

# TotalView

Multi-process debugger for LynxOS



*Fast, intuitive debugging of multiprocessor and distributed applications*

TotalView™ is the only source level, window oriented, embedded debugger designed specifically for today's distributed multi-tasking environments. With TotalView, developers are able to rapidly and accurately debug multi-process, multi-threaded and multi-processor applications and systems—even when processes are executing across numerous diverse platforms and remote machines.

While traditional single-process debugging tools make it virtually impossible to visualize the different states of a multi-process application, TotalView is designed specifically to provide this kind of scope and clarity. At the same time, the software's intuitive GUI enables developers to concentrate on debugging rather than on learning complex new commands or on determining how best to configure and access multiple machines. The net result is an accelerated time-to-market for products using advanced multiprogramming technologies combined with decreased developer overhead and training demands.

## A clearer view

The ability to access information from multiple processes is at the heart of TotalView's design, allowing it to represent system state with greater clarity than is possible with multiple invocations of single-process debuggers.

Developers enjoy all the standard features of a modern debugger plus many additional capabilities designed specifically for rapid multi-process debugging:

- Threads and processes can be started, stopped, restarted, deleted and viewed easily

- Users can conveniently connect to any process on the system with a simple mouse click
- The way tasks react to events such as signals and breakpoints can be controlled and altered
- Code can also be patched on-the-fly so that different execution scenarios can be tested rapidly without recompiles
- Multiple processes on multiple processors can be grouped and when one process hits a breakpoint all the "grouped" processes will be stopped. This can be very helpful in client-server style distributed systems

Even processes not under TotalView's direct control can be attached and controlled, thus providing users absolute authority over their application's operation.

## Windowing for the total picture

The TotalView GUI is highly intuitive with windows, popup menus and online help available for all commands. Hence users are free to concentrate on the process of debugging without having to memorize long lists of commands. This in turn enhances productivity and drives down training costs.

## Viewing processes simultaneously

TotalView windows are free-floating with each window covering a specific kind of data display (see sidebar). This display methodology enables data from different processes to be viewed simultaneously, in contrast to monolithic-display debuggers that only display information related to a single process or thread at any given time.

## TotalView Advantages

- Accelerated time-to-market— effectively debug state-of-the-art distributed processing technology
- Decreased developer training— streamline multi-process, multi-threaded and multi-processor debugging through window orientation and intuitive, easy-to-use GUI
- Lower developer overhead— minimize time spent coordinating multiple debug sessions and synchronization issues for multi-process debugging

## Diving into detail

With TotalView, data and information types are managed as objects. This empowers users to "dive" into data structures as well as processes and threads for a more detailed view. Simply right clicking on a diveable object displays data for that object in a new window. This data may contain other objects that are themselves diveable. For example, diving into a thread displayed in the root window opens a thread window, diving into a function displays its source code, diving into a variable in the source code opens a variable window, and diving into a variable in a variable window displays the referenced structure.

## TotalView for total control

TotalView decreases developer overhead by reducing the time spent configuring and ac-

cessing multiple machines for multi-process debugging. Developers are able to easily develop and debug the most sophisticated multitasking applications distributed across numerous machines without impediments and with complete control over the application.

A variety of multi-process debugging scenarios are supported by TotalView, including:

- Multiprocessor
- Distributed among many processors
- Client-server
- Remote target

For remote debugging, TotalView utilizes a unique and highly compact TCP/IP-based debugger server (tvdsvr), which communicates back to the host machine. Unlike other debugging servers, tvdsvr can attach to any process on the target system as opposed to just attaching to a single process.

As a result of this architecture, debugging a program distributed across multiple machines is as easy as debugging it on a single machine.

## Seeing and managing it all

TotalView's mouse-driven interface is built around windows that provide comprehensive detailed information on the makeup of applications. Key window types include:

- Thread windows—for displaying process/thread location and status; stack trace, stack frame and source code for selected routine; breakpoints, and evaluation points and event points set in source machine code
- Root window—for displaying all processes/threads within a TotalView environment
- Process groups window—for displaying process groups for all of a multi-process program
- Variable window—for displaying the address, data type and value of a local variable, register or global variable
- Action points window—for displaying a summary of action points—e.g.: break-points, evaluation points, event points—in a program, which can be set, deleted, enabled, disabled, suppressed and unsuppressed at both source and machine levels
- Expression window—where code fragments, including functions calls used by the current process, can be written and evaluated

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