Compuware® NuMega® DriverStudio®

Accelerating Device Driver Development
Comprehensive tools for Windows device driver development

Finally, state-of-the-art tools to design, debug and test device drivers.

The experts who brought you the best application tools turn their talents to device driver development.

Quickly develop more reliable device drivers with tools that accelerate key phases of device driver development.
Windows 2000 offers a host of new challenges for the device driver developer.

Plug and Play, power management and new WDM driver architectures make developing and testing even the simplest device drivers more complex than ever. DriverStudio simplifies Windows 2000 driver development from design to deployment with new WDM classes, default handling of Plug and Play messages, and comprehensive trace facilities that “peel back the cover” to expose the real operation of the Windows 2000 kernel.

NuMega DriverStudio—The ultimate device driver development tools

Device driver programming—often considered the realm of the elite developer—has become a serious bottleneck for innovation. Difficult to write and of catastrophic consequence when they fail, device drivers are considered by Microsoft to be the leading cause of Windows system stability problems.

With the introduction of DriverStudio, Compuware is building on a long history of award-winning tools for device driver and application development. This innovative new suite includes the time-tested SoftICE, DriverWorks, VtoolsD and DriverAgent tools—plus new device driver tools based on the application-level technologies developed for BoundsChecker, TrueTime, TrueCoverage and FailSafe.

The result is a suite of tools that accelerates the development, debugging, testing, tuning and deployment of device drivers. DriverStudio brings high quality tools and modern software engineering practices to the once-neglected area of device driver programming.
Highlights of DriverStudio

DriverStudio offers tools that accelerate development and improve testing and reliability of Windows device drivers. Regardless of your level of expertise, phase of development or existing tool preferences, DriverStudio will make your device driver development easier.

Getting started
If your requirements include a device driver for Windows NT, Windows 2000 or a Win32 Driver Model (WDM) driver for Windows 98, DriverWorks offers the unique DriverWizard for automatic code generation. The carefully-crafted class library reduces complex operations to simple interfaces and models the object-oriented nature of the underlying operating system even better than the procedural C-based interfaces provided by the Microsoft DDK.

For VxD developers (Virtual Device Drivers on Windows 9x), the award-winning VtoolsD includes the QuickVxD code generator and complete support for driver development in C or C++.

For many developers, DriverAgent provides the ideal introduction for building a hardware interface. Without writing a device driver, the DriverAgent user can access hardware by writing a simple Win32 application in C, C++, Visual Basic, Java or Delphi. The resulting application works transparently on Windows 9x, Windows NT and Windows 2000 systems.


Understanding the system
Writing a device driver correctly requires a detailed understanding of the operation of the Windows operating system. The detailed system instrumentation provided by BoundsChecker Driver Edition offers a unique peek into the workings of the Windows kernel.

Error detection and debugging
SoftICE is the only single-machine debugger for kernel-mode programming in Windows. The product gives developers unparalleled control and visibility into kernel-mode drivers and the operating system itself.

BoundsChecker Driver Edition monitors the operation of selected device drivers, optionally signaling errors that occur when the driver issues system calls. To help resolve system crashes (the infamous Blue Screen Of Death), DriverWorkbench works closely with BoundsChecker Driver Edition to provide a detailed trace of system activity stored in a crash dump file and quickly find errors that would otherwise be nearly impossible to detect.

Performance tuning
TrueTime Driver Edition* uses the performance monitoring engine originally developed for applications to pinpoint performance bottlenecks, helping developers focus their efforts on critical issues for better performing products.

Testing your driver
Because a faulty device driver can cause a catastrophic system crash, it is vital that device drivers be thoroughly tested. TrueCoverage Driver Edition* gives the developer code coverage analysis, ensuring that all code paths in the device driver are tested before the software is released to the field.

Deployment and remote error handling
Sometimes problems occur only on particular system configurations. DriverStudio tools help identify and debug problems in the field by offering FieldAgent technology that allows the developer to configure BoundsChecker Driver Edition to monitor customer systems. The resulting errors can be debugged using new SoftICE remote debugging capabilities, or analyzed by the DriverWorkbench crash analysis engine.

*TrueTime Driver Edition and TrueCoverage Driver Edition will be available at no additional charge to all subscribers later in 1999.
Use powerful wizards to get your driver on track fast.

NuMega DriverWorks
The DriverWorks tools provide an automated way to develop device drivers for Windows NT, Windows 2000 and Windows 98 WDM. The product includes the innovative DriverWizard, which leads you through the device driver development process and automatically generates device driver source code from a description of your hardware.

- Class libraries encapsulate common operations, reducing your coding effort dramatically
- DriverWorks includes complete source code, including tens of thousands of lines of sample and library source code
- NuMega Driver Access Architecture provides source code compatibility across all Windows systems.

NuMega VtoolsD
VtoolsD includes all of the documentation, wizards, libraries and example code you need to write VxDs for Windows 98, Windows 95 and Windows 3.1 in either C or C++. The QuickVxD wizard quickly creates the framework for your driver, saving you time and effort:

- Microsoft DDK is not required
- VtoolsD libraries are carefully crafted to ensure optimal performance
- NuMega Driver Access Architecture provides source code compatibility across all Windows systems.

NuMega DriverAgent
DriverAgent gives Win32 applications direct hardware access and control. Use DriverAgent to build rapid prototypes used for testing the hardware, stand-alone diagnostic packages that reduce the complexity of a related device driver; or end-user applications that combine ease of programming with performance close to native device drivers, but requiring a fraction of the development effort.

- Fast and easy access to hardware from Win32 applications
- Interfaces are language independent—DriverAgent supports: C, C++, Java, Delphi and Visual Basic
- Configuration tool simplifies Plug and Play setup for developer and end user.

NuMega DriverWorks
NuMega VtoolsD
NuMega DriverAgent
Find and fix system-level errors with ease

**NuMega SoftICE 4.0**

SoftICE reduces debugging downtime by providing powerful features that extend beyond the limitations of the traditional Windows SDK/DDK tools. SoftICE has unique system-wide views and controls that make it easy to understand and diagnose the widest variety of Windows software problems.

- Remote debugging over the Internet
- Provides single-machine, source-level debugging capabilities
- Supports Windows NT, Windows 95, Windows 98 and Windows 2000, providing powerful, reliable debugging for companies building device drivers and system components for any Windows platform

- SMP Support—(SoftICE Windows NT)
  SoftICE now supports debugging on Pentium, Pentium Pro and Pentium III multiprocessor systems with up to 8 CPUs that use the standard Intel multiprocessor scheme (APIC)

- Supports Microsoft's Kernel Debug extensions.

SoftICE [is] a powerful debugger that will debug all the way into the Windows kernel, in order to give you ultimate insight into the behavior of your program.

*InfoWorld*
*October 27, 1997*
DriverWorkbench displays the series of events that led to the failure.

NuMega BoundsChecker 
Driver Edition

BoundsChecker Driver Edition watches all calls into the operating system kernel. In addition to detecting parameter errors, BoundsChecker maintains a record of the operation of selected device drivers. This record is available for display and analysis by SoftICE and DriverWorkbench.

• Dozens of programming errors are detected automatically
• The trace log exposes the operation of the operating system, and helps you understand the interface between the operating system and the device driver
• Easy configuration lets you collect only the information you need, whether you want a broad collection of all system events or a specific set of APIs in your driver only.

NuMega DriverWorkbench

DriverWorkbench provides easy access to a variety of important device driver development, test and debug capabilities. This includes Crash Analysis and Debugging, FieldAgent configuration and graphical display of BoundsChecker events.

• Easily determine the cause of system crashes using the system crash analyzer
• Understand what happened prior to a crash by reviewing the BoundsChecker event log recovered from crash files
• Learn how the operating system behaves by monitoring calls to and from any driver
• View system information about drivers, modules and processes using the powerful debugging interface
• Fully compatible with Microsoft’s Kernel Debug Extensions.

NuMega FieldAgent

Even though your driver runs flawlessly on your development system, it behaves poorly at your customer’s site. Sound familiar? FieldAgent gives you the tools you need to solve remote problems.

• Distribute a configured BoundsChecker engine to collect events from customer sites
• Configure the customer installation quickly and easily
• Store and retrieve event data for detailed analysis.
NuMega TrueCoverage automatically locates untested code in device drivers.

NuMega TrueTime Driver Edition (coming soon—free to all subscribers)

If performance is important, you need TrueTime Driver Edition. Building on the NuMega TrueTime performance analysis tool for applications, the Driver Edition provides detailed timing information that helps you identify performance bottlenecks quickly and easily.

- Pinpoint slow code and performance bottlenecks anywhere in the code
- Obtain the most useful kernel-mode performance data possible
- Analyze comprehensive timing, statistics and data for drivers, source files, libraries, procedures and individual lines of code.

NuMega TrueCoverage Driver Edition (coming soon—free to all subscribers)

Device driver problems are especially destructive because an untested piece of code can easily cause the entire system to crash. Be sure that your drivers are tested thoroughly with TrueCoverage Driver Edition.

- Gather coverage information without changing your source code
- Merge multiple test runs to aggregate resulting coverage data
- Build instrumented drivers painlessly.

...the TrueCoverage tool, which automates the tedious task of ensuring that all the code in a complex software project has actually been exercised in prerelease testing. This seems like such a basic thing, but few nonprogrammers have ever considered the complexities of testing every path through one of today’s event-driven applications.

“Quality software heads for the Super Bowl”
PC Week
December 2, 1998
More than just a product

Operating systems are always in a state of transition, and your success depends on keeping pace. Compuware keeps you current by providing DriverStudio in a subscription format. This means that you aren’t just purchasing a product or even a suite of products. When you purchase a DriverStudio subscription, you become a member of Compuware’s driver development community. This membership includes a full year of access to all upgrades, new tools, beta programs, premium technical web content, preferred access to technical support, and more.

Visit the Driver Zone at www.compuware.com/driverzone for detailed product information.

Compuware products and professional services—
the commitment to stable applications

From application development to testing and management, Compuware products and services help achieve stability and software quality throughout the business enterprise. At 14,000 of the world’s largest corporations, Compuware products are bridging client/server, mainframe and Internet-related technologies. Please contact Compuware to learn more about our ideas on end-to-end application stability. We would be happy to share Compuware’s quarter century of information technology achievement with you.

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