



Thread Status

by

Software Verify

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Thread Status

Thread Status Monitor for Windows Operating Systems

by Software Verify Limited

Welcome to the Thread Status software tool. Thread Status is a software tool that monitors the status of every thread in a particular process.

You can monitor thread status, wait reason, context switches, CPU usage per thread to identify that threads are doing in your application.

We hope you will find this document useful.

Thread Status Help

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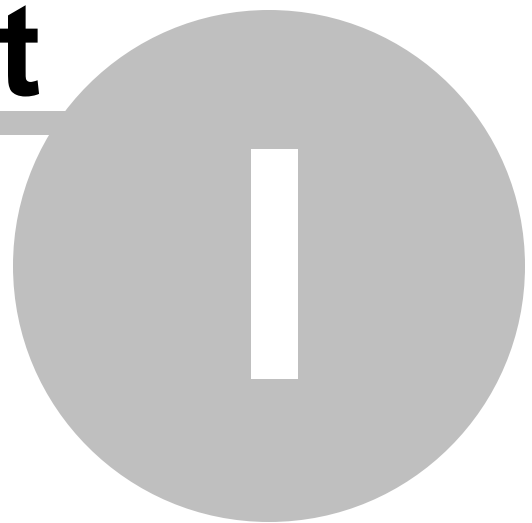
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Foreword

Part



1 How to get Thread Status

Thread Status is free for commercial use. Thread Status can be downloaded for Software Verify's website at <https://www.softwareverify.com/product/thread-status-monitor/>.

This help manual is available in Compiled HTML Help (Windows Help files), PDF, and online.

Windows Help	https://www.softwareverify.com/documentation/chm/threadStatus.chm
PDF	https://www.softwareverify.com/documentation/pdfs/threadStatus.pdf
Online	https://www.softwareverify.com/documentation/html/threadStatus/index.html

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Versions

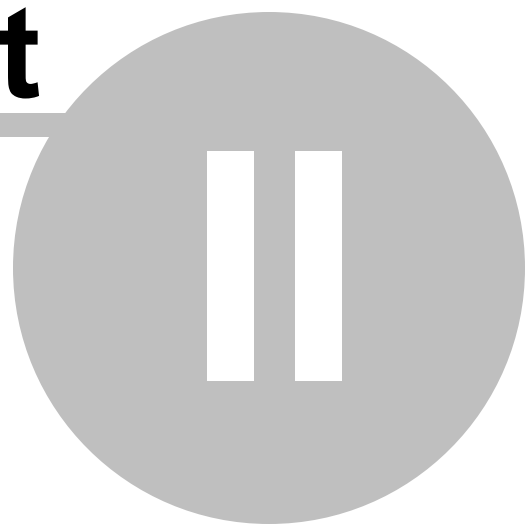
There are two versions of Thread Status:

- A version for 32 bit operating systems: **threadStatus.exe**
- A version for 64 bit operating systems: **threadStatus_x64.exe**.

The 32 bit version will run on 64 bit operating systems but will only show information about 32 bit processes.

The 64 bit version will only run on 64 bit operating systems and will only show information about 64 bit processes.

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2 What does Thread Status do?

Thread Status allows you to inspect information about each running thread in an application.

ID	Name	Status	Reason	Context	Priority	Wait Time	CPU Cycles	Thread Time	CPU Delta
13580	MemoryInfra	StateWait	UserRequest	3	8	38,056,206	2,348,472	0	
12752	ThreadPoolBackgroundWorker	StateWait	UserRequest	201	4	38,064,760	30,978,400	156,250	
11744	ZwWaitForWorkViaWorkerFactory	StateWait	WrQueue	3	8	38,063,849	212,714	0	
11360	ZwWaitForWorkViaWorkerFactory	StateWait	WrQueue	3	8	38,063,849	291,948	0	
10516	CrUtilityMain	StateWait	UserRequest	1,774	8	38,065,794	993,370,508	312,500	
10256	CacheThread_BlockFile	StateWait	WrQueue	108	8	38,064,225	47,158,752	156,250	
9644	ThreadPoolServiceThread	StateWait	UserRequest	13	8	37,912,321	2,870,256	0	
9608	Chrome_ChildIOThread	StateWait	WrQueue	2,228	10	38,065,744	691,997,802	937,500	
7648	ZwWaitForWorkViaWorkerFactory	StateWait	WrQueue	3	8	38,063,849	872,700	0	
3468	ThreadPoolForegroundWorker	StateWait	UserRequest	331	8	38,064,640	346,906,945	468,750	
2204	LoaderLockSampler	StateWait	UserRequest	2	9	37,883,687	1,291,902	0	
1896	ZwWaitForWorkViaWorkerFactory	StateWait	WrQueue	127	9	38,063,849	7,136,187	0	

Processes

Processes are shown in the top grid. The process id and the process name are shown. You can sort the grid by clicking the appropriate column header.

By default only user processes are shown.

System processes (executables in the Windows systems directory) and services can be shown if you want to monitor one of those.

Use the three check boxes to control which types of process are shown.

Threads

Threads are shown in the bottom grid. The thread id, thread name and thread statistics are shown. You can sort the grid by clicking the appropriate column header.

Information that is displayed about each thread:

Thread id

This is the numeric identifier assigned to the thread by the Windows operating system.

Name

This is the name of the thread if the thread has been given a name using the `SetThreadDescription()` API. This is only available on Windows 10.

If a thread description is not available we attempt to provide a name for this thread by querying the thread's start address, and if successful we try to turn this start address into a useful symbolic name. Depending on the process and the operating system these operations may success, in which we display a name, or they may fail in which case we display nothing.

Status

This is the state the thread is in. The possible values are:

- StateInitialised
- StateReady
- StateRunning
- StateStandby
- StateTerminated
- StateWait
- StateTransition
- StateUnknown

Reason

This is the reason the thread is in the state it is in. The possible values are:

- Executive
- FreePage
- PageIn
- PoolAllocation
- DelayExecution
- Suspended
- UserRequest
- WrExecutive
- WrFreePage
- WrPageIn
- WrPoolAllocation
- WrDelayExecution
- WrSuspended
- WrUserRequest
- WrEventPair
- WrQueue
- WrLpcReceive
- WrLpcReply
- WrVirtualMemory
- WrPageOut
- WrRendezvous
- WrSpare1
- WrSpare2
- WrSpare3
- WrSpare4
- WrSpare5
- WrSpare6
- WrKernel

Context switches

This is the number of context switches this thread has been involved in.

Thread Priority

This is the thread scheduling priority used by the operating system to decide which thread runs next.

Wait Time

This is how long the thread has been waiting.

Thread Time

This is how long the thread has been running.

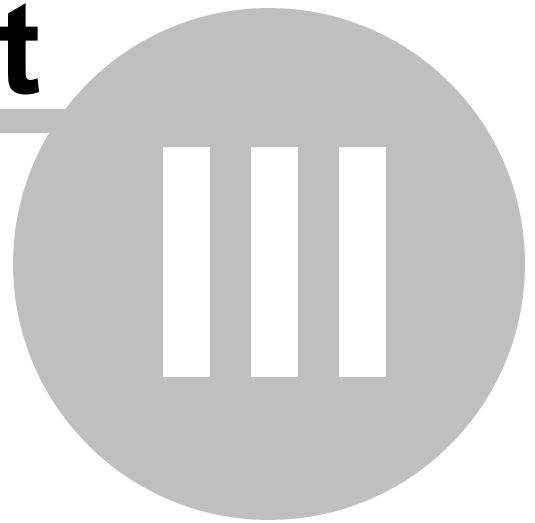
Thread Delta

This is the change in the thread run time since the last sample.

CPU usage

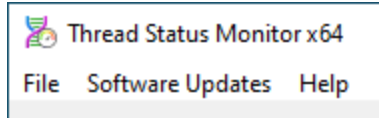
This is how much CPU time the thread is getting relative to the other threads.

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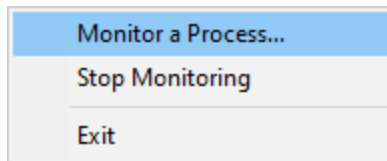
3 Menu

The main menu contains three menus, File, Software Updates and Help.



3.1 File

The File menu controls which process will be monitored.



File menu > **Monitor a Process...** > displays the process chooser to allow you to choose which process to monitor.

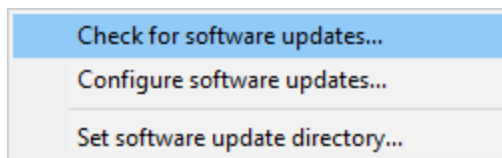
File menu > **Stop Monitoring** > stops monitoring the process and clears the display.

File menu > **Exit** > closes Thread Status.

3.2 Software Updates


The Software Updates menu controls how often software updates are downloaded.

If you've been notified of a new software release to Thread Status or just want to see if there's a new version, this feature makes it easy to update.

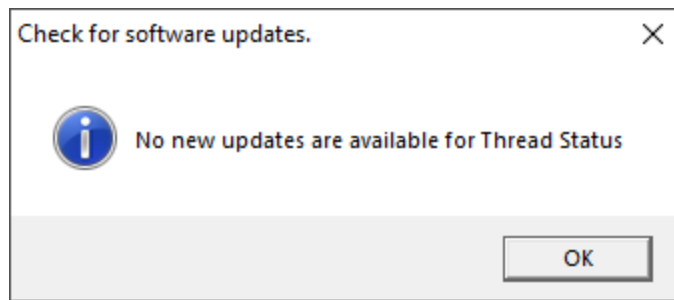


 **Software Updates** menu > **Check for software updates** > checks for updates and shows the software update dialog if any exist

An internet connection is needed to be able to make contact with our servers.

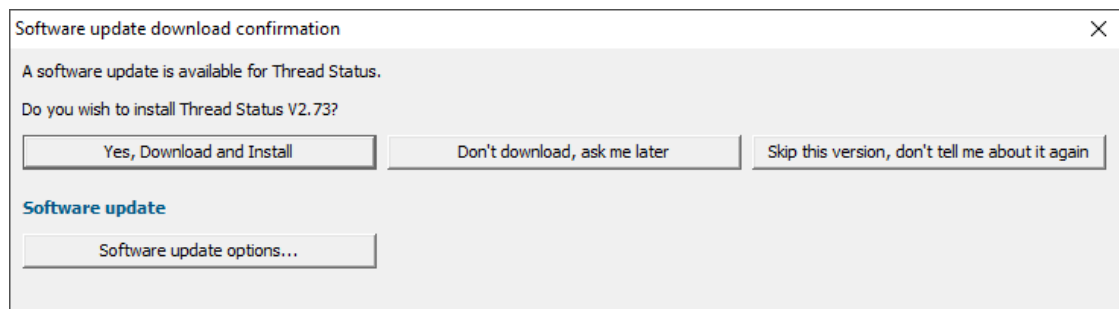
 Before updating the software, close the help manual, and end any active session by closing target programs.

If no updates are available, you'll just see this message:

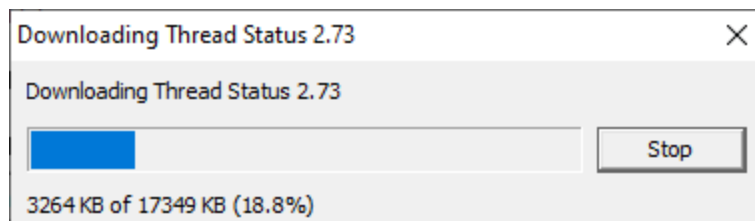


Software Update dialog

If a software update is available for Thread Status you'll see the software update dialog.



- **Download and install** ➤ downloads the update, showing progress



Once the update has downloaded, Thread Status will close, run the installer, and restart.

You can stop the download at any time, if necessary.

- **Don't download...** ➤ Doesn't download, but you'll be prompted for it again next time you start Thread Status
- **Skip this version...** ➤ Doesn't download the update and doesn't bother you again until there's an even newer update
- **Software update options...** ➤ edit the software update schedule

Problems downloading or installing?

If for whatever reason, automatic download and installation fails to complete:

- Download the latest installer manually from the software verify website.

Make some checks for possible scenarios where files may be locked by Thread Status as follows:

- Ensure Thread Status and its help manual is also closed
- Ensure any error dialogs from the previous installation are closed

You should now be ready to run the new version.

Software update schedule

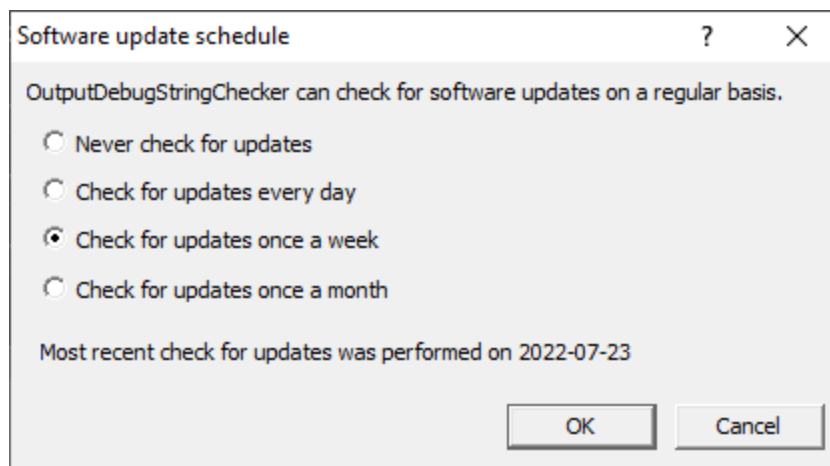
Thread Status can automatically check to see if a new version of Thread Status is available for downloading.

 **Software Updates** menu > **Configure software updates** > shows the software update schedule dialog

The update options are:

- never check for updates
- check daily (the default)
- check weekly
- check monthly

The most recent check for updates is shown at the bottom.

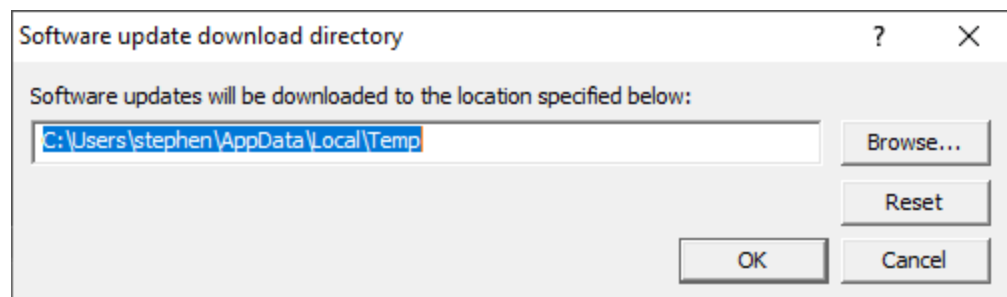


Software update directory

It's important to be able to specify where software updates are downloaded to because of potential security risks that may arise from allowing the `TMP` directory to be executable. For example, to counteract security threats it's possible that account ownership permissions or antivirus software blocks program execution directly from the `TMP` directory.

The `TMP` directory is the default location but if for whatever reason you're not comfortable with that, you can specify your preferred download directory. This allows you to set permissions for `TMP` to deny execute privileges if you wish.


 **Software Updates** menu > **Set software update directory** > shows the Software update download directory dialog



An invalid directory will show the path in red and will not be accepted until a valid folder is entered.

Example reasons for invalid directories include:

- the directory doesn't exist
- the directory doesn't have write privilege (update can't be downloaded)
- the directory doesn't have execute privilege (downloaded update can't be run)

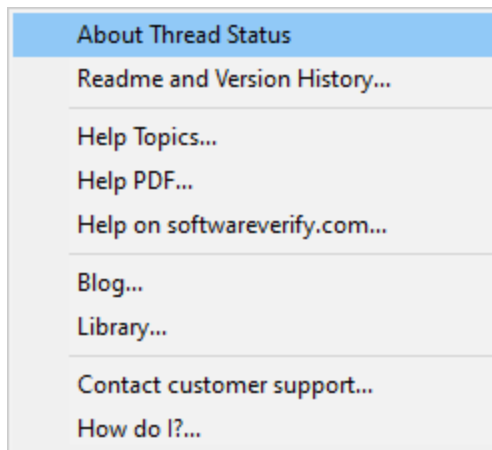
 When modifying the download directory, you should ensure the directory will continue to be valid. Updates may no longer occur if the download location is later invalidated.

- **Reset** > reverts the download location to the user's `TMP` directory

The default location is `c:\users\[username]\AppData\Local\Temp`

3.3 Help

The Help menu controls displaying this help document and displaying information about Thread Status.



Help menu > **About Thread Status...** > displays information about Thread Status.

Help menu > **Readme and Version History...** > displays the readme and version history.

Help menu > **Help Topics...** > displays this help file.

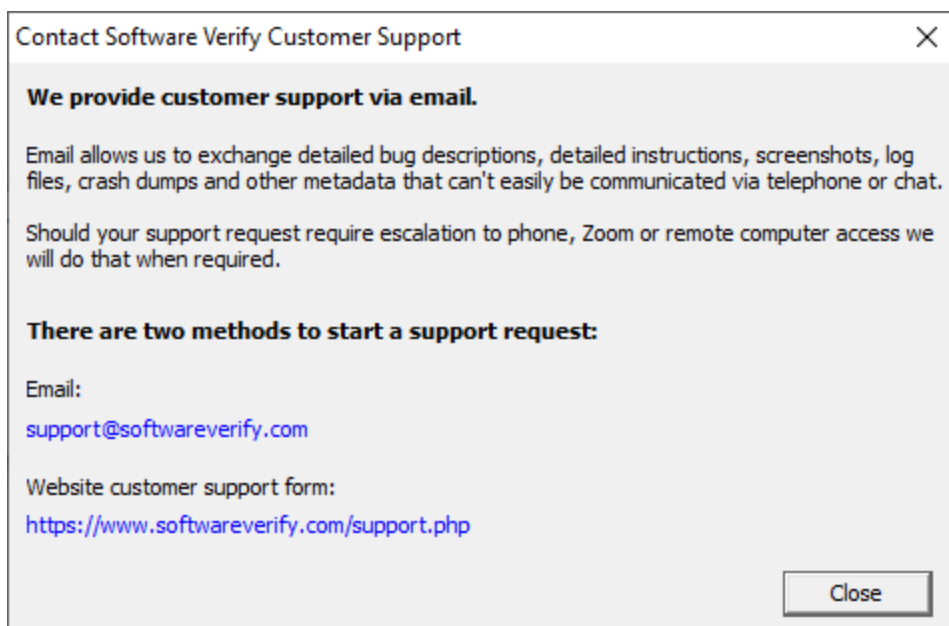
Help menu > **Help PDF...** > displays this help file in PDF format.

Help menu > **Help on softwareverify.com...** > display the Software Verify documentation web page where you can view online documentation or download compiled HTML Help and PDF help documents.

Help menu > **Blog...** > display the Software Verify blog.

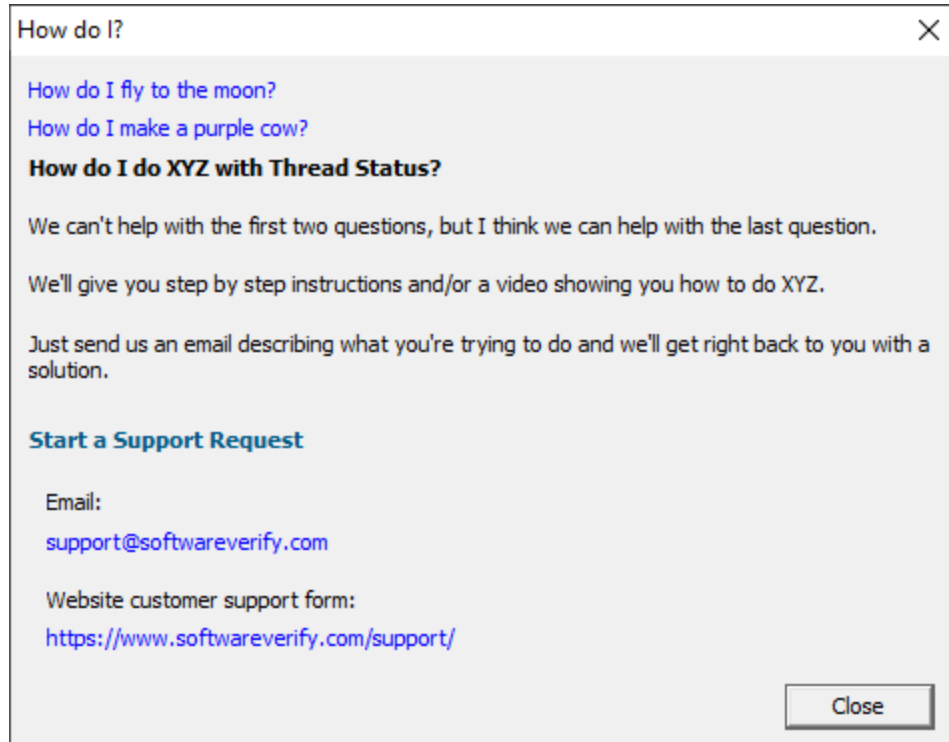
Help menu > **Library...** > display the Software Verify library - our best blog articles grouped by related topics.

Help menu > **Contact customer support...** > displays the options for contacting customer support.



Click a link to contact customer support.

Help menu > **How do I?...** > displays the options for asking us how to do a particular task.

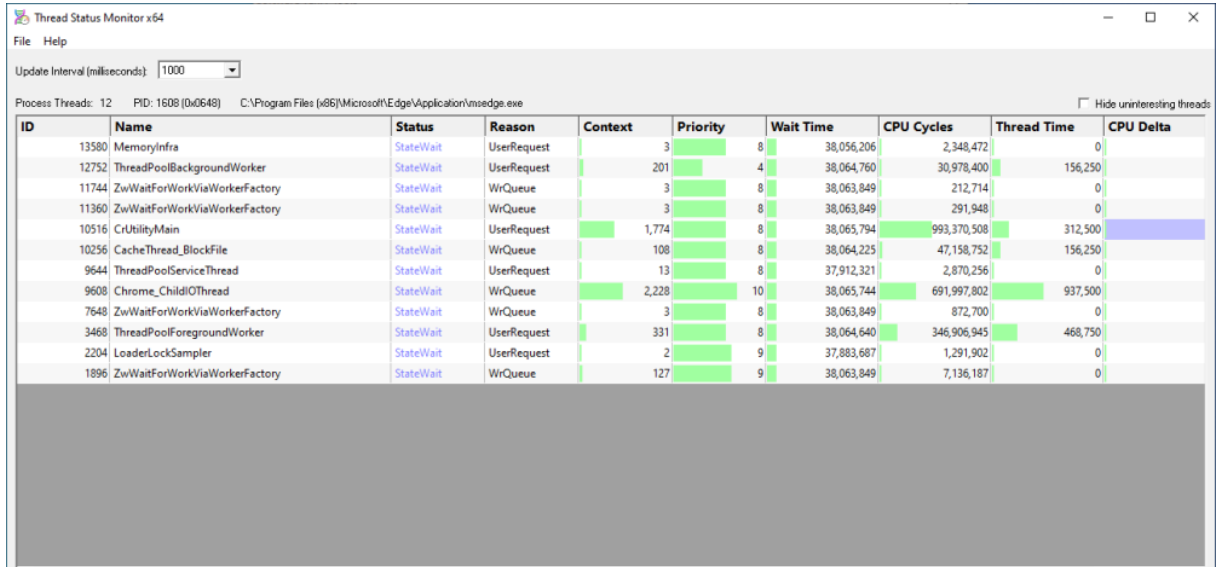


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4 The user interface

The Thread Status user interface displays the threads in the selected process:



Thread Status Monitor x64

File Help

Update Interval (milliseconds): 1000

Process Threads: 12 PID: 1608 (0x0648) C:\Program Files (x86)\Microsoft\Edge\Application\msedge.exe ☐ Hide uninteresting threads

ID	Name	Status	Reason	Context	Priority	Wait Time	CPU Cycles	Thread Time	CPU Delta
13580	MemoryInfra	StateWait	UserRequest	3	8	38,056,206	2,348,472	0	
12752	ThreadPoolBackgroundWorker	StateWait	UserRequest	201	4	38,064,760	30,978,400	156,250	
11744	ZwWaitForWorkViaWorkerFactory	StateWait	WrQueue	3	8	38,063,849	212,714	0	
11360	ZwWaitForWorkViaWorkerFactory	StateWait	WrQueue	3	8	38,063,849	291,948	0	
10516	CrUtilityMain	StateWait	UserRequest	1,774	8	38,065,794	993,370,508	312,500	
10256	CacheThread_BlockFile	StateWait	WrQueue	108	8	38,064,225	47,158,752	156,250	
9644	ThreadPoolServiceThread	StateWait	UserRequest	13	8	37,912,321	2,870,256	0	
9608	Chrome_ChildIOThread	StateWait	WrQueue	2,228	10	38,065,744	691,997,802	937,500	
7648	ZwWaitForWorkViaWorkerFactory	StateWait	WrQueue	3	8	38,063,849	872,700	0	
3468	ThreadPoolForegroundWorker	StateWait	UserRequest	331	8	38,064,640	346,906,945	468,750	
2204	LoaderLockSampler	StateWait	UserRequest	2	9	37,883,687	1,291,902	0	
1896	ZwWaitForWorkViaWorkerFactory	StateWait	WrQueue	127	9	38,063,849	7,136,187	0	

Thread Controls

Refresh

You can update the display manually by clicking the Refresh button. This is useful if you have disabled automatic updates via the the Update Interval control.

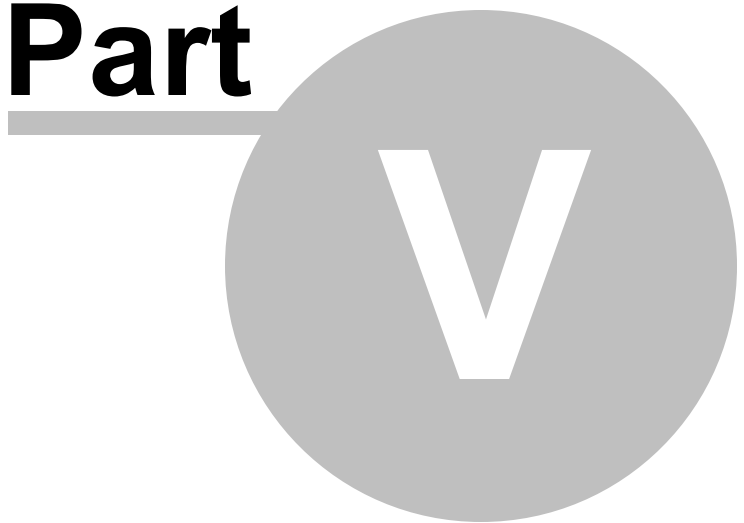
Update Interval

You can change how frequently the display is updated using the Update Interval control. The default is to update every one second.

Hide uninteresting threads

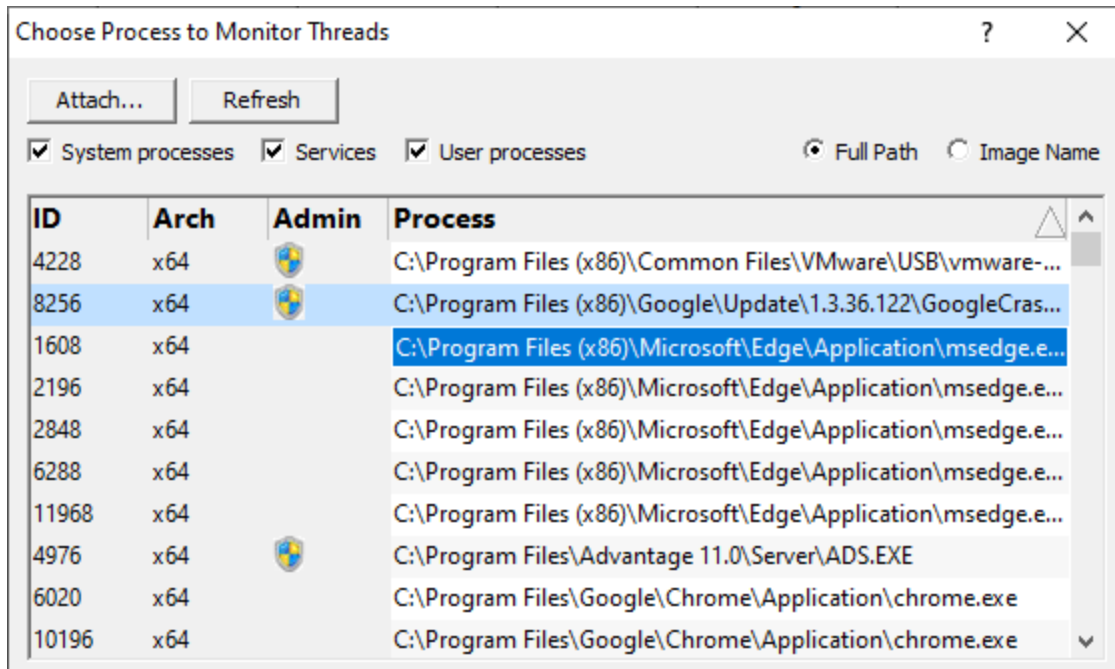
When this is selected, threads that are known to be Microsoft worker threads are hidden.

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5 Process chooser dialog

The Attach to process dialog allows you to choose a user process, system process or service to attach to.



- **System processes / Services / User processes** ➤ show either of system or services or user processes in the list, or both
- **Full path** ➤ shows the full path to the process executable in the list
- **Image Name** ➤ shows the short program name without path
- **Refresh** ➤ update the list with currently running processes
- **Attach** ➤ attach to the selected process and start collecting debug events

Clicking on the headers of the list will sort them by ID or by name using the full name or short name, depending on what's displayed.

