



MEMORYSCAPE MEMORY DEBUGGER

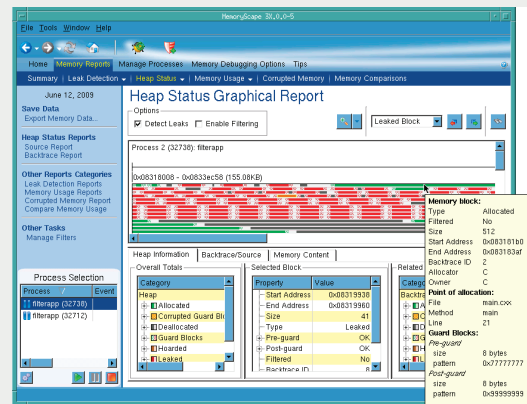
An advanced memory debugger for developers

“We switched from Purify to MemoryScope for debugging memory problems in our application. MemoryScope had the functionality and support we needed. When a problem occurs, MemoryScope’s GUI provides a very clear view of the source of the problem, and its scripting interface allows us to use it preventively by automating the bug detection process. Now we run MemoryScope continuously, around the clock. It has been very effective in uncovering the hidden latent errors in our code. It finds problems that defy the regular testing methods, and allows us to fix them proactively.”

Nick Monyatovsky
Software Engineer
SIMULIA

MemoryScope is an easy-to-use, interactive memory debugger that helps developers identify, inspect, and resolve difficult memory problems in complex multi-process and multi-threaded programs written in C, C++ or Fortran. With a graphical and intuitive user interface that simplifies memory debugging, MemoryScope efficiently and effectively guides developers of all experience levels through the memory debugging process.

Designed to be an integrated part of the software development process, MemoryScope allows developers to watch for memory leaks and monitor memory usage and heap allocations while an application is running. Enhanced facilities enable developers to monitor heap memory, view memory usage, locate memory leaks, track memory events, and show corrupted memory. Developers can save and compare memory states and compile sophisticated memory reports. In addition, memory debugging command line scripts can be used to test programs for memory errors and generate reports.



MemoryScope Benefits

- Intuitive and highly interactive interface simplifies memory debugging for developers at all skill levels
- Ability to debug memory problems in programs on the fly, without instrumentation. reduces development time
- Lightweight memory debugging technology for debugging performance critical applications
- Advanced capabilities enable analysis of heap memory usage, memory leaks, and bounds violations
- Ability to test programs in batch environments or within a test system to catch regressions in heap memory usage
- HTML and text based memory debugging reports to share insights
- Memory state saved for later offline analysis or historical comparisons

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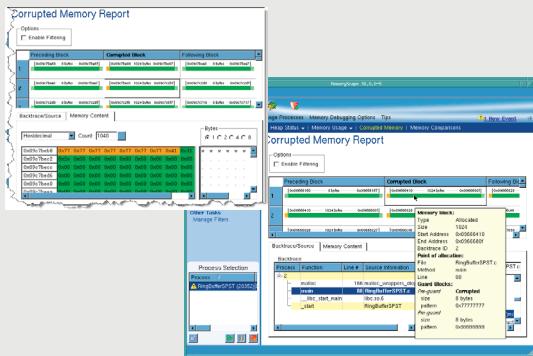
MemoryScope Features

Heap Information Display — The enhanced user interface in MemoryScope allows developers to focus on the most important memory problems. Developers can track, interpret and see relationships of allocated, deallocated, and leaked memory blocks with various status reports and a graphical browser that displays the heap layout in a simple color-coded format, clearly showing heap fragmentation.

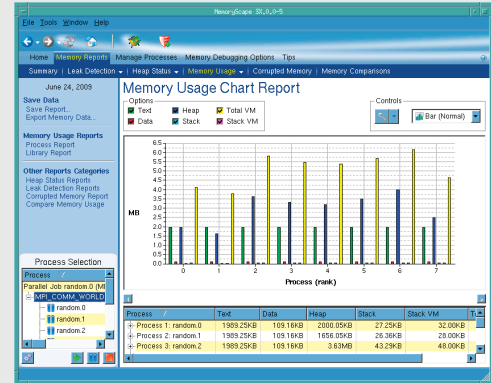
Memory Leak Detection — MemoryScope simplifies memory leak detection by producing a leak detection report that organizes information hierarchically and provides detailed information about each individual leaked memory block, such as the program line number and how many bytes were leaked.

Memory Event Tracking — MemoryScope tracks memory events, such as “double free,” can stop program execution and display event information at the time of the event.

Corrupted Memory Detection — Using patterned guard regions around each allocated memory block, MemoryScope can detect when heap memory bounds are exceeded. Once the existence of a problem is known, the red zone feature can be used to determine the precise instruction where the program tries to write outside of the allocation.



Memory Usage Reports — Using memory usage reports, developers can see the program’s overall usage of memory. These reports display the amount of memory used by text and data areas, as well as heap, stack, and virtual memory sizes. Tracking this information over time allows programmers to determine when memory usage becomes unacceptable. MemoryScope can display heap usage by source code object, function, and line number to aid developers in optimizing memory usage.



Advanced Filtering — With advanced filtering, troubleshooting memory problems is less confusing because developers can create filters that hide unnecessary data. For example, a filter can hide leaks that originate in libraries that the developer does not control.

Automated Memory Debugging with Scripts — Users, such as QA and testing developers, need an automated solution for analyzing memory use and locating memory problems. Developers can easily integrate MemoryScope into automated testing frameworks using scripts. Within these frameworks, MemoryScope can produce plain text result files that are easy to parse, HTML files that are easy to post to collaborative web development infrastructures, and/or detailed binary heap files that can be studied and compared with interactive memory debugging sessions.

Ability to Save and Compare Memory States — MemoryScope allows the state of the heap to be saved, retrieved, and compared with current memory states or other saved states. It can then create reports that show the differences between memory states to ensure previous memory problems have been fixed. Saving memory states lets developers trace the use of memory over time, which is often the best way to locate problems.

Program and Memory Information Reports — Memory debugging reports can be saved in HTML or text-based reports, allowing the results to be easily shared with team members.

Memory Debugging of MPI Programs — MemoryScope allows developers to easily memory debug parallel programs using MPI. Using simplified MPI launch facilities, it is able to track memory allocations across all the MPI processes, enabling detailed analysis of the MPI processes and comparisons between processes.

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Language and Platform Support:

- MemoryScape is supported on Linux, Unix, and Mac OS X systems
- Language support includes C, C++ and Fortran
- Up to date platform support for a wide range of compilers including GCC, PGI, Intel, and other vendor compilers.
- A full list of supported platforms and environments is available online.

Remote Memory Debugging — Using MemoryScape, application developers can memory debug processes running on remote machines - just as if they were running locally.

Ability to View Contents of Blocks — MemoryScape provides a detailed view of the contents of any allocated block of memory and allows the contents of the block to be viewed in a variety of formats.

Intuitive Navigation — An intuitive user interface makes MemoryScape extremely easy to use and guides the user through various memory debugging tasks, allowing the user to quickly locate memory debugging problems and understand how their program is using memory.

Interoperability with the TotalView Debugger — MemoryScape can be used as a standalone solution to provide all the functionality listed above. It can also be used in conjunction with the TotalView debugger, allowing developers control over program execution along with the ability to inspect the state of the program for more effective analysis of program behavior. The TotalView debugger can display pointers into the heap with status information provided by MemoryScape. Heap baselines can be used to determine exactly how memory usage changed at a very specific section of the code, such as during a function call.

About Rogue Wave Software

Rogue Wave Software, Inc. is the largest independent provider of cross-platform software development tools and embedded components for the next generation of HPC applications. Rogue Wave tools and components are designed to increase the productivity of developing applications that take advantage of parallel computing architectures. Rogue Wave's strategy marries High Productivity Computing with High Performance Computing to enable developers to harness the power of parallel applications and multi-core computing. Our products reduce the complexity of prototyping, developing, debugging, and optimizing multi-processor and data-intensive applications. We are the foremost single source for HPC software development solutions in the market today.



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