TOTALVIEW FOR HPC

Fault isolation, memory optimization, and visualization for your high-performance computing apps

TotalView for HPC is an intuitive debugger for parallel applications written in C, C++, and Fortran that shortens the process of debugging complex applications. Built for parallel computing, TotalView for HPC delivers control over processes and thread execution, along with deep visibility into program states and data.

Simultaneous debugging
Debug many processes and threads in a single window; get complete control over program execution: running, stepping, and halting line-by-line within a single thread or within groups of processes or threads.

Reverse debugging
Work backwards from failure through reverse debugging, isolating the root cause faster by eliminating the need to repeatedly restart the application.

Pinpointing and fixing bugs
Find race conditions, memory leaks, and memory overruns, allowing troubleshooting of difficult problems that can occur in concurrent programs that take advantage of threads, OpenMP, MPI, GPUs, or coprocessors.

Manage the challenges presented by concurrency, parallelism, and threads
Building a multithreaded application or transitioning from a serial to a parallel application presents significant challenges. TotalView for HPC is a source code debugger for troubleshooting complex, multiprocess programs.

- Operate with equal ease on single thread/process or with groups of threads/processes
- Set breakpoints with thread or process width to synchronize or use barrier constructs
- Control the execution of threads or processes individually or in groups
- View program data and threads/processes with parallel backtrace
- Troubleshoot deadlocks and race conditions
- Work with automatically defined lockstep or custom groups
- Multi-language debugging — C/C++ with Python

“TotalView for HPC has proven to be a valuable tool for debugging our data-intensive reservoir modeling and simulation software. It helps us find bugs fast, so we can get our products to market sooner.”

Birgir Sigurjonsson
Principal software engineer
Roxar AS
Stavanger, Norway
Showing Dining Philosopher example with multiple threads

Detect and analyze memory errors

TotalView for HPC includes MemoryScape, a dynamic memory analysis tool that reduces time spent on memory debugging. The powerful memory error and analysis tool has a low performance overhead with an interface that allows for identification of heap memory within a program.

- No need to recompile applications
- Detect leaks and errors in vendor libraries
- Track allocated, deallocated, and leaked memory blocks
- Detect memory leaks early
- Flag memory leaks and events before they crash your application
- Detect corrupted memory
- Analyze memory usage patterns
- Support for multiprocess and hybrid applications in clusters

Record, save, and replay executing history

ReplayEngine, included in TotalView for HPC, records and saves execution, making it possible to work back from a failure, error, or crash to find the origin without repetitive restarts and stops. It allows storage of the recording to investigate the error at any time. ReplayEngine reduces the amount of time invested in troubleshooting your code.

- Freedom to explore application execution either backwards or forwards
- Step back through execution history and review all variables
- Go back and look at functions and variables in the context of a crash
- Easily follow the logic of unfamiliar routines
- Set a watchpoint and run back to find the source of unexpected data
- Enable recording during a debug session without detaching