

# Trace Collection Guide:

## Windows Storport Device Driver

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## Windows Trace Data Collection

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This document describes how to gather trace data from the NVMe Community Driver. If the driver was built as DEBUG, trace data may ONLY be viewed through the kernel-level debugger. If the driver was built as RELEASE, this document describes how to gather that trace data using ETW (Event Tracing for Windows)

With the current values for Debugging Printing Levels, trace filtering does not work correctly for RELEASE-version drivers. To enable the correct filtering of DEBUG and RELEASE tracing, the debug print values were changed as follows to match the levels defined in evnttrace.h

```
/* Debugging Printing Levels */
enum
{
    INFO = TRACE_LEVEL_INFORMATION, // 4
    WARNING = TRACE_LEVEL_WARNING, // 3
    ERROR = TRACE_LEVEL_ERROR, // 2
    TRACE = TRACE_LEVEL_VERBOSE // 5
};
```

When tracing in the kernel debugger, the following storminport\_mask values will individually enable different types of traces:

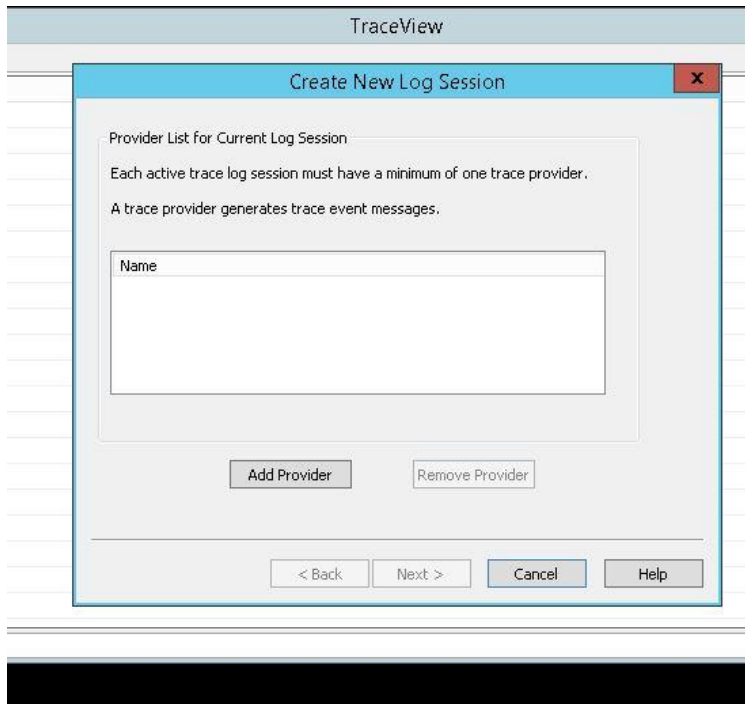
- 0x0 and 0x1 – No tracing
- 0x4 – ERROR
- 0x8 – WARNING
- 0x10 – INFO
- 0x20 – TRACE

For example, in the kernel debugger, to enable tracing of all StorPortDebugPrint statements that are INFO or ERROR, use the mask 0x14. In the current code, a mask of 0xf was sufficient to get all tracepoints. With these changes, the mask must now be set to 0x3f.

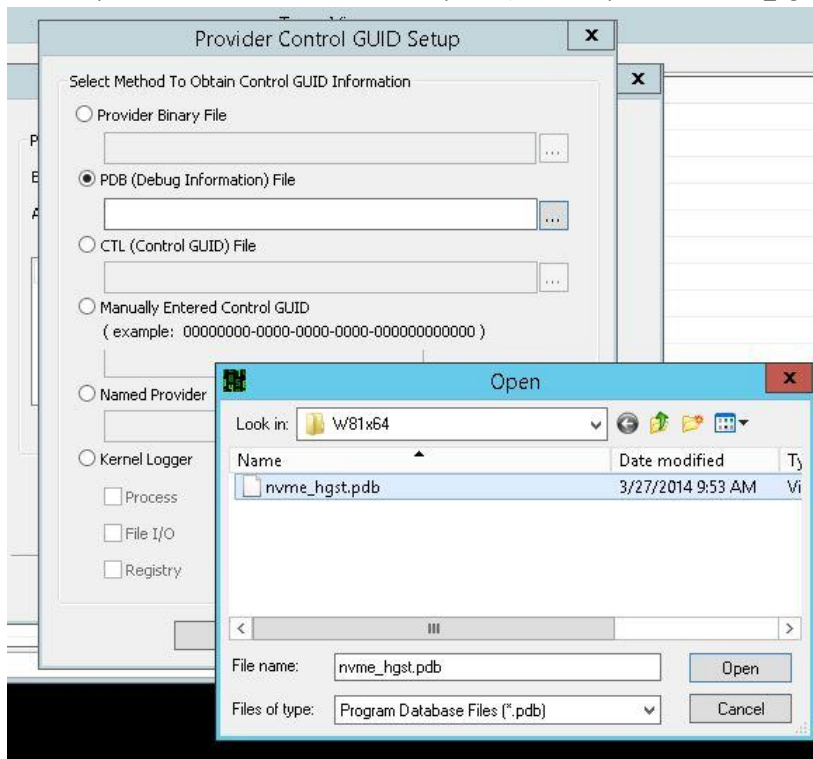
This change allows the use of severity level filters when using the ETW to collect the driver trace. Details are provided later in this document.

- 1) Three files are relevant for tracing - traceview.exe, nvme.sys and nvme.pdb.
  - a) Traceview.exe can be downloaded from MSDN.
  - b) Nvme.sys is the installed nvme storport driver.
  - c) nvme.pdb is built as part of building the driver. The nvme.pdb file used must be the version that was built when the installed version of nvme.sys was built. nvme.pdb can be found in the solution's output file (e.g. /SolutionDirectory/x64/Win8.1Release).

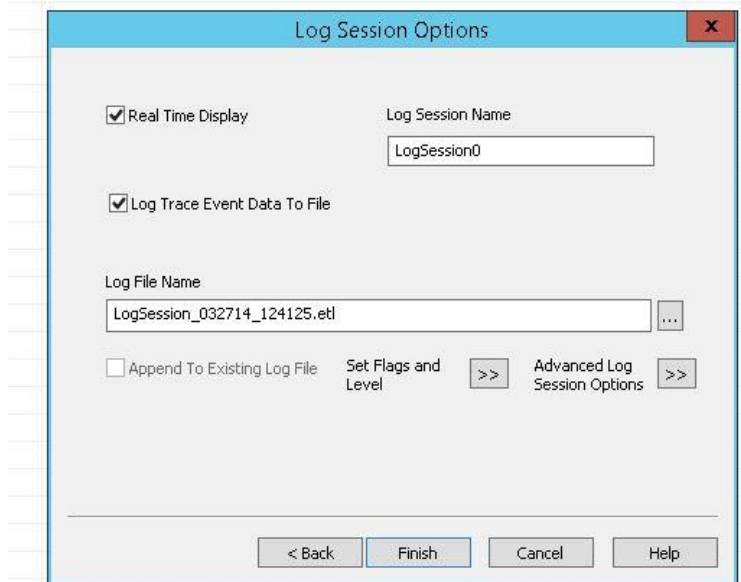
- 2) Start Traceview.exe (Run as administrator) to access trace data through ETW. The driver trace may be viewed this way ONLY if the driver was built as RELEASE.
  - a) File-Create New Log Session
    - i) Press the “Add Provider” button



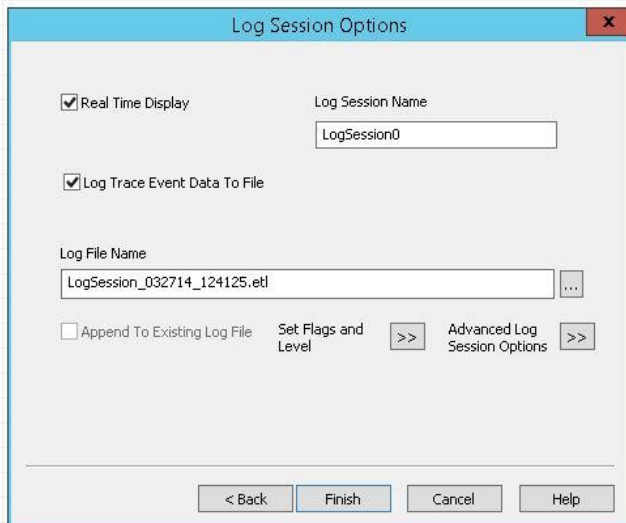
- ii) Select “PDB” and choose the PDB file - C:\PathToFile\nvme.pdb
    - iii) Select “Open” then “OK” then “Next” to complete. (The example shows nvme\_hgst.pdb – it should be nvme.pdb)



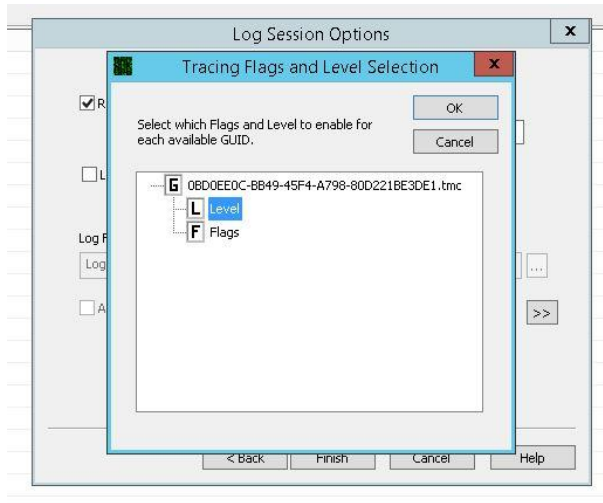
- b) Specify location for binary trace data file – if desired
  - i) Select “Log Trace Event Data to File” and specify a file for that event data.



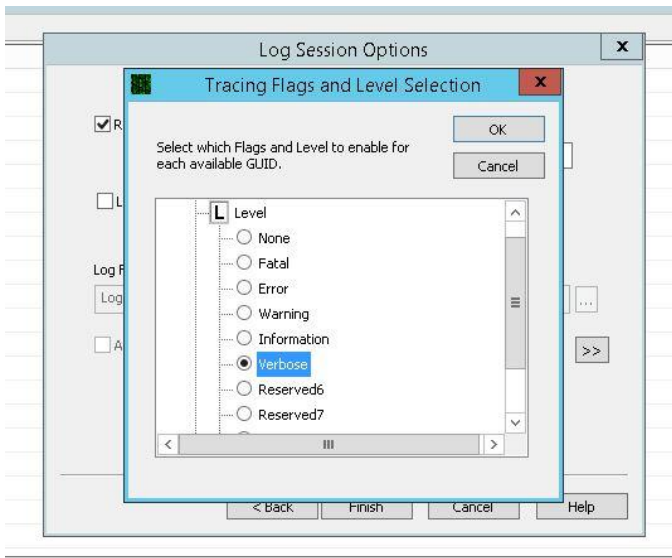
- c) If desired, enable tracing of specific Levels.
  - i) Set the tracing level from the “Log Session Options” screen
  - ii) Choose “set flags and level”



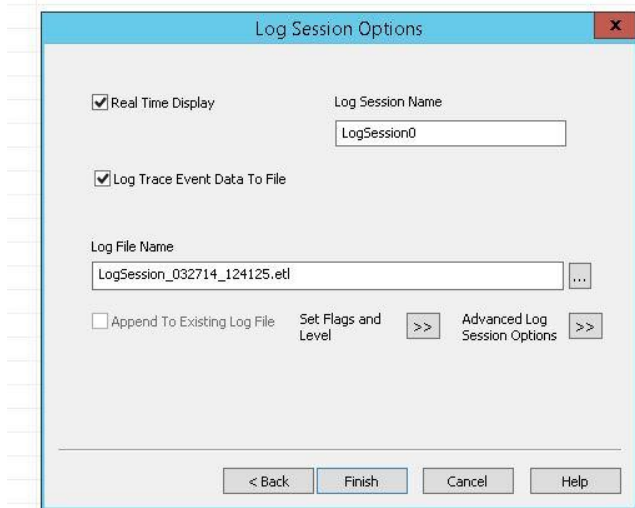
iii) Select “L Level”



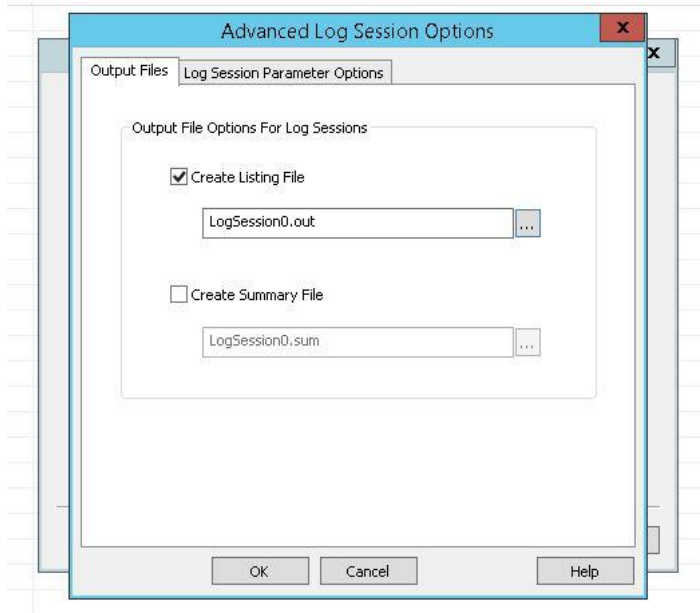
- iv) Trace filtering allows the user to specify the severity level of the trace points that are gathered. When specifying a severity level, the trace will contain all events at that level or below. E.g. when specifying a severity level of “Warning”, the trace will contain Fatal, Error and Warning trace events.
- v) In this example, the user is specifying a severity level of “Verbose”. This will gather all trace events.



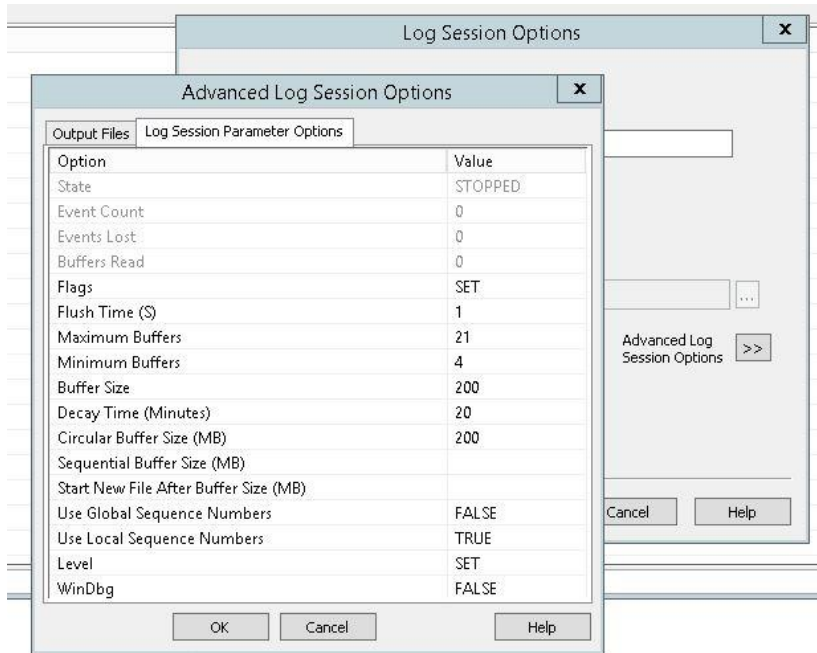
- d) If desired, specify a file for saving the text version of the trace data.
  - i) Choose “Advanced Log Session Options”



- ii) Specify the name of the listing file
  - iii) Select “OK” followed by “Finish” to complete



- e) If desired, specify that the tracing data is collected in a circular buffer.
  - i) Choose “Advanced Log Session Options”
  - ii) Choose “Log Session Parameter Options”
  - iii) Set “Circular Buffer Size (MB)”



- f) At this point, Traceview is ready to collect the driver’s trace data.
- g) Perform the driver tasks to be traced
- h) Trace data will collect in Traceview
- i) To stop the tracing – Right click on the Session Name (e.g. LogSession0). Select “Stop Trace”
- j) The trace data will be in the Traceview window and in the output files specified in the earlier steps.

