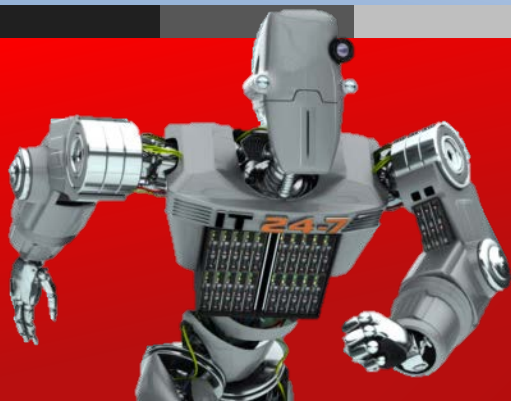


EMBEDDED¹ MAGAZINE



Windows Server 2008 R2 for Embedded Systems

learn more about the
embedded version



Windows[®] 7

is getting Embedded



7 Reasons for Windows 7 for Embedded Systems

tutorial

Installing Windows Embedded
Standard 7 into a VHD



Embedded Product Guide

Learn about all the Windows Embedded
products from Microsoft.
Find out the product which is right for you.

Unique Tools

Find out more about the unique tools from us!
Learn about how these tools can help you
develop your Windows Embedded images!

Windows® Server 2008 R2



Embedded Power for your solutions

including

Hyper-V



Microsoft®

editorial

This has been a very exciting year for the Windows Embedded product line. Known as Windows Embedded Standard 7, this newest member of the Windows 7 product family runs on a variety of smart, connected and service oriented devices, ranging from consumer devices such as gaming systems to high-tech medical imaging equipment. OEMs and Partners are using Windows Embedded Standard 7 for a huge variety of smart, connected, and service-oriented advanced commercial or consumer devices to run thousands of existing Windows middleware, components, applications and drivers, ranging from thin clients to multifunction printers.

A sampling of these devices includes advanced set-top boxes, fuel pumps, full-featured point-of-service terminals, ATMs, self-service terminals, gaming devices, home automation gateways, industrial controls, intelligent appliances, multimedia Internet devices, kiosks, media servers, mobile point-of-service devices, monitoring devices, multifunction printers, networked media devices and servers, and Windows-based terminals. One of the main reasons for them to do this is that they can easily leverage the existing Windows eco system in their embedded applications, which leads to a very fast time to market of their products. In addition they get all the tools and functionality to maintain the complete life cycle of their devices without having to reinvent the wheel all the time.

If you want to get more details on what Windows Embedded Standard 7 and Windows Server 2008 R2 has to offer you will definitely enjoy reading this excellent Embedded Magazine.

Sincerely yours,

Günther Fischer

Microsoft Embedded

Senior Partner Technology Manager



Seminars

Elbacom is arranging seminars for all embedded products on a regular base. To find out the current schedule visit our website.

Techblog

If you have a technical problem regarding Windows Embedded visit our techblog at www.elbacom.com/blog/. A solution might be there already!

Unique Tools

Elbacom has created unique tools which can improve your development process!

More information on page 14.

www.elbacom.com



Windows® 7

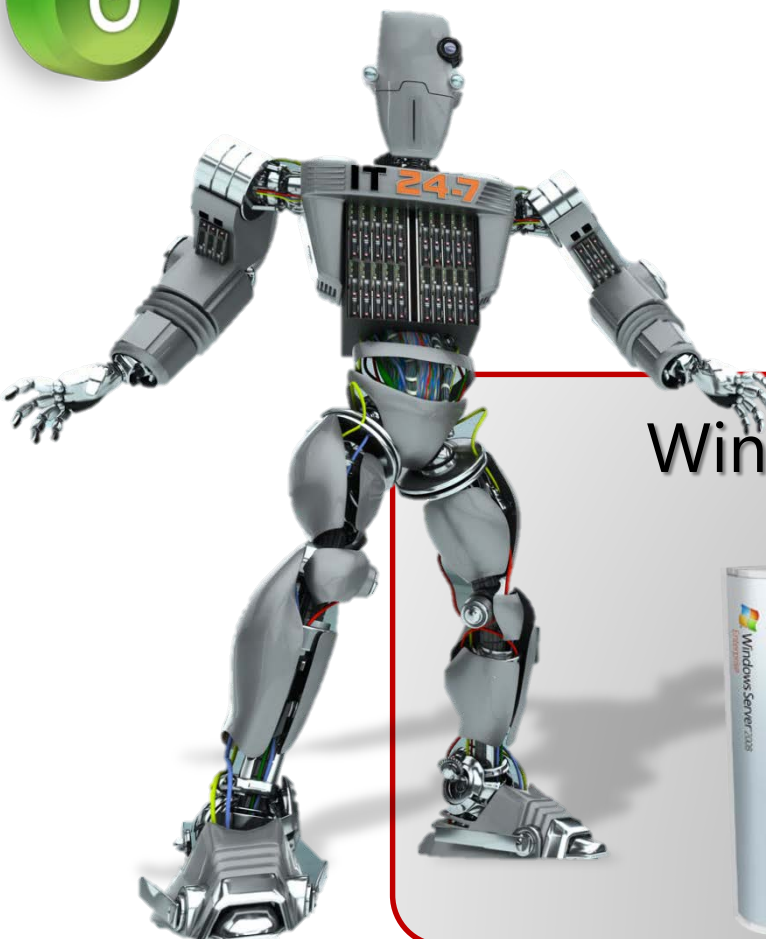
is getting Embedded



Windows® Embedded Standard 7

Learn more about the next generation embedded operating system from Microsoft.

Page 8

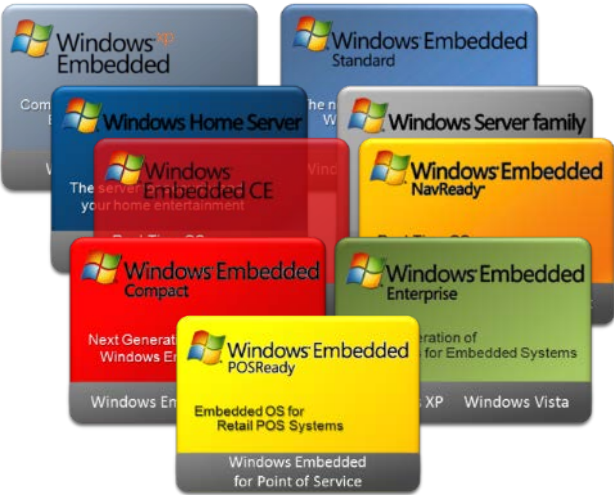


Windows Embedded Server products offer full server functionality for a small price.

Page 10

Windows® Server 2008 R2 *Embedded Power*





Windows® Embedded Products

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7 Reasons for Windows® 7

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Installing Windows
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Unique Tools

Find out more about the unique
tools from Elbacom!

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embedded NEWS



Windows Embedded Standard 7 released

Microsoft has released its newest embedded operating system which is based upon Windows 7 Ultimate. It allows maximum customizability and offers great new features.

Microsoft made it easier for OEMs to setup Windows Embedded Standard. Different to previous versions it is now possible to install the embedded operating system directly on the target device. The setup process looks like a standard Windows 7 installation containing additional wizard pages to customize the image.

A separate tool is provided for advanced users which allows creating answer files for unattended installations. The setup process can be configured in detail with this tool allowing a fast and automated way for mass deployment.

The Embedded version ships with Embedded Enabling Features such as Enhanced Write Filter to protect the image from unwanted changes.

Windows Embedded Standard 7 is available in different editions and contains all the features from Windows 7 Ultimate – including Windows Media Center.

For a detailed preview please read on page 8.

Evaluation Versions

Microsoft offers free and fully functional evaluation versions for each embedded product. The only limitation is that the evaluation version will expire after 120-180 days.

However you can build and test your images to find out if a product suits your needs before buying the toolkit and licenses.

Contact us to get free evaluation versions!

New Website

The Elbacom website has been completely redesigned to offer more information in a clearly structured interface. The embedded products pages are now divided into „Overview“ which gives a detailed summary about the products features, installation, licensing support and availability. The „Technical“ part contains all the technical information from Elbacom about the product including tut-

orials, news, solutions, videos, etc.

The „Tools & Downloads“ tab includes tools from Elbacom and Microsoft and shows related downloads. All similar products are displayed in the „Related Products“ tab.

Additionally the licensing website, including CLA information, and Embedded Basics has been completely renewed.

www.elbacom.com

Windows Embedded Compact 7 on its way

The next version of Windows Embedded CE is named Windows Embedded Compact 7. Customers interested in the new version can already test the Customer Technical Preview version from Microsoft Connect.

Windows Embedded Compact 7 is designed to

deliver rich and connected experiences for consumers such as HDTVs. Also Microsoft made it easier to connect to corporate email, calendar and contacts over enterprise networks through AirSync and Microsoft Exchange.

For more information visit: www.windowsembedded.com/compact7

Windows® 7

Microsoft®

also available in the
Embedded Channel

ask now for embedded versions

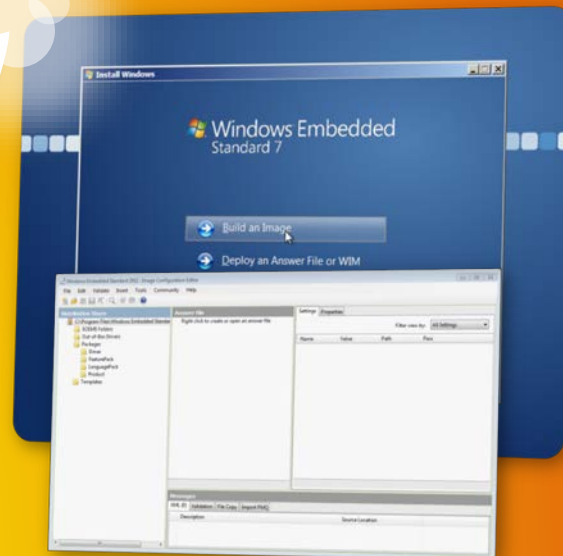
Windows 7 Professional

Windows 7 Ultimate



Windows® Embedded Standard

make Windows your way



Windows Embedded Standard 7 is the latest release of Windows Embedded. Following Windows XP Embedded and Windows Embedded Standard 2009 it allows you to customize Windows the way you need it. The system is based on Windows 7 Ultimate and it enables you to build a real Ultimate version if you add all feature packages to the image.

Feature Packages

The operating system is split into 150 feature packages. Other than in XP Embedded where a component only contained some files, registry entries, etc. a feature pack contains everything needed to ensure that the package is running properly. Feature Packages also have dependencies upon other packages where some of them are optional dependencies and can therefore be left out.

Media Center

For the first time ever in the Microsoft Embedded area Windows Embedded Standard 7 includes Windows Media Center. This is

a great benefit if you are creating devices for end users such as set-top boxes. Media Center can be customized to not include the Microsoft branding.

Licensing

Windows Embedded Standard 7 is available under different licenses. The license you need depends on the features you use in the image. e.g. if you have more than one Language Pack in the image you need the higher license - called WES7 P.

The available licenses are WES7 E and the premium version WES7 P. There is also a separate license available for set-top boxes called WES7 C. For a complete list of which features are included in which license visit

www.elbacom.com/?id=1020

Microsoft has also released a tool which will show you the needed license for your image based on which features are included. The tool is available as a free download and is named License Assessment Tool.

www.elbacom.com/?id=1007

Enhancements

WES7 ships with some great features known from Windows 7. These features can help developers to save time to setup, configure and service the images. For example DISM (Deployment Image Servicing and Management) is a powerful tool which allows you to add and remove feature packages at any time - online in the running system or offline if the image is located in a folder on the development machine. This is a great benefit compared to earlier scenarios with XPe or WES2009 because if there was a missing component you had to rebuild the image. Now with DISM you just need to add the component via a simple command line entry - reboot - and the component is installed.

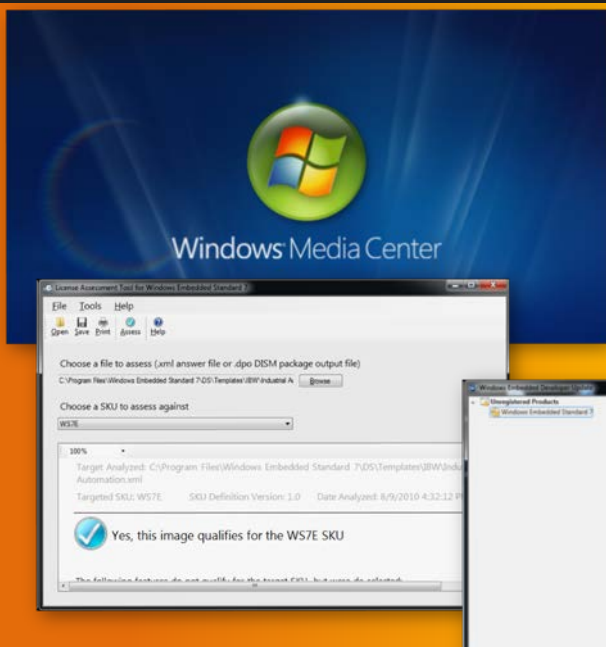
This feature can also help if you have images in the field and need an additional feature package for an application update.

Another new feature is that WES7 now supports Windows Update. This is because WES7 knows which packages are included and it retrieves

only these security updates directly from the Microsoft servers. The system will be patched automatically - if configured to do so.

VHD Boot

VHDs are the virtual hard disk files known from Microsoft Virtual PC or Hyper-V which can contain the same content as a physical hard disk but in a single file. WES7 has the capability to boot directly from a VHD file. In this case only the bootloader and the VHD file are located on your disk drive which makes it easier for deployment. Also servicing can benefit from VHDs - you can write a tool which searches for new updates (VHDs) on your server. Then it can download the new VHD to the disk and set the new VHD as default boot entry in the bootloader. After a restart the system is running the updated version. If something went wrong the user can still go back to the old version via the bootmenu. If everything went well you can remove the old VHD from the disk and the bootmenu.



Embedded Enabling Features

Windows Embedded Standard 7 also ships with Embedded Enabling Features (EEFs) such as Enhanced Write Filter, File Based Write Filter, Registry Filter, USB Boot, Dialog Blocker, ...

The write filters can protect your image from unwanted changes by redirecting all writes to a RAM overlay. After a reboot the system reverts back to its original state. Additionally it is possible with the File Based Write Filter to create exclusions for folders and files which will be written directly to the disk.

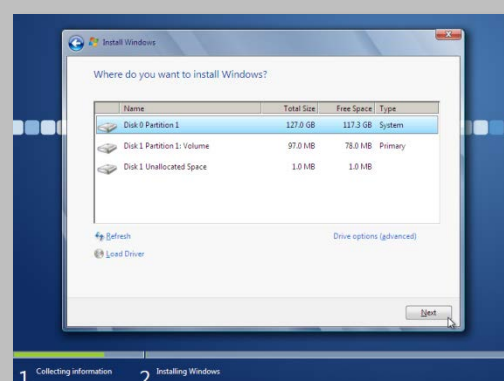
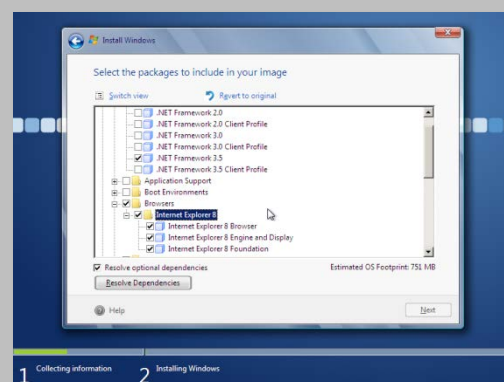
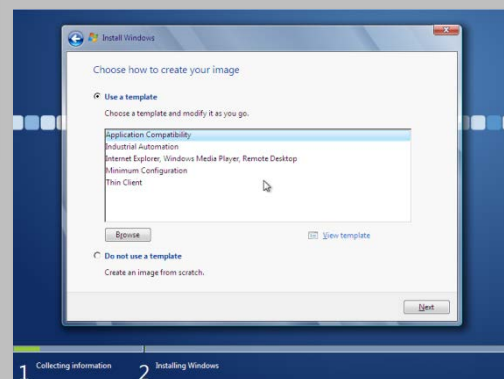
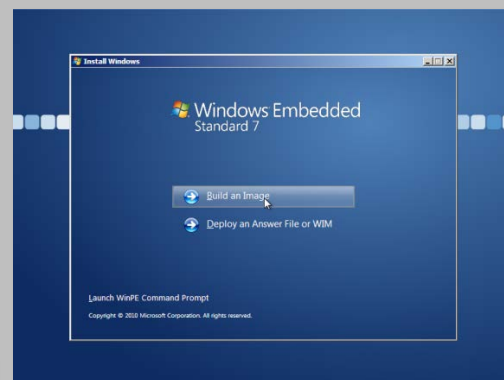
USB Boot allows you to boot your system directly from a USB drive - e.g. a flash drive connected to the internal USB connector.

Shell Customization

WES7 allows to be customized in terms of hiding Windows from the end user. This can be done by adding unbranded boot screens, a customized Windows Logon screen and a customized shell application.

Installation

The installation type of Windows Embedded Standard 7 has changed completely in comparison to Windows XP Embedded. The systems toolkit now ships with two tools called Image Build Wizard and Image Configuration Editor. The Image Build Wizard is the main tool used to build your images. It is a bootable DVD (one for 32-Bit and one for 64-Bit) which is started on the target device. The system will then run a setup user interface similar to a standard Windows 7 installation but with additional wizard steps that allow you to customize Windows. The Image Configuration Editor is a tool which needs to be installed on a development machine. It is designed to create answer files for the installation process and sysprep phase. With it you can fully configure Windows as you like it. The installation will then run unattended with your configuration. This is a good way for an automated mass deployment scenario.



more information

www.elbacom.com/products/wes/wes7
www.elbacom.com/blog/
www.windowsembedded.com

Windows® Server 2008 R2

Embedded Power



With the Microsoft Embedded Server product family you can get the same server products known from the retail market also in the embedded market. These products are 100% the same and only differ in terms of licensing but are cheaper.

Windows Server 2008 R2 is the latest release of the Microsoft Server family. It ships with many new features and works together best with Windows 7. Also additional server products are built upon Windows Server 2008 R2 – such as the SQL Server 2008 R2.

Server Core

Server 2008 R2 ships with a feature called Server Core. It is a different setup type which leaves out the graphical user interface and installs only the necessary components to run the server roles. This adds lots of security because most security holes are within the additional applications – such as Internet Explorer, Media Player, etc.

The core installation only includes a command prompt window which allows you to do all the needed server administration. This includes installing features and roles or doing simple configuration of these roles. All additional configuration can be done remotely via the management console.

Hyper-V

Hyper-V is Microsoft's Low-Level virtualization. It is available as a role in Windows Server 2008 R2. It enables you to run several additional computers on the same server hardware in a virtual environment.

Snapshots

With snapshots you can easily backup the current state of the virtual machine. This is a great help in case you are deploying bigger updates to your machines and want to revert back easily in case something went wrong.

Virtual Networks

With Hyper-V you can create virtual networks to connect your virtual machines together. Also it allows you to map a physical network port only to a virtual machine and remove the port from the host machine. For example this can be useful for firewalls – you can map the internet port directly to the firewall VM and the host has no access to it.

Failover Clustering

Hyper-V also supports failover clustering. If one host fails all virtual machines are immediately resumed on another host resulting in no noticeable downtime of services. Also you can easily move machines from one server to another via the manage-



ment console. There will be no server downtime during the move!

There are several other Microsoft Windows server products which are built upon the powerful Windows Server 2008 and 2008 R2 platform.

Data Protection Manager

Microsoft's Data Protection Manager is a powerful backup tool which supports automated backups on application level. This means that the server is aware of the application it backs up. For example, it supports Exchange Server, SharePoint server, SQL Server, etc.

Because each client runs its own backup agent which keeps track of all changes on block level it is possible to do backups every 15 minutes!

ForeFront Threat Management Gateway

The ForeFront Threat Management Gateway (TMG) is a powerful firewall solution which supports publishing services, such as Microsoft Exchange Outlook Web Access, Microsoft SharePoint, etc. safely to the internet. It also supports Active Directory authentication to only allow domain users access the resources but it allows many other ways of authentication. TMG can

act as a webproxy server too. With the Webproxy it allows filtering webcontent to protect users from harmful webcontent such as viruses, malware, trojans, ... Additionally it allows to block specific content such as social networks.

Additionally it supports email filtering with the add-on ForeFront Protection for Exchange server. With this addition it allows you to filter unwanted emails, such as spam, malware, phishing, etc. before they reach the Exchange server itself.

For more information on servers please contact us!

Microsoft offers many other servers in the embedded area:

- ✓ **SQL Server**
- ✓ **Internet Security & Acceleration Server**
- ✓ **Storage Server**
- ✓ **Unified Access Gateway**
- ✓ **Windows Home Server**
- ✓ **Data Protection Manager**
- ✓ **Server Appliance**
- ✓ **Server Telecommunication Appliance**
- ✓ **others**

Windows Storage Server 2008 R2

Windows Storage Server 2008 R2 is the cheapest server solution from Microsoft which is built upon Windows Server 2008 R2. It provides file services on a reliable platform. Being optimized for the file serving role Windows Storage Server 2008 R2 gets the most out of your servers. It offers several great features of which you can benefit. These are for example:

iSCSI Target

Windows Storage Server 2008 R2 supports Microsoft iSCSI Target which converts your server into a reliable iSCSI solution. The Microsoft implementation of Internet SCSI (iSCSI) is based on the industry standard developed to enable transmission on SCSI block commands over the existing IP network by using the TCP/IP protocol. The encapsulated SCSI commands and data can be transmitted over a local area network (LAN) or a wide area network (WAN). Combined with better scalability, reliability & availability iSCSI is set to provide an enterprise class solution at a low cost price. Affordable because it leverages existing Ethernet-based hardware and the current expertise of your IT staff.

For more information visit: <https://www.microsoft.com/windowsserver2008/en/us/WSS08/iscsi.aspx>

Single Instance Storage

Windows Storage Server 2008 R2 implements a feature called Single Instance Storage (SIS) which is designed to save disk space by eliminating duplicates on the disk. The background service recognizes duplicate files and replaces all duplicates with a hard link pointing to the original file. This can save you lots of disk space and additionally reduces backup times.

Contact us for more information on Windows Storage Server!





Windows® Embedded Products

The Microsoft Embedded product line offers many different operating systems. Starting from Windows 7, Windows CE to Windows Servers it covers all the important versions and adds long-term availability. This means that a product is available at least 15 years after its release. For example Windows XP is no longer available in the retail market but is still available until 2016 in the Embedded area!

Microsoft has divided the embedded operating systems into different groups.

Windows Embedded Enterprise

With Windows Embedded Enterprise products, such as Windows 7 for Embedded Systems or Windows XP Professional for Embedded Systems, you can get started with embedded very quickly. These products are 100% the same as the retail version and only differ in terms of licensing. You can still use your known way of deployment as the tools and disks are the same as the retail version.

Windows Embedded Standard

The Standard products are the most flexible systems from Microsoft. These products can be customized completely to your needs as they come componentized. This means that you can install only the components of Windows you really need. This will cause the system to be much smaller (XP Embedded: ~300 MB, Windows Embedded Standard 7: ~1 GB). Additionally it adds speed and security because unnecessary components are not included. The biggest benefit of the Standard products is that they need **no activation**. Once Windows has its product key it can be deployed to as many machines as you need without a need to reactivate it. Just clone the disk and the deployment is done. All that needs to be done to have a licensed system is to put the license sticker (COA - Certificate of Authenticity) onto each sold system.

Embedded Enabling Features

The Embedded Standard products ship with additional Embedded Enabling Features which offer you additional value and security for your products. e.g. you can protect your system from unwanted changes by redirecting all writes to a RAM overlay or you can boot your system from USB.

Windows Embedded Compact

If you need realtime and maximum customizability in terms of source code access and smallest footprint you will find the right product in the Windows Embedded Compact family. These products are Windows Embedded CE which ship with source code and allow you to customize the code to your needs via the Shared Code program. This way you have a fully customized Windows and can still protect your Intellectual Property! There is no need to share your modifications with anyone!

Windows Embedded Server

The embedded server family offers most servers which are available in the retail market also in the embedded market. The biggest advantage is the pricing - because of a different licensing model the prices are much lower than the retail version. The products themselves are binary 100% the same and therefore enable you maximum compatibility to existing systems. e.g. you can add an embedded TMG server to your corporate network domain as a firewall - or you can add Storage Server 2008 as a cheap iSCSI storage solution.

Microsoft also offers Windows Home Server in the embedded space enabling customers to build cheap server solutions for small offices up to 10 PCs which includes a central file storage, backup and remote access.

For a complete overview and more details please visit www.elbacom.com

Windows® Client

Windows Embedded Standard



Windows Embedded
Standard 7



Windows Embedded
Standard 2009



Windows XP
Embedded

Ready



Windows Embedded
POSReady 2009

Windows Embedded Enterprise



Windows 7
for Embedded Systems



Windows Vista
for Embedded Systems



Windows^{xp} Professional
for Embedded Systems

Windows® Embedded CE

Windows Embedded Compact



Windows Embedded CE 5.0



Windows Embedded CE 6.0

Windows Embedded Compact Ready



Windows Embedded
NavReady

Windows® Embedded Server



Windows Storage Server 2003



Windows Storage Server 2008



Windows Server 2003
Branch Office Applications



Windows Server 2003
Server Appliance



Windows Server
Forefront Unified Access Gateway



Windows Server
Forefront Threat Management Gateway



Windows Server
Internet Security & Acceleration Server



Windows Server 2008
Server Appliance

Windows Home Server



Windows

Windows SQL Server



Windows Server 2



Windows Server
Data Protection Manager

DISMUI

you add a feature package but it won't work until all dependent packages are included. Our tool DISMUI is a graphical solution which takes care of all this. All you need to do is to specify the Distribution Share and whether you want to modify a running image (online) or an image located in a folder on your development machine (offline). DISMUI will then check which feature packages are already installed and will show them in an "Image Build Wizard"-like user interface. Now you can add or remove features by just checking or unchecking them. If you are done click the "Resolve Dependencies" button and DISMUI will automatically add all the needed depend-

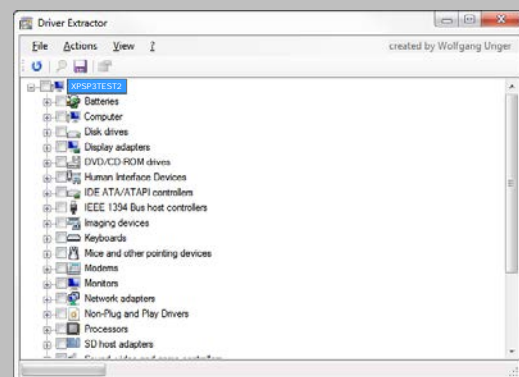
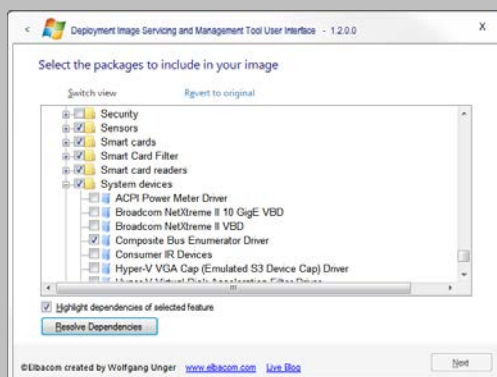
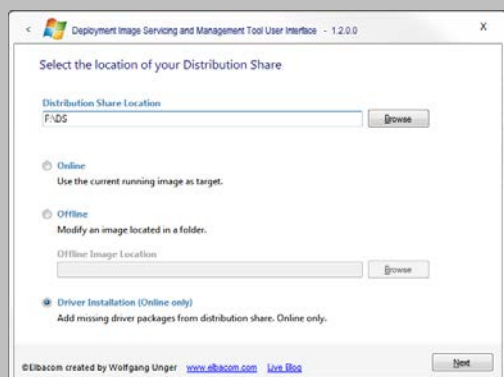
Adding drivers with DISMUI

DISMUI also supports adding driver packages to your system. If you have added additional devices to your system after running the setup it might occur that the needed drivers are not yet included in your image. You can resolve this manually of course but it is a lot easier if you let

DISMUI take care of this. Just select "Driver installation" after running the tool. DISMUI will then scan the Distribution Share for the missing drivers and will add them including the dependencies automatically.

Driver Extractor

Have you ever run into troubles with finding componentized drivers for your devices when building images for Windows Embedded Standard 2009 or Windows XP Embedded? If so Driver Extractor will help you. The tool allows you to extract drivers from a running Windows system and it will automatically create a SLD file for you which is ready to be imported into the



Component Database! All you need to do is to run the tool. It will show you all installed devices in a Device Manager like UI. Then you can select the devices of which you need the drivers. After you click on "Actions" - "Export selected" you can specify a directory to which the tool should extract the drivers to. Driver Extractor will then search for all needed driver files automatically and create a SLD file for you. These files can be imported to the repository and are ready to use for your images. Also you can use Driver Extractor to just display the driver files in case you want to copy them manually. For this just double click on any device and the tool will show you all the needed files and their location on the system.

Windows Embedded Standard Builder & XP Embedded Builder

Microsoft offers great tools to build your Windows XP Embedded and Windows Embedded Standard 2009 images. However working with Target Designer takes some time to learn. Creating images for different hardware platforms can be tricky as well because Target Designer is not designed for this scenario.

Even though Microsoft has a solution for this called POSReady 2009 - which is an easy to install version of XP Embedded designed to boot directly on the target hardware where the installation is done via a graphical UI. However it does not offer much flexibility in terms of image size, components and also does not ship with all the Embedded Enabling Features.

Our Builders for XP Embedded and also for WES2009 offer this functionality. They are also designed to boot directly on the target hardware. They will enable you to prepare your target drive and will do a full Plug And Play enumeration to only include the drivers needed for your image. It is also possible to add drivers on a USB drive if they are not included in the Windows XP SP3 driver database. The Builders will then offer you many component packages where you can choose which features you need in your image. Some packages also have addition configuration packages so you can pre-configure the system properly. They also ship with all the available language packages for XP. An additional feature of the builders is to build an XP Professional-like

image which includes nearly all of the features available in XP Professional. This is a great feature which enables you to build highly compatible images very fast. Also it offers you to build a XP Professional system for a cheaper price and without the need to activate the images!

The builders also have the capability to run unattended. Each manual deployment will create an unattend template file on your target disk drive. You can use this template to install the same image again unattended by just copying and renaming the template on a USB drive!

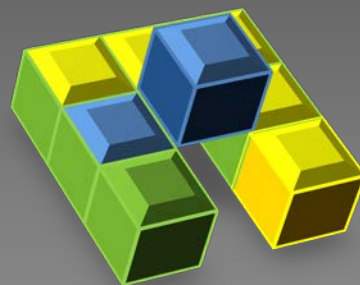
Both Builders also offer all available Embedded Enabling Features – such as the Enhanced Write Filter, the File Based Write Filter, the Registry Filter, USB Boot, ... Some of these filters can be preconfigured during the setup.

For more information and a download of these tools please visit

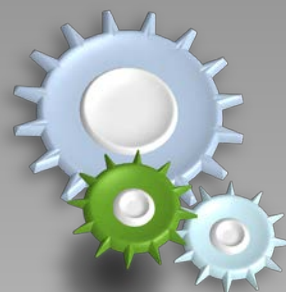
www.elbacom.com/embedded/products/tools



Windows Embedded Standard Builder



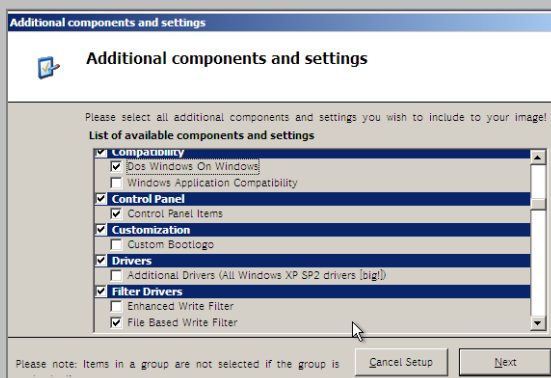
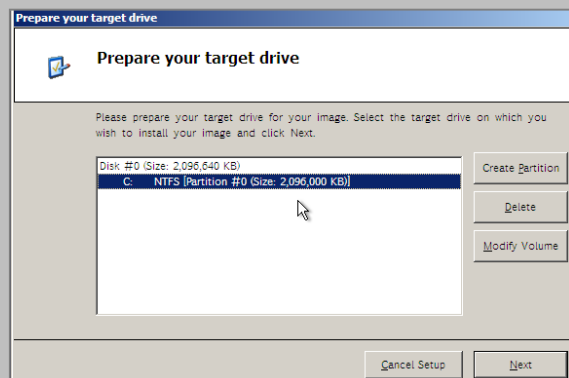
DISMUI



Driver Extractor



XP Embedded Builder



Reasons for Windows® 7

1 VHD Boot

With VHD Boot you can natively boot Windows 7 from a Virtual Hard Disk. The file format is known from Microsoft Windows Virtual PC and Microsoft Hyper-V. VHD files are Virtual Hard Disks stored in a single file which can be used like real harddisks. Also they can be partitioned and formatted just like a real harddisk.

The possibility to boot directly from a VHD offers great new advantages:

✓ Easy Deployment

There is no need to create separate image files (like .WIM) because the VHD itself is the image. Every Windows 7 system can even mount the VHD files as a local drive by using the Diskmanagement console.

To deploy Windows stored in a VHD you just need to copy the VHD and the boot manager to a new primary active NTFS partition with NT60 MBR.

✓ Easy Backup

To backup your system all you need to do is to create a copy of the VHD file. Also the restore is as easy as backing it up – just one file copy process.

✓ Easy Update

If you need to upgrade your whole system you can either replace the existing VHD file or copy a new VHD file to the system and create the boot manager entries to boot the new VHD as default OS. The next time you boot your device will load the updated system. In case you still have the old VHD in place and something went wrong you can easily revert to the old OS by just selecting the previous version in the boot manager.

2 MultiTouch

With a touch-sensitive screen you can use your fingers to scroll, resize windows, play media, and pan and zoom on your PC.

Even if your application is not designed to support multitouch input you can make use of this technology. This is because Windows takes care of it – you can still pan, zoom and scroll with gestures. Windows will emulate a mouse input for non-touch-aware applications.

Alternatively you can use the Windows Touch API to create powerful multitouch aware applications. Also the .NET Framework 4.0 supports multitouch events making it easier to manipulate objects with touch!

3 BitLocker

Bitlocker completely encrypts your drives including pagefile and hibernationfile. There are different possibilities how to use Bitlocker:

✓ TPM Module

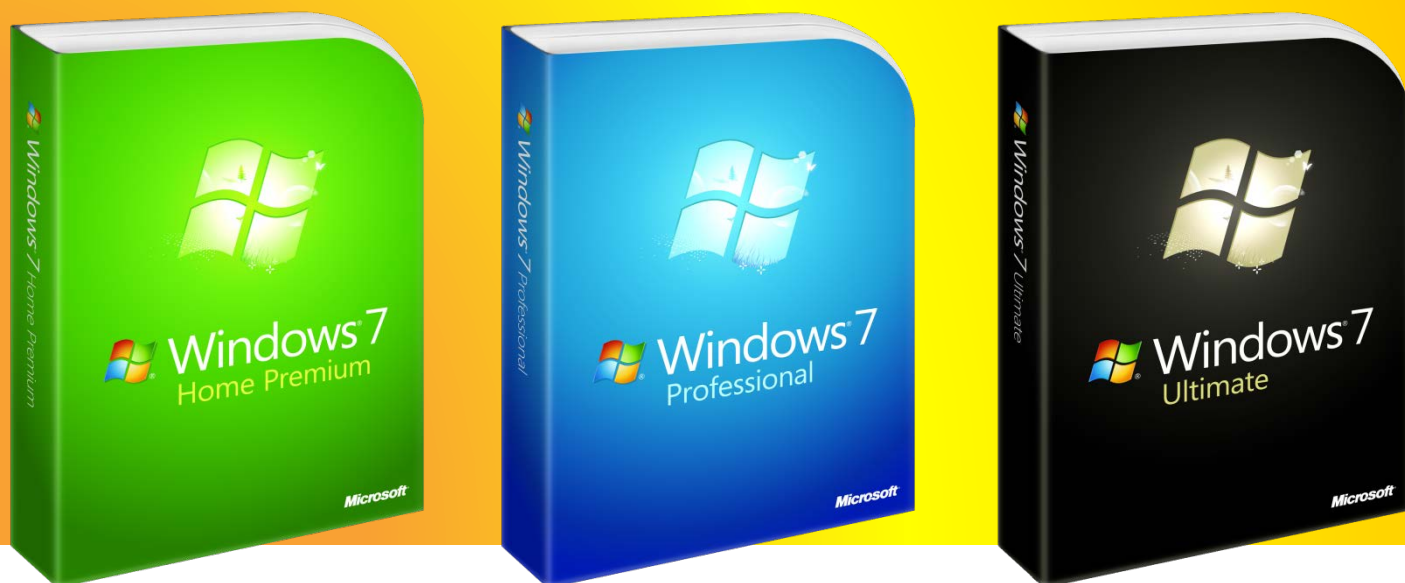
The encryption key can be saved on a TPM chip. This way the disk will only work on the hardware which encrypted the disk. If the disk will be taken out and will be connected to a different hardware all the data is encrypted. If the disk is inserted again into the original hardware Windows can boot.

✓ USB Key

The encryption key can be saved on a USB key. Bitlocker will only allow access to the disk if the USB key is connected. If not the disk drive remains encrypted.

✓ PIN Entry

On every boot Bitlocker will ask a user to enter a password which allows access to the disk.



4 Language Packs

Windows 7 supports over 100 different languages by using Language Packages (MUIs) and Language Interface Packages (LIPs).

A switch between languages is possible with a few clicks during runtime and Windows is translated 100% into the selected language pack.

5 DirectAccess

DirectAccess is a new feature in the Windows 7 and Windows Server 2008 R2 operating systems that gives devices the possibility of being seamlessly connected to the corporate network any time they have Internet access. With DirectAccess, devices are able to access corporate resources (such as data-servers, shared folders,...) securely without connecting to a virtual private network (VPN).

Also the device administration is easier because if a device is online it can be accessed like any other device in the local network – this makes it easier to service a device in the field.

6 AppLocker

By using AppLocker you can prevent unwanted applications to run on your Embedded device.

By setting up Blacklists or Whitelists you can configure exactly which applications are not allowed or allowed to run.

The AppLocker policy can either be configured as local policy or can be deployed via group policy in a domain environment.

There are 3 ways to configure:

- ✓ **Path**
Define an application by its program path.
- ✓ **Hashvalue**
Define an application by its unique hash.
- ✓ **Publisher**
All applications by a specified publisher. These applications must be signed by the publisher. This is the recommended way of defining an application pool which is [not] allowed to run.

7 BranchCache

BranchCache optimizes the use of WAN if many devices are in a local network and need to download the same files from a server. If a client requests a file from a remote server the server will provide only a file hash. The client then sends a inquiry to all clients in his local LAN asking for this file. If the file is found locally the clients will do a local transfer which saves time and bandwidth because a file must be transferred only once via the WAN. If the file could not be found locally the client will download it from the remote server.

A second version of BranchCache allows the usage of a local caching server which will store all the files locally. BranchCache is fully integrated into the Windows TCP and SMB protocol so it will work automatically in the background.

tutorial



Installing Windows® Embedded Standard 7 into a VHD



Windows Embedded Standard 7 ships with a great feature called VHD Boot. This enables the OS to boot directly from a Virtual Hard Disk known from Virtual PC or Hyper-V. The advantages of using VHDs are easier deployment, easier servicing and easy backup of the whole system. In any case all you need to do is to copy one file (+ bootmanager)!

Windows 7 also supports mounting VHDs as a hard-drive which makes them a good alternative to WIM files.

The installation into a VHD is nearly as easy as installing it to a real hard disk. By creating and mounting the VHD file in Image Build Wizard the system will take care of creating the bootmanager.

VHD installation with Image Build Wizard

- Boot Image Build Wizard
- Press Shift+F10 to open a command prompt
- Ensure that you have a formatted drive ready
if not use diskpart to create one with the following commands:


```
diskpart
list disk
select disk 0 [0 is the id of the disk you want to manipulate]
create partition primary
assign letter=C
active
format fs=ntfs quick
quit
```
- Run the following commands:


```
diskpart
create vdisk file=C:\WES7.vhd maximum=10240
                                         type=expandable

select vdisk file=C:\WES7.vhd
attach vdisk
exit
```
- Close the command prompt
- Run the WES7 setup
- At disk selection choose the previously attach VHD

For a video tutorial please visit www.elbacom.com/blog/

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