Page Fault Monitor

by

Software Verify

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Smarter tools for better software

MAP File Browser

MAP file contents inspector

by

Welcome to the MAP File Browser software tool. MAP File Browser is a software tool that allows you to inspect the contents of MAP files.

We hope you will find this document useful.

Page Fault Monitor

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Table of Contents

1 How to get Page Fault Monitor

Page Fault Monitor is free for commercial use. Page Fault Monitor can be downloaded for Software Verify's website at http://www.softwareverify.com.

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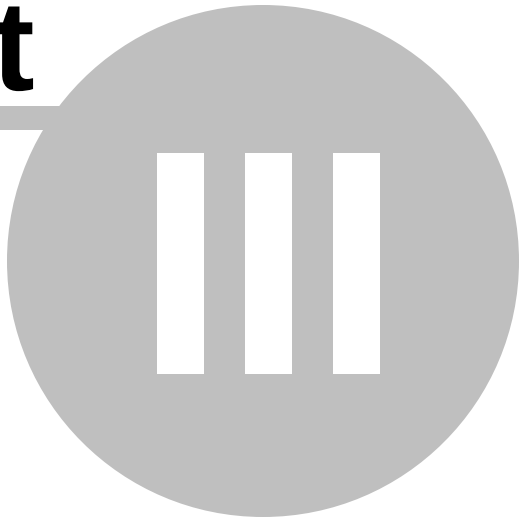
2 What does Page Fault Monitor do?

Page Fault Monitor allows you to view page fault data for a specific application in real time.

History

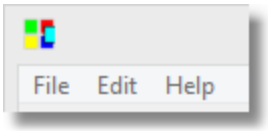
Page Fault Monitor has been an internal tool at Software Verify for many years. We recently decided to make it a bit more user friendly and to make it available for public use.

Part



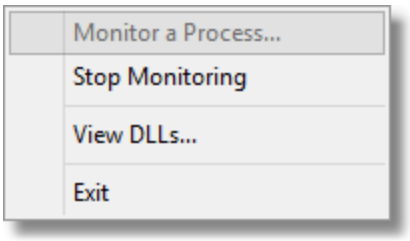
3 Manu

The main menu contains three menus, File, Edit and Help.



3.1 File

The File menu controls the monitoring of processes for Page Faults.



File > Monitor a Process...
Choose a process and start monitoring it for page faults.

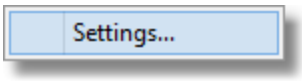
File > Stop Monitoring
Stop monitoring a process for page faults.

File > View DLLs
View information about the DLLs in the process.

File > Exit
Closes Page Fault Monitor.

3.2 Edit

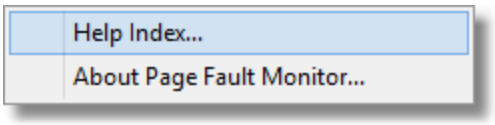
The Edit menu controls editing settings.



Edit > Settings...
Displays the settings dialog.

3.3 Help

The Help menu controls displaying this help document and displaying information about Page Fault Monitor.

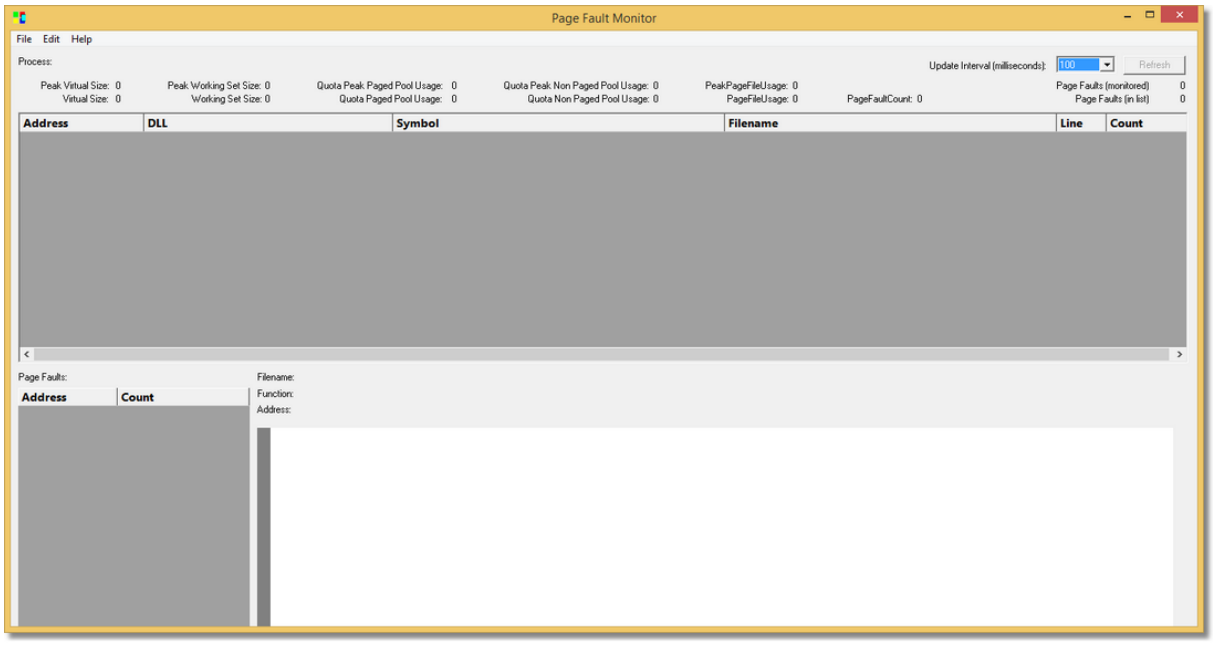


Help > Help Index...
Displays this help file.

Help > About Page Fault Monitor...
Displays information about Page Fault Monitor.

4 The user Interface

The user interface of Page Fault Monitor is shown below.



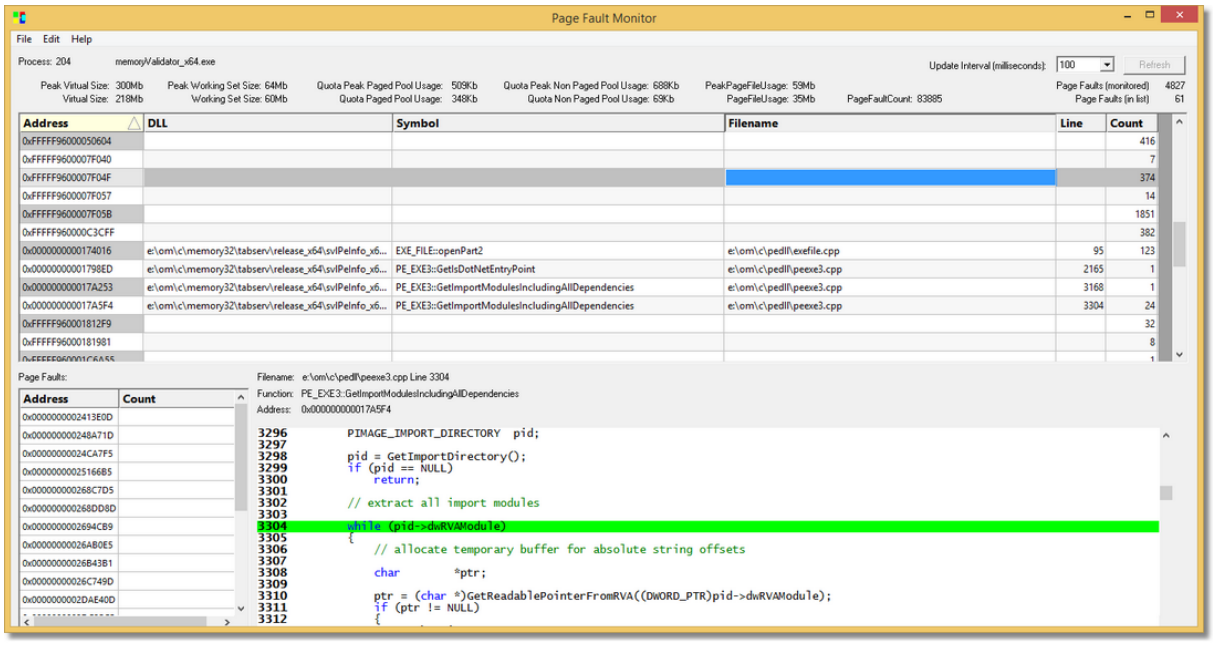
The top list shows all unique addresses that caused page faults for the monitored process.

The bottom list shows the page fault information associated with any address in the top list. Select an address in the top list and the related data is shown below. For any addresses that we can determine the DLL, symbol, filename and line number, we display that information in the source code window at the bottom of the display.

Above the top list various Virtual Memory status values are shown indicating virtual size, working set size, page file usage and various quota values. The total page fault count for the application is also shown, this value will be different from the number of page faults that Page Fault Monitor has information about. The reason the two values are different is that Page Fault Monitor displays the information Windows NT provides about page faults. Windows NT only stores a limited amount of data about page faults. Once this storage is used up, no more data is stored until after Page Fault Monitor has asked for the stored data. If Page Fault Monitor does not ask for the data frequently enough some information will be discarded by Windows NT.

- To change the interval at which Page Fault Monitor asks Windows NT for information about page faults, adjust the **Update Interval** combo box. The shorter the interval, the more accurate the information collected about page faults.
- To prevent the page fault list from being updated by the timer, change the combo value to No Update. When **No Update** is chosen, the **Refresh** button is enabled.
- To Refresh the processes list and the page fault list, click the **Refresh** button.

The picture shown below shows Page Fault monitor monitoring **memoryValidator_x64.exe**.



This picture shows process 204 (memoryValidator_x64.exe) is being monitored for page faults. Page Fault Monitor has collected information about 4827 page faults caused by memoryValidator_x64.exe. The top list shows information about the page faults. The list displays the addresses of all instructions that have caused page faults. The **Count** column indicates how many times this address has caused a page fault.

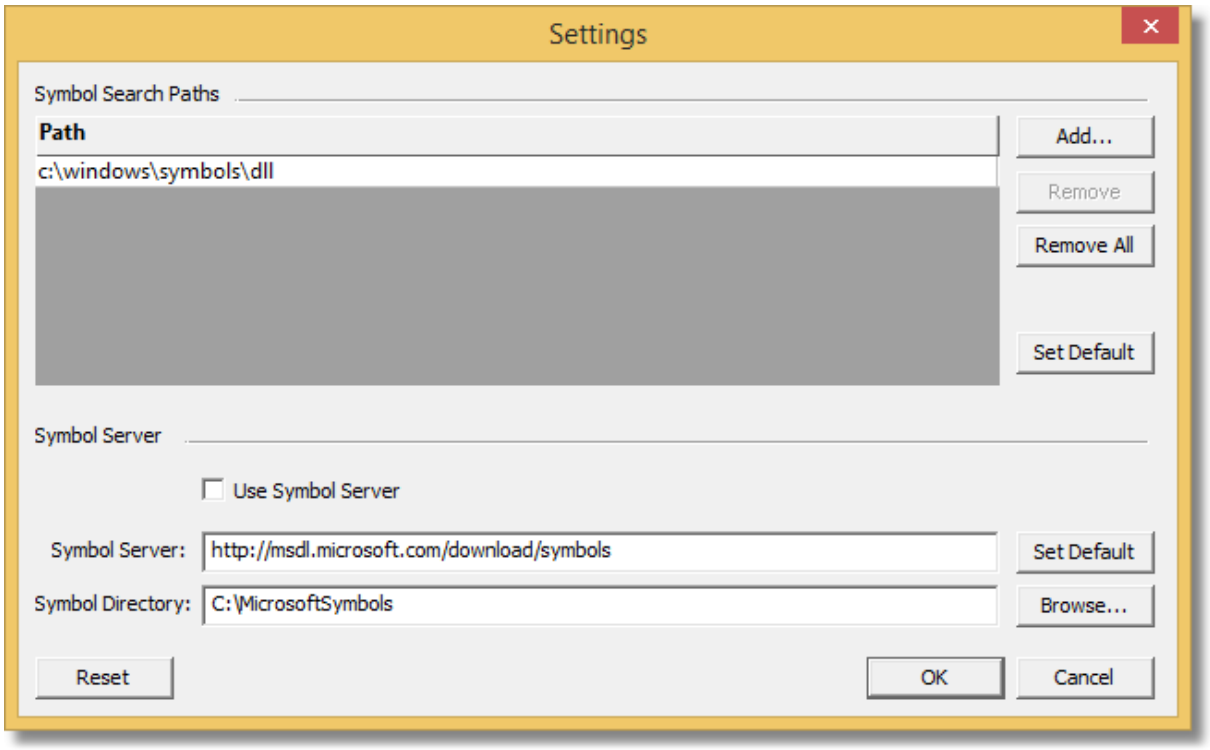
When displaying information about instructions, Page Fault Monitor will try to display DLL name, symbol, filename and line number, with the latter being taken from debug information.

Selecting an address in the top list causes information about the page faults at that address to be shown in the bottom list. The source code and symbol information (if known) is also displayed.

Note that the Page Fault count of 83885 is higher than the numbers monitored by Page Fault Validator because memoryValidator_x64.exe in this example has been running for a very long time, whereas Page Fault Monitor has been running for a few minutes.

5 Modifying the settings

The settings dialog allows you to configure how Page Fault Monitor gets symbol information.



Symbol Search Paths

We use debug information found in PDB files to turn addresses into human readable symbols, filenames and lines.

By default there is one path in the symbol search paths: **c:\windows\symbols\dll**.

If you wish to add more paths to symbols you can add or remove them using the **Add...**, **Remove** and **Remove All** buttons.

You can restore the default symbol paths using the **Set Default** button.

Symbol Server

If the symbol server is enabled (**Use Symbol Server**) Page Fault Monitor will download symbols using a symbol server.

Symbols are downloaded to a **Symbol Directory**. This directory must be valid for the symbol server to work. You can type the directory name or click **Browse...** to use the Microsoft folder browser to select the directory.

Microsoft DLLs

For Microsoft DLLs that are found in the Windows System32 directory we download symbols from Microsoft's symbol server:

```
http://msdl.microsoft.com/download/symbols
```

None Microsoft DLLs

For none Microsoft DLLs we download symbols from the symbol server specified on the settings dialog in the **Symbol Server** field.

You can set the symbol server to it's default value using the **Set Default** button.

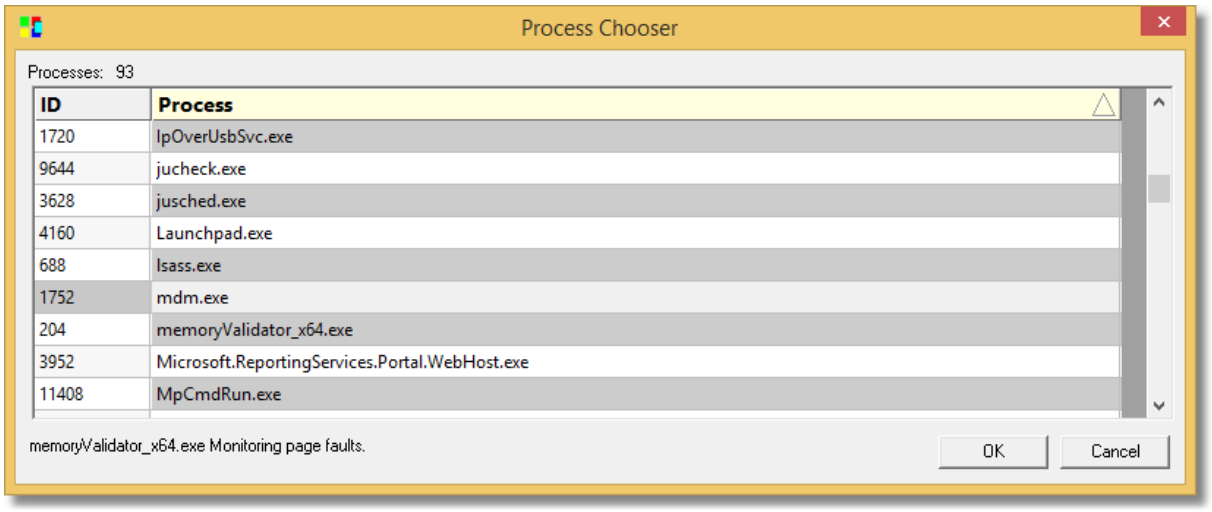
Please note that if you have symbol servers enabled there may be a delay in providing symbol information the first symbols for a specific DLL are downloaded from the symbol server.

Reset

You can reset the settings to their default state at any time by clicking **Reset**.

6 Choosing a process to monitor

The Process Chooser allows you to choose which process you will monitor for Page Faults.



The display consists of a list of processes, one per line, with each line containing the process id and the process name.

To choose a process click the process you are interested in monitoring.

If the process can be monitored for page faults a message with the process name and "Monitoring page faults" will be displayed below the list of processes.

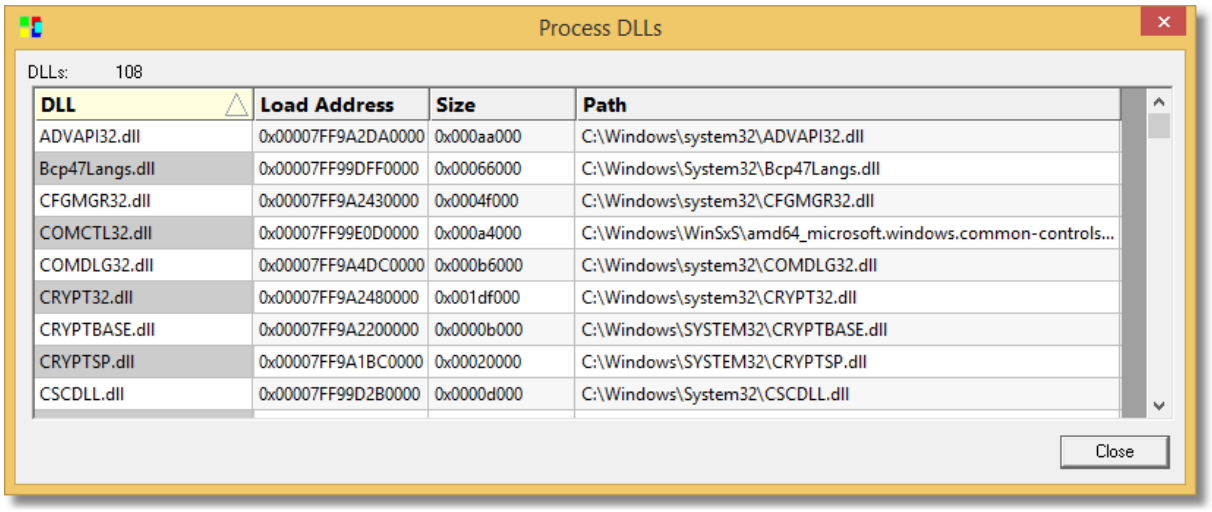
If the process cannot be monitored for page faults a message is displayed in red indicating that the page faults can be monitored.

Once you have chosen a process click **OK** to start collecting page fault information.

You can also double click on a process to select it and start collecting page fault information.

7 Viewing the list of DLLs

The Process DLLs dialog allows you to view the list of DLLs in the process being monitored.



The display consists of a list of DLL information, with information for each DLL displayed on one line.

The information displayed is DLL name, load address, DLL size and the full path to the DLL.

The display can be sorted by each column. Click the column header to choose which column to sort the data. Click the same column again to reverse the sort direction.

8 How to use Page Fault Monitor

Select a process to monitor

Use the **File > Monitor a Process...** option to choose a process to monitor

The grid displays page fault data as page faults are detected.

Page fault addresses are converted to symbols according to the settings.

Select a symbol to see information about the line numbers and source code and pages that were faulted at this address.

Please note that if you have symbol servers enabled there may be a delay in providing symbol information the first symbols for a specific DLL are downloaded from the symbol server.