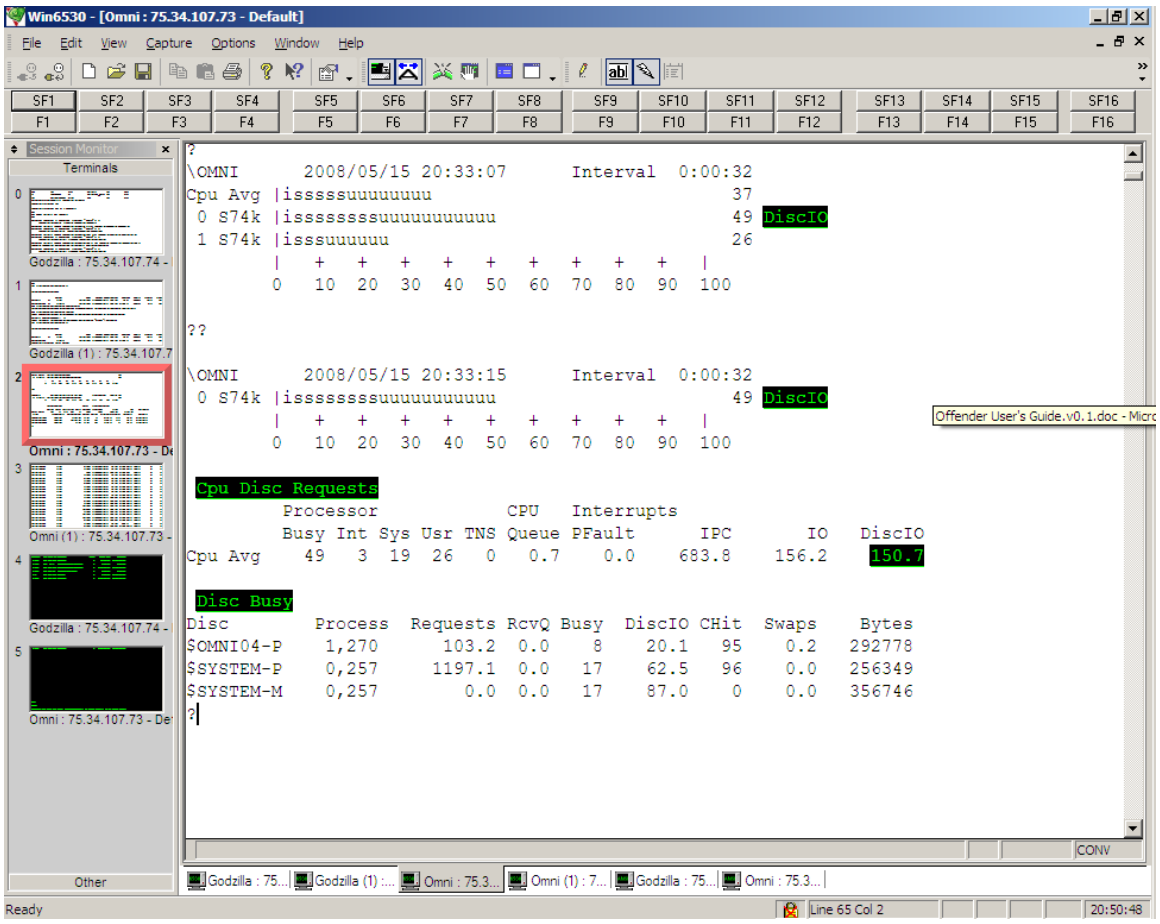
<cpu-list> ::= { * | <cpu> [, <cpu> ...] | <cpu>/<cpu> }

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

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

2.28 ?

'?' 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 go behind the systems back 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 prodid'd to the super group. Any operator id is fine.

Be sure to install the correct binary; at the moment each there is a different binary for the G, H, and J 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.

4 About OmniOffender

4.1 Version 2.2

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

- Changed to use standard Opsol License files.

4.2 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.

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