



Windows® Embedded Standard: Product Overview

Introduction

Windows Embedded Standard is the next generation of Windows® XP Embedded. It delivers the power, familiarity, and reliability of the Windows operating system in componentized form, helping device makers to easily create smart connected devices requiring rich applications, services, and end-user experiences. Windows Embedded Standard features technologies that easily connect with many common industry standards plus several Microsoft desktop and server technologies which can help lead to lower costs in application development, operating system deployment, servicing, and maintenance.

With Windows Embedded Standard, developers get access to a mature technology portfolio of embedded specific tools that work in the familiar developer environment of Visual Studio, and allow them to rapidly configure, build, and deploy devices that are more secure, reliable, and manageable. Support for the most commonly available PC architecture processor families; compatibility with thousands of certified, production-quality, off-the-shelf applications, drivers, and services; and a global ecosystem of Windows Embedded Standard experts help ensure that device makers have flexibility and access to the skills to develop the next generation of smart connected devices with confidence.

Windows Embedded Standard includes security and management technology updates to help embedded devices connect seamlessly to Windows Vista and take advantage of the new features in Windows Server 2008. Build sophisticated devices with visually compelling user experiences. Windows Embedded Standard delivers features that enable next-generation media experiences, rich interactive applications, and compelling user interfaces – helping device makers bring innovative devices to market faster than ever before, while offering unparalleled connected experiences



Windows Embedded Standard – Powerful Features

Windows Embedded Standard is a componentized version of the Windows® XP Professional operating system that brings the rich feature set of Windows® to embedded devices. Choose from over 12,000 individual feature components based on Windows® binaries to achieve optimum functionality in a reduced footprint. The array of embedded-enabling features in Windows Embedded Standard help support embedded-specific device scenarios. Learn about the many features and technologies that make Windows Embedded Standard the ideal embedded operating system for your next device.

- **Latest Multimedia and Web Browsing:**

- **Internet Explorer 7:** Comes with improved navigation and search, improved printing, and access to RSS feeds. Dynamic security protection provided by a robust new architecture, helps defend against malware and phishing. Windows Internet Explorer 7 also provides an improved platform for web development and manageability through support for CSS, RSS, and enterprise deployment and management.
- **Windows Media™ Player 11:** Includes new media features designed to help manage libraries of digital music, photos, and videos. Windows Media Player 11 automatically converts media files — even protected audio and video files — to optimal quality for smart connected device.
- **Microsoft Silverlight:** A cross-browser, cross-platform plug-in for delivering the next generation of media experiences and rich interactive applications (RIAs) for the Web that incorporate video, animation, interactivity and stunning user interfaces.
- **DirectX® 9 (Direct3D®, DirectDraw®, and DirectPlay®):** Enables rich graphics such as 3-D and full color along with video, interactive music and surround sound.
- **Television Technologies:** Supports both digital and analog television reception and display, digital video recording and includes a stream buffer engine which enables time shifting for video recording.



- **Supports a wide variety of industry-standard networking technologies**
 - **Remote Desktop Protocol (RDP):** RDP allows a thin client, such as a Windows-based terminal, to communicate with a terminal server across a LAN, wide area network (WAN) or virtual private network (VPN) connection. Windows Embedded Standard release provides the latest version of Remote Desktop Protocol (RDP 6.1) to help enable Windows Embedded Standard-based thin clients, point of service devices, and multifunction printers to connect using the latest version of Windows Server remote computing technologies. RDP helps you use the new Terminal Services (TS) features and updates introduced in Windows Vista such as Network Level Authentication, Server authentication, resource redirection, TS gateway servers, Remote Programs, monitor spanning, and other visual improvements.
 - **802.11:** Windows Embedded Standard supports the 802.11 wireless LAN (WLAN) standards, providing high bandwidth connectivity.
 - **802.1X:** 802.1X helps provide security-enhanced access to the network to support WLANs and Ethernet. It enables interoperable user identification, centralized authentication and dynamic key management and can help achieve both wired and wireless LAN security-enhanced access.
 - **Wi-Fi Protected Access 2 (WPA2):** Windows Embedded Standard provides support for WPA2, the latest wireless security solution derived from the IEEE 802.11i standards. WPA2 delivers support for the new Wi-Fi Alliance certification for wireless security, making it easier to connect to public spaces that are equipped with wireless Internet access — locations otherwise known as "Wi-Fi hotspots."
 - **Universal Plug and Play (UPnP):** Universal Plug and Play (UPnP) is an architecture for pervasive peer-to-peer network connectivity of devices of all form factors, including intelligent appliances and wireless devices. UPnP is a distributed, open networking architecture that leverages TCP/IP and the Web to enable seamless-proximity networking in addition to control and data transfer among networked devices.
 - **Win HTTP Services:** WinHTTP provides developers with a high-level interface to HTTP. WinHTTP is used primarily in server-to-server HTTP



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communication, and can be used in conjunction with Microsoft Internet Information Server (IIS).

- **IPv6:** Windows Embedded Standard supports Internet Protocol version 6 which provides longer IP addresses, better routing capabilities, and more integrated security.
 - **Universal Serial Bus (USB):** USB 2.0 (as well as 1.0) is supported, and USB 2.0 supports a wide array of USB peripherals such as scanners, mice, keyboards, and so forth.
 - **IEEE 1394:** An emerging standard for consumer video.
 - **Internet Connection Sharing:** Enables multiple devices to share a single Internet connection.
 - **Advanced Graphics Port (AGP):** AGP technology provides a dedicated, high speed port through which large blocks of 3-D texture data can be moved between the computer's graphics controller and system memory. It frees CPU resources and enhances overall graphics performance.
 - **Point-to-point protocol over Ethernet (PPPoE):** PPPoE enables LAN users to gain individual authenticated access to high-speed data networks and provides an efficient way to create a separate connection for each user to a remote server.
 - **Extensible Authentication Protocol over Ethernet (EAPoE):** This feature is an enhancement to secure WLANs, allowing servers to be deployed on Ethernet or WLANs.
 - **Infrared Data Association (IrDA) Support:** Windows Embedded Standard supports standards for this low-cost, low-power, cable replacement technology that enables any device to communicate from point-to-point when two devices share a line of sight.
- **Multiple Boot and Storage options (Embedded Enabling Features)**
 - **Remote Boot:** Enables Windows Embedded Standard clients to boot up an image from a server, eliminating the need for client-side persistent media.
 - **Enhanced Write Filter:** Enables you to boot from read-only media, such as CD-ROM, write-protected hard drives or flash, while protecting flash media from wear.



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- **File Based Write Filter:** Provides more write protection granularity than EWF, allowing the developer to select individual files and/or folders that can be protected while allowing other files and folders on the same disk or partition to be updated.
- **Flash Technology Support:** Windows Embedded Standard provides support for DiskOnChip Flash, PCMCIA-ATA, Compact Flash, MultiMediaCard and Memory Stick.
- **El Torito support:** Enables you to boot and run a Windows Embedded Standard-based platform from CD-ROM, through support of this bootable CD-ROM format specification.
- **USB Boot:** Windows Embedded Standard supports booting from a USB flash device (thumb drive or USB key). USB Boot offers many benefits, a USB Flash Device (UFD) is typically removable; swapping a UFD is much easier than swapping an internal hard disk drive (HDD).
- **Numerous deployment and management technologies**
 - **First Boot Agent (FBA):** Allows you to perform run-time tasks that could not be authored offline with the Windows Embedded Studio tools. These tasks include security installation, catalog registration, Plug and Play detection, network configuration, dynamic-link library (DLL) registration and profile initialization.
 - **System Deployment Image (SDI) Manager:** Allows you to deploy images to virtual disks, eliminating the need for increased client-side memory. By using System Deployment Image to Hard Drive (SDI2HD), you can easily deploy image updates to the field by capturing an image on a hard drive and subsequently transferring it to a removable storage medium, such as a CD.
 - **Windows Pre-installation Environment:** Hardware-independent Windows environment that enables users to develop, deploy, and recover Windows Embedded Standard run-time images. can be booted over the network or via CD, allowing you to run without the need for client-side persistent media.
 - **Device Update Agent (DUA):** Management tool that enables you to service and manage deployed Windows Embedded Standard images and applications. DUA can run local or remote scripts that modify device settings or update system binaries.



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- **Works with existing management tools:** Windows Embedded Standard-based devices are easily managed through interoperability with backend systems and tools including: Windows Management Instrumentation (WMI), Windows Scripting Host (WSH) and Microsoft Management Console (MMC).
- **Active Directory Client:** With this capability, a device can participate in an Active Directory® domain and experience the benefits of being an Active Directory client.

- **Efficient Power Management**

Windows Embedded Standard includes features that enable granular control over power consumption, such as:

- **Advanced Configuration and Power Interface (ACPI) 2.0:** On an ACPI-compliant system, the operating system manages, directs, and coordinates power so the system is instantly accessible to users when needed, while remaining silent and consuming the least possible power when not actively working. Power Management services enabled include Thermal control, Hot Plug PCI, LCD dimming, power schemes, wake-on support, Power Policy for individual peripherals, and more.
- **Advanced Power Management (APM):** Provides power management support for legacy systems based on the Advanced Power Management (APM) API.
- **Power Management Control Library:** Provides standard power management functionality through a .DLL called Xpepm.dll. This DLL allows you to utilize the shutdown, restart, standby, and hibernate power management features, even if the configuration does not include the standard Start menu UI otherwise required to access power management functionality.

- **Flexible Internationalization**

- **Language Packs:** Support for over 20 languages enables easy localization of the user interface. Enables developers to create code in one language (English, for example), while localizing GUIs and help menus, saving development time and effort.



Windows Embedded Standard - Development Environment

Windows Embedded Standard helps you to reduce time-to-market by taking advantage of a familiar programming model and a powerful set of tools. Windows Embedded Standard includes the Windows Embedded Studio, an end-to-end toolset that enables devices to be brought to market faster. The Windows Embedded Studio streamlines the end-to-end development process, helping developers to rapidly configure, build and deploy smart, connected, service oriented devices.

- **Windows Embedded Studio Platform Development Tools**

- **Target Analyzer:** Helps you to quickly generate a base operating system configuration that supports your chosen hardware.
- **Target Designer:** Helps you to rapidly build a custom operating system image. Features such as footprint estimator, which allow you to gauge the footprint impact of a component and its associated dependencies prior to image build, streamline the development process. Target Designer further accelerates your development efforts by including dependency checking capabilities prior to the image build process. Target Designer's design templates help you quickly generate a base configuration for various devices by providing all the base functionality you need for a specific device type.
- **Component Designer:** Allows you to quickly convert unique drivers and applications into components that can then be used in your custom operating system image. Target Designer and Component Designer together provide a build environment to accelerate custom OS development.
- **Component Database Manager:** Manages all of the components you have at your disposal and facilitates a high performance integrated build environment, through use of the Microsoft SQL Server Desktop Engine (MSDE).
- **Command Line Tool:** Automate the end-to-end build process, search and manipulate the component database, investigate component relationships and dependency chains, import custom components, and delete components from the database



- **Application Development Tools**
 - **Visual Studio:** Helps you to build powerful embedded applications with the same standards-based, familiar tools used for mainstream application development by more than six million developers worldwide. You can use Visual Studio to build applications for your Windows Embedded Standard image.
 - **.NET Framework 3.5:** Windows Embedded Standard includes a component for the .NET Framework, enabling you to build, deploy and run Web-based applications, XML Web services, and stand alone applications built upon the Common Language Runtime and .NET Framework class libraries. The .NET Framework 3.5 is the new managed-code programming model for Windows, new technologies for building applications that have a visually compelling user experience, eases communication across technology boundaries, and support for a wide range of business processes. Some of these new technologies include: Windows Presentation Foundation (WPF) and Windows Communication Foundation (WCF).

- **Use Commodity PC Hardware and Desktop Software**
 - **Full Win32 binary compatibility:** Accelerate your development process by easily porting over desktop/Win32 applications, drivers and services to your Windows Embedded Standard operating system.
 - **Use PC hardware:** Streamline your platform development by taking advantage of PC drivers, services and applications.
 - **Desktop usability expertise:** Take advantage of familiar features such as drag-and-drop and the overall look and feel of the desktop version of the product.
 - **Componentized drivers:** includes componentized drivers for Intel's most recently released x86 chipset providing device makers with the flexibility to easily migrate and benefit from the performance improvements of the latest processor generation.



Windows Embedded Standard – Enterprise Features

- **Connecting into existing infrastructure**
 - Support for Windows Server Update Services, System Center Configuration Manager, Windows Server and Microsoft Operations Manager helps ensure that Windows Embedded Standard supports enterprise-class manageability of both operating system and application level updates helping enterprises to protect, manage, and monitor devices within existing IT infrastructures

- **Enterprise-class Security**
 - **Encrypting File System (EFS) with Multi-User Support:** Encrypts each file with a randomly generated key. The encryption and decryption processes are transparent to the user. In Windows Embedded Standard, EFS can allow multiple authorized users access to an encrypted document.
 - **Internet Protocol Security (IPSec):** Uses cryptographic security services to help protect organizations' data that is transmitted over a virtual private network.
 - **Smart Card support:** Windows Embedded Standard integrates smart card capabilities into the operating system, including support for smart card login to terminal server sessions.
 - **Kerberos authentication protocol:** Provides industry-standard security authentication.
 - **Internet Connection Firewall:** Windows Embedded Standard has a firewall client that can help protect devices from common Internet attacks.
 - **Software restriction policies:** This feature provides a policy-driven mechanism to identify software running in a domain and help control its ability to execute. It can help identify software that is hostile or unwanted and guard against it executing on Windows Embedded Standard-based devices.
 - **Certificate Services:** Windows XP Professional supports multiple levels of a certification authority hierarchy and a cross-certified trust network using digitally signed certificates.



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- **Credential Manager:** A controlled store for password information. It allows users to input usernames and passwords once, and then have the system automatically supply that information for subsequent visits.
- **Access Control Infrastructure:** Support for thousands of security-related settings, such as user access permissions, that can be implemented individually to protect selected files, applications, and other resources. These features include:
 - Access Control Lists (ACL): Create a resource, such as a folder or file share, and either accept the default access control list settings or implement custom access control list settings.
 - Security Groups: Place users in the standard security groups, such as Users, Power Users, and Administrators, and accept the default ACL settings that apply to those security groups.
- **Security Configuration Manager:** This is a set of tools that you can use to manage security policy on your computer, organizational unit, or domain.



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