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Windows Research Kernel

Overview

The Windows Research Kernel (WRK) packages core Microsoft Windows XP x64/Server 2003 SP1 kernel source code with an environment for building and testing experimental versions of the Windows kernel for use in teaching and research. The WRK includes source for processes, threads, LPC, virtual memory, scheduler, object manager, I/O manager, synchronization, worker threads, kernel heap manager, and other core NTOS functionality.

The WRK is useful in design projects that allow your students to explore operating system (OS) principles using the Windows kernel sources. It enables advanced teaching and research by facilitating building experiments and projects based on modifying the Windows kernel, as well as by promoting better understanding of the Windows architecture and implementation.

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WRK Details

The Windows Research Kernel contains the sources for the core Windows (NTOS) kernel. NTOS implements the basic OS functions for processes, threads, virtual memory and cache managers, I/O management, the registry, executive functions such as the kernel heap and synchronization, the object manager, the local procedure call mechanism, the security reference monitor, and low-level CPU management (thread scheduling, Asynchronous and Deferred Procedure calls, interrupt/trap handling, exceptions).

The NT Hardware Abstraction Layer, file systems, network stacks, and device drivers are implemented separately from NTOS and loaded into kernel mode as dynamic libraries. Sources for these dynamic components are not included in the WRK. However, some are available in various development kits published by Microsoft, such as the Installable File System (IFS) Kit and the Windows Driver Development Kit (DDK).

The WRK includes most of the NTOS kernel sources from the latest released version of Windows, which supports the x64 architecture on the desktop. The kernel sources excluded from the kit are primarily in the areas of plug-and-play, power management, the device verifier, kernel debugger interface, and virtual dos machine. The primary modifications of the released kernel for the WRK are related to cleanup and removal of server support, such as code related to the Intel IA64.

WRK is primarily intended for faculty and instructors working in the area of operating systems who develop courses and write textbooks and want to include information about the Windows kernel based on the actual source code. The WRK includes a build/test environment and binaries for the omitted source components, which can be used to build fully functional NTOS kernels that can be installed on Windows Server 2003 for x86/x64 and Windows XP x64.

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Use and Restrictions

- The WRK, and all the components of the Windows Academic Program, are for academic, non-commercial use only.

Eligibility Requirements

- Use of the Windows Research Kernel requires academic affiliation with an accredited institution of higher education and direct involvement in teaching and/or research, such as being academic faculty members, system or lab administrators or instructors, students enrolled in relevant undergraduate or graduate programs, or academic researchers working on faculty sponsored projects.
- Users must accept the terms and conditions of the Microsoft Windows Research Kernel Source Code License.

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Fulfillment

- The Windows Research Kernel is available via [MSDNAA Subscriber Downloads](#) (accessible to administrators of participating departments) and/or via [Faculty Connection](#) portal (sign in to register for downloads) to eligible academic faculty or staff and may be redistributed to eligible users subject to the terms and conditions of the License.

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Customer Commitment

In exchange for obtaining access to the Windows Research Kernel, Microsoft requests that users respect our intellectual property and adhere to the license requirements.

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Questions

If you have questions about the Windows Research Kernel, please send e-mail to compsci@microsoft.com. You can also ask questions about WRK and share helpful information with other members of the academic community on the Windows Academic Program discussion forum located at http://forums.microsoft.com/windowsacademic.

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