

eVM[®] for Windows[®]

The Embedded Virtual Machine Manager for Windows

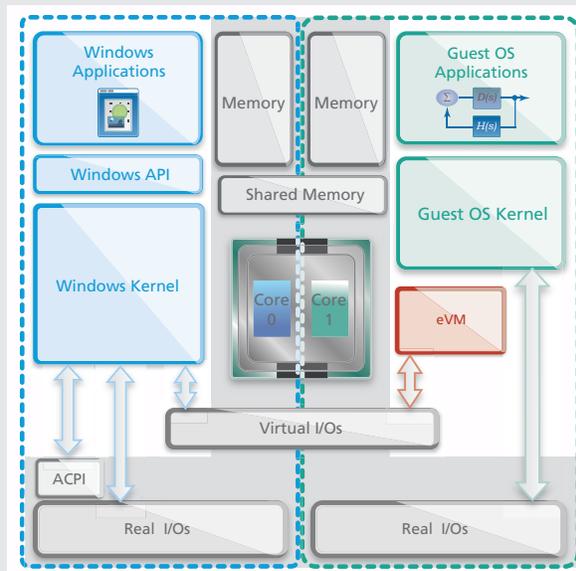
- Run your embedded and real-time operating systems alongside Windows without sacrificing determinism, performance, or features.
- Exploit Intel's latest virtualization and multi-core technology to consolidate all your applications on to one platform

eVM Features

- Lowers your total systems costs by consolidating CPU subsystems into one main system
- Preserves your proven applications and legacy OS software without modifications
- Enables PC compatible guest operating systems including QNX[®], Windows[®] CE, VxWorks[®], T-Kernel (iTRON), RMOS3, Linux and others to run with Windows[®] on the same multi-core platform
- Lets you dedicate one Windows 7, Vista or XP instance across any number of cores without compromising features or performance
- Installs easily – systems can be integrated and running in a matter of minutes

TenAsys' eVM for Windows embedded virtualization manager fundamentally changes the economics of building complex embedded systems. Now embedded system designers can consolidate multi-platform systems, while preserving their legacy software investments. eVM for Windows uses the latest hardware-assisted virtualization features in Intel VT processor platforms to enable system developers to combine third-party operating system environments with applications designed for Microsoft[®] Windows.

eVM[®] for Windows runs both on one platform



The TenAsys eVM for Windows embedded virtualization platform provides a virtual machine environment that hosts an embedded or real-time 'guest' operating system alongside Windows on the same multicore processor platform.

Embedded virtualization makes it work.

eVM Provides:

- Virtual PC supporting real-time operating systems with dedicated CPU and memory
- Interconnects to Windows virtually
- Dedicate hardware interfaces to guest operating systems

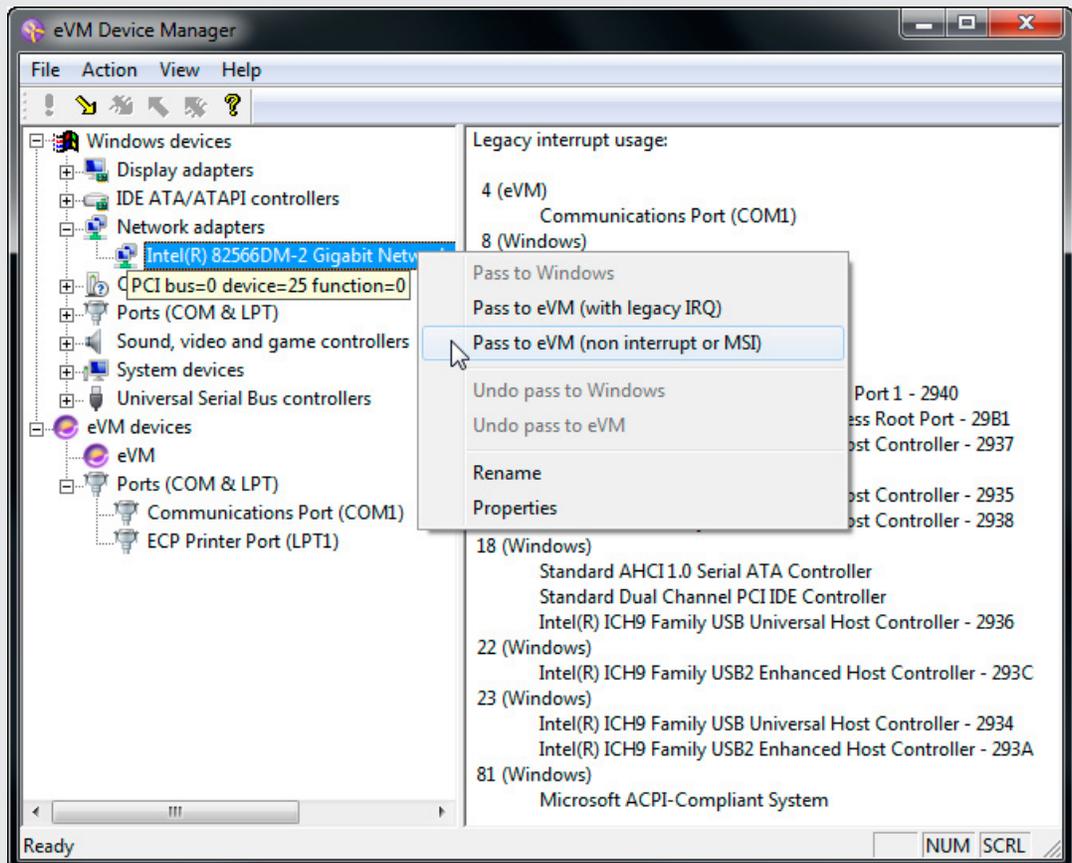
System consolidation reduces cost and extends the life of field-proven software.

Embedded applications often need a mix of features, typically a human interface or off-the-shelf analysis or database software package that is developed to run on a general purpose OS (GPOS) such as Windows. They also typically require control and data acquisition software that is designed to run on a real-time operating system (RTOS). Traditionally, because the two types of operating environments (RTOS and GPOS) are optimized for different types of processing, embedded systems have required multiple processing platforms, with the extra manufacturing cost and development complexity that this entails. For the bulk of embedded system designers, those problems are now concerns of the past.

By using eVM for Windows to host your real-time software and Windows applications on the same platform you eliminate redundant hardware while improving system reliability. Right out of the box, eVM is the easiest to use, most cost-effective embedded virtualization solution available. It is not necessary to abandon the proven legacy application code for which you've made major investments. eVM preserves the integrity of your software domains and allows your OS to preserve control of the devices it controlled before.

Partition real hardware resources between Windows and guest OS

eVM Device Manager makes it easy to assign hardware interfaces to the guest operating system environment. Devices 'passed' to eVM are automatically enumerated on the guest PCI bus for dedicated use.



Deterministic response to real-time events

eVM for Windows embedded virtualization platform provides a bare metal virtual machine environment that hosts an embedded or real-time operating system alongside Windows on the same multicore processor platform. Unlike schemes that virtualize the entire machine environment at the expense of responsiveness, eVM partitions the platform to ensure that critical hardware interfaces aren't virtualized, guaranteeing maximum performance and deterministic response to real-time events.

eVM for Windows does not require that any software modifications be made to guest operating systems, drivers, or application code. This avoids costly and risky modifications or rewrites, support costs and the risk of system reliability problems. Software services supplied by eVM for Windows run in hard real-time, allowing the guest OS to retain its native execution characteristics.

Native functionality

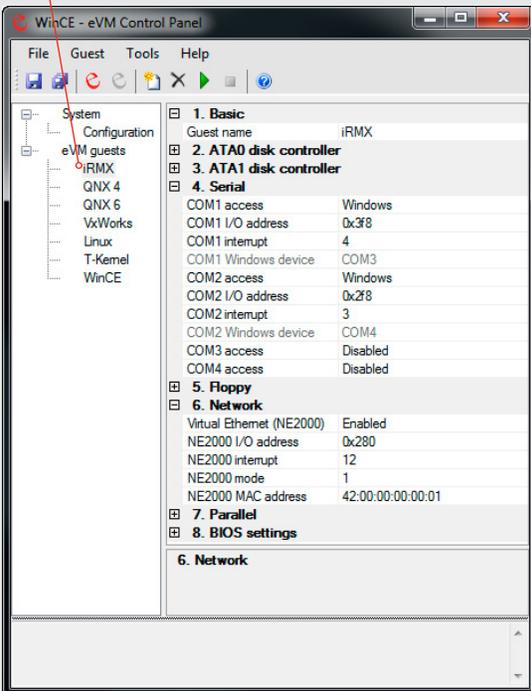
There is no virtualization of Windows. No change to Windows SMP configuration or additional hardware virtualization detracting from performance or functionality. Both Windows and guest OS boot natively, exactly as if they were running stand-alone.

eVM for Windows shortens time to market, reduces risk:

- Based on proven embedded virtualization technology
- Not a para-virtualization approach – no special OSes, driver, or software modification required
- Systems can be integrated and running in minutes.
- Includes sample guest RTOS for reference and experimentation
- Run your RTOS and application software alongside Windows, right out of the box.

Configure guest OS environment

Use the supplied sample guest iRMX RTOS as a reference for quick integration and configuration experimentation.

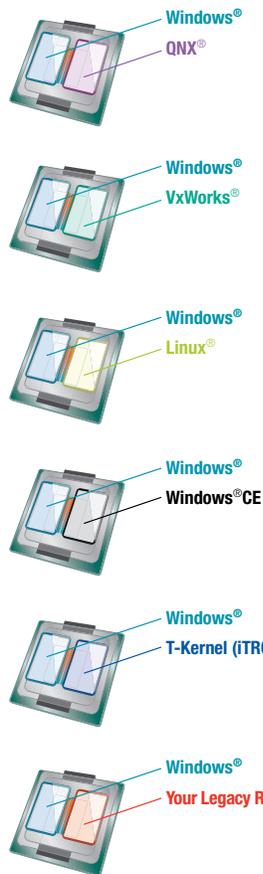


Link your real-time and Windows applications

Besides hosting multiple OSes on a single multicore platform, eVM provides virtual communications channels in shared memory to link your embedded and Windows applications. The PC platform's traditional Ethernet interfaces are now virtualized, giving immediate links between your Windows and guest RTOS applications without requiring any changes to applications or native driver software. This simplifies the task of adding Windows functionality to legacy real-time applications, or adding real-time device interfaces to Windows applications.

eVM is easy to configure and use

eVM is as easy to install as a standard Windows application. Your system can be integrated and running in a matter of minutes. All of the necessary installation/integration tools are included. With the Windows-based eVM control panel, assigning interrupts, allocation of I/O devices, and the set up of disk boot images (see screen shot) is a simple task. You can set up multiple RTOS guest configurations and easily start and stop a RTOS guest from this screen. The RTOS guest console connects to the Windows side of your system through the use of virtual COM ports. The interactive eVM Device Manager controls the passing of resources, including real-time interfaces, from Windows to the RTOS.



eVM takes care of the details

After the system is set up, eVM provides your guest RTOS with the lowest possible interrupt latency, direct and high-speed access to I/O, non-paged RAM, and guaranteed ownership of a CPU core. In most cases your RTOS runs exactly the same way as it would on a separate legacy platform. There is no need to modify drivers or change code in order to make this work. You connect to your RTOS system almost the same way as you did before.

Tenasys, the real-time virtualization experts

Since 1980, customers worldwide have entrusted TenAsys INtime® and iRMX® products to provide reliable, deterministic control in a wide array of mission-critical applications including: medical, telecommunications, industrial control, robotics, test and measurement, and military applications.

Tenasys is the longest supplier of embedded virtualization products for the PC architecture and still the only RTOS vendor providing solutions for Windows platforms. The company's INtime RTOS has been ensuring determinism in dual-OS systems alongside Windows for more than a decade. With this experience, it was natural for TenAsys to take the lead in the development of real-time, embedded virtualization solutions for other RTOS environments. Our close ties to Intel technology have enabled us to make optimal use of the virtualization support that Intel builds into its processors to deliver maximum performance and highest reliability to embedded applications worldwide.

Buy online today

eVM for Windows is available for purchase on-line at www.tenasys.com

System Requirements

- **Intel VT-x enabled multi-core processor platforms running Microsoft Windows** Intel PC-compatible system with an Intel VT-aware BIOS; Hyperthreaded single core, dual-core or multi-core CPU; Microsoft Windows 7, Windows Vista, Windows XP, Windows XP Embedded, Windows Server 2003 and Server 2008.
Platform also needs VT-d for DMA bus mastered interfaces using native guest device drivers.
- **PC-bootable embedded OS image** Bootable from a CD-ROM, hard disk, floppy, or any other INT 13H boot device.
- **Headless guest RTOS application** Microsoft Windows runs at full speed in all graphics modes; the embedded OS and application run "headless"; text-based serial console I/O is supported; emulation of embedded graphic devices are not supported at this time; keyboard, mouse, and video devices are allocated to Microsoft Windows only.
- **Real-time OSes validated with eVM** QNX version 4 and newer, Windows CE, VxWorks, T-Kernel (iTRON), Siemens RMOS3 and Linux, others to follow. See tenasys.com for complete listing of validated OSes.