This Product Guide provides an overview of the features and functionality of Windows® Home Server software.
# Windows Home Server

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Overview

Microsoft® Windows® Home Server software was designed for households and home-based businesses that have more than one personal computer. Your life has gone digital - it is time to simplify your life so you can easily access your files, photos, videos and music from any PC or TV in your home, or even while away from home.

Features at a Glance

- Automated imaged-based backup of up to 10 computers every day, also known as “No button backup”. No need for CDs and external hard drives because Windows Home Server does your backups for you.
- Simple to restore an entire PC, a specific hard drive or individual files and folders from the backups stored on your home server.
- Store more files, photos, videos, recorded TV shows, etc. simply by adding more internal or external hard drives to your home server. Also, you do not have to deal with remembering those annoying drive letters (C:, D:, etc.) anymore.
- Store your files and media in shared folders that are automatically duplicated - so you will have 2 copies of your important stuff on 2 different hard drives to protect you against the failure of a hard drive.
- Share your favorite photos with friends and family via your own family web site.
- Home-based businesses can easily share lots of documents, presentations, and spreadsheets with their clients through a built-in remote access web site.
- Remotely access some of your PCs while away from home, so that you can run an application to check your e-mail, peruse financial information, or look up an address or a phone number.
• Windows Home Server is an extensible platform with over 70 Add-Ins already developed, with more on the way.

Before You Begin

Find a suitable location to put your home server before you begin the Windows Home Server Setup. The location you choose must have a wired network connection either to your broadband router or to a network switch that is connected to your broadband router.

Network Requirements

To successfully use Windows Home Server software, your home network must meet the following requirements:

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<th>Minimum Specification</th>
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<tr>
<td>Home server connection</td>
<td>100 Mbps wired connection</td>
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<tr>
<td>Home computers</td>
<td>One or more computers that are running a supported operating system, with either a wired or a wireless network connection.</td>
</tr>
<tr>
<td>Internet connection</td>
<td>Broadband connection</td>
</tr>
<tr>
<td>Broadband router/firewall device</td>
<td>An external Internet broadband router/firewall device with 100 Mbps wired Ethernet connection. Additionally, Windows Home Server assumes that your home computers get their IP address from the router/firewall device on your home network.</td>
</tr>
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</table>

Supported Operating Systems for Home Computers

The following operating systems for home computers are able to run the Windows Home Server Connector software:

• Windows 7
• Windows Vista and Windows Vista X-64 editions
• Windows XP with Server Pack 2 and higher

In addition, home computers running earlier versions of Microsoft Windows, and computers running Apple MacOS 10.4 and higher can easily connect to a home server over your home network to access files and media stored in the shared folders on the home server.

Wireless Support

Windows Home Server must be connected through a wired connection directly to your router or other home network device. Connecting the home server to your home network through a wireless connection is not supported. However, using home computers that are connected through a wireless router is supported.
Setup

You can get Windows Home Server up and running in three easy steps:

**Step 1: Connect and Power On**

Plug in the power cord and Ethernet cable to the back of your home server.

**Step 2: Install the Windows Home Server Connector Software**

From one of your home computers, place the Windows Home Server Connector software CD in the optical drive and follow the on screen instructions.

**Step 3: Complete Windows Home Server Setup**

From the computer where you install the Windows Home Server Connector software, you will be prompted to complete the Windows Home Server Setup. This is a one-time task and you must complete this step successfully to ensure Windows Home Server functions properly.

Windows Home Server Console

The Windows Home Server Console is used to configure your home server. It is intended to be used by the person responsible for the home network and computers in your household.

You access the Windows Home Server Console from any computer that has the Windows Home Server Connector software installed by double-clicking the Windows Home Server taskbar icon. When you run the program it will ask you for the Windows Home Server password and then will connect to your home server.

- **View the Backup Status of your Home Computers**
  
The **Computers & Backup** tab allows you to view the backup status and configure backups on the computers that have the Windows Home Server Connector software installed.

- **Configure User Accounts**
  
The **User Accounts** tab allows you to add up to 10 user accounts. You can change the Shared Folders that users have access to, and enable remote access for each user. Each user will automatically be provided with a Shared Folder that only they (by default) have access to. (e.g. \server\users\jeff).

- **Configure Shared Folders**
  
The **Shared Folders** tab allows you to add, remove and change properties of Shared Folders. If you have two or more hard drives in your home server, when you create a new folder, you can select **Enable Folder Duplication** that provides a level of redundancy for your files in the case of a single hard drive failure.
• **Configure Server Storage**

The **Server Storage** tab allows you to view, add, and remove hard drives on your home server. You can see the status of your home server storage, and attempt to repair any hard drives that show an unhealthy status. You can also see a graphical representation of the total space usage on your home server.

• **View the Health Status of your Home Network**

The **Network Health** indicator provides you with Healthy, At Risk and Critical health notifications for your home server and your home computers.

• **Adjust Windows Home Server Settings**

You can change the configuration settings for your home server, such as: Windows Update settings, Computer Backup settings, Password policy, and the date and time. Additionally, you will find the option to shutdown and restart your home server.

**Home Computer Backup and Restore**

Windows Home Server software will automatically back up as many as 10 home computers and allow you to easily restore the entire computer or an individual file or folder to a previous point in time. The Windows Home Server Backup solution uses an innovative method to back up only the data that has changed since the previous backup. If you have several copies of the same data on different computers, the data is backed up only once on your home server which keeps track of what data was stored on each home computer on each day. This makes it very efficient in terms of the time it takes for backups to complete and also the amount of space that is used on your home server.
- **Automated Image-based Backup of your Home Computers**

  Computer backups are automatically configured when you install the Windows Home Server Connector software on your computers. Backup is performed on a daily basis for every configured computer.

- **Restore an Entire Home Computer**

  Restoring a home computer to a previous point in time is easy. Simply boot the home computer using the Home Computer Restore CD. The computer will connect to your home server and provide a wizard for restoring a single hard drive or multiple hard drives from a backup of that computer that is stored on your home server.

- **Restore Individual Files and Folders**

  You can also restore individual files or folders by selecting a home computer and a specific backup of that computer from the Windows Home Server Console. A Windows Explorer window is displayed with the files and folders that were backed up for that computer on that day. You can easily drag and drop individual files or entire folders from this Windows Explorer window and store them on your Windows Desktop or another location on your home computer.

Image: Computers & Backup tab in Windows Home Server Console

Learn more by reviewing the [Back Up and Restore Step-by-Step](http://www.microsoft.com/windowshomeserver).

Home Network Health Monitoring

Windows Home Server monitors its own health status and the status of your computers on your home network, and it notifies you of any issues or problems that are found. Windows Home Server monitors the following health information:

- **Home Computer Backups**
  
  Monitors that your home computers are being backed up on a regular basis and that the backups are completing successfully.

- **Server Storage and Shared Folder Duplication**
  
  Monitors the hard drives in your home server and helps ensure that there is adequate space available for Shared Folders.

- **Home Computer Health Monitoring**
  
  Monitors the Security Center status for home computers running Windows 7 and Windows Vista, so you can have a single view into the health of your home network.

Image: Network Health tab in Windows Home Server Console

The taskbar application provides you with a high-level indicator of the health of your home network. If a problem is found, you can connect to the Windows Home Server Console to get more detailed information.

- Green – your home network is healthy
- Yellow – your home network is at risk
- Red – your home server has found a critical problem
- Blue – this computer is currently being backed up to your home server
Shared Folders and Server Storage

Windows Home Server Drive Extender is a revolutionary new storage technology that enables you to use internal and/or external hard drives of varying sizes for additional storage on your home server.

- **Pre-Defined Shared Folders**

  Your home server is pre-configured with the following Shared Folders: Photos, Music, Videos, Public, and Software. From the Windows Home Server Console you can easily specify the user permissions for these folders and create any number of new shared folders.

- **Shared Folder Duplication**

  If you have two or more hard drives in your home server, Windows Home Server helps protect against a single hard drive failure by ensuring that files stored in Shared Folders are automatically duplicated across multiple hard drives. Folder Duplication is configurable for each individual Shared Folder.

For additional information please read the [User Accounts and Shared Folders Technical Brief](http://www.microsoft.com/windowshomeserver) available at [http://www.microsoft.com/windowshomeserver](http://www.microsoft.com/windowshomeserver)
• **Easy to Add More Storage**

From the Windows Home Server Console you can add a new hard drive to your home server using a simple wizard. The amount of storage available to your shared folders and home computer backups increases proportionally. The hard drives you add can be either internal or external (e.g. USB 2.0, FireWire or eSATA).

As you add more hard drives to your home server, they are represented in Server Storage as a single large collection of available storage space. You no longer need to deal with E:, F:, G:, etc. drive letters as you add more hard drives.

With Folder Duplication enabled, important data will be stored on separate hard drives helping to provide protection against a single hard drive failure.

It is also easy to remove hard drives through the Windows Home Server Console. When you select Remove Drive within the Windows Home Server Console, files and folders on the hard drive will be automatically moved. You might want to do this if a hard drive is failing or you want to replace an older, smaller hard drive after adding a newer, larger hard drive.

![Server Storage tab in Windows Home Server Console](image.png)

Learn more by reviewing the [Increase Data Storage Step-by-Step](http://www.microsoft.com/windowshomeserver).
For additional information please read the [Drive Extender Technical Brief](http://www.microsoft.com/windowshomeserver) available at http://www.microsoft.com/windowshomeserver
Media Sharing and Streaming

Your home server is pre-configured with the following Shared Folders that can be used to store your media files: Photos, Music, and Videos. Additionally, these Shared Folders can be enabled for media streaming from the Windows Home Server Console. You can selectively turn on Media Library Sharing for each of these Shared Folders so that your music, photos, and/or videos can be accessible from an Xbox 360™ entertainment system or another supported digital media receiver that is attached to your home network.

- **View Photo Slideshows from a Home Computer**
  You can store your digital photos in the Photos folder on your home server so you access them from your home computers or from an Xbox 360 in your home.

- **Stream Music in your Home**
  Similarly, you can store your music on your home server so you can access and play it from any of your home computers or a digital music receiver on your home network.

- **Store your Videos on your Home Server**
  Your home server can be used to store your collections of videos and recorded TV from a computer running Windows Media Center, so that you can easily grow your collections and access them from any TV in your home.

Learn more by reviewing [Stream Digital Files Step-by-Step](http://www.microsoft.com/windowshomeserver).

Remote Access

Using the Windows Home Server Console you can turn on Remote Access and configure a user account with a username and a secure password. When you configure Remote Access you will receive a personalized Internet address that you will use to remotely access your home server.

Remote Access to Shared Folders

Users can browse folders and files on the home server, as well as upload files to the Shared Folders on their home server while away from home. You can also search through the Shared Folders when you are trying to locate a specific file. Permission to access specific folders is configured under the User Accounts tab in the Windows Home Server Console.
Remote Access to Home Computers

After logging into your home server, you may be able to connect to a home computer and run an application as if you were sitting in front of that computer. Your home computer must be running a version of Windows that supports Remote Desktop connections, such as: Windows XP Professional with Service Pack 2 (SP2), Windows XP Media Center Edition 2005, Windows Vista Ultimate, Windows Vista Business, Windows Vista Enterprise, Windows 7 Professional and Windows 7 Ultimate.

Remotely Connect to the Windows Home Server Console

If the need arises, you can access the Windows Home Server Console while away from home to add new users, add new Shared Folders or check the health of your home network.

Learn more by reviewing the Connect and Upload Step-by-Step.
For additional information please read the Home Networking Technical Brief and Remote Access Technical Brief available at http://www.microsoft.com/windowshomeserver
Windows Home Server Software Add-ins

- **Your Home Server Can Do More**

Windows Home Server has been designed with extensibility in mind, so that software developers can create innovative Add-In software. New Add-Ins for Windows Home Server are continually being developed, with multiple solutions available in the following categories:

- Media Streaming & Archiving
- Family Web Site / Photo Sharing
- Home Automation
- Power Management
- Online Backup
- Anti-Virus
- Mobile Phone solutions
- Home-based Business applications

For the latest information on Windows Home Server, please visit the product web site at [http://www.microsoft.com/windowshomeserver](http://www.microsoft.com/windowshomeserver).


For technical support regarding Windows Home Server, please visit the [Windows Home Server Support Center](http://www.microsoft.com/windowshomeserver).


Check out a list of the more popular Windows Home Server Add-In at the [Most Popular Windows Home Server Add-Ins](http://www.microsoft.com/windowshomeserver) page. And follow links to learn more about all of the available Add-Ins.
## Windows Home Server Features-at-a-Glance

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• Configure Shared Folders  
• Configure Server Storage  
• View the Health Status of your Home Network  
• Adjust Home Server Settings  
• View the Backup Status of your Home Computers |
| User Accounts                     | • User accounts are required in order to control access to the shared folders                                                                 |
| Home Computer Backups             | • Automated Daily Image-based Backup of up to 10 home computers                                                                                                                                  |
| Home Computer Restore             | • Entire Home Computer  
• One or more hard drives  
• Individual Files and Folders                                                                                                               |
| Pre-Defined Shared Folders        | • Music, Photos, Videos, Software, Public  
• A secure personal shared folder for each user account                                                                                     |
| Easy to Add Server Storage        | • External USB 2.0 hard drive  
• External FireWire hard drives  
• eSATA hard drives  
• Internal hard drives                                                                                                                       |
| Shared Folder Duplication         | • Duplication is configurable on a per shared folder basis helping protect you from the failure of a single hard drive on your home server |
| Media Sharing and Streaming       | • Enjoy slideshows of your digital photos stored on your home server from any PC in your home, or from a digital photo frame  
• Stream music throughout your home from your home server  
• Watch videos and movies stored on your home server from any TV in your home                                                                 |
| Remote Access                     | • To Shared Folders  
• To Home Computers  
• To Windows Home Server Console  
• Using Personalized Internet Address  
• Permissions set for each user                                                                                                               |
| Home Network Health Monitoring    | • Home Computer Backups  
• Home Server Storage  
• Shared Folder Duplication  
• Security Center Status for PCs running Windows Vista                                                                                         |
| Third Party Add-ins               | New Add-Ins for Windows Home Server are continually being developed, with multiple solutions available in the following categories:  
• Media Streaming & Archiving  
• Family Web Site / Photo Sharing  
• Home Automation  
• Power Management  
• Online Backup  
• Anti-Virus  
• Mobile Phone solutions  
• Home-based Business applications |
Abstract
This technical brief provides an in-depth look at home networking and how it applies to Windows® Home Server. The brief has been updated to include additional information for Windows Home Server Power Pack 1.

To learn more about other aspects of Windows Home Server, see the Microsoft Web site (http://go.microsoft.com/fwlink/?LinkId=100260).
Home Networking Overview

When used in combination with your existing home network, Windows® Home Server helps protect, connect, and organize your files, photo, music, and videos.

Features and Functionality

The core features of Windows Home Server that relate to home networking include:

- **Home Computer Backup and Restore**
  
  Windows Home Server automatically backs up your home computers to the home server and allows you to easily restore the entire computer or an individual file or folder to a previous point in time.

- **Shared Folders**
  
  Your family photos, videos, music, and other important documents are located in one central place. You can create folders by subject or topic, so the whole family can stay organized and up-to-date.

- **Home Network Health Monitoring**
  
  Windows Home Server monitors its health status and the status of your computers that are running a Windows Vista® operating system. It notifies you of issues that it finds.

- **Media Sharing**
  
  Your home server is preconfigured with shared folders that can be used to store your media files. The folders are named: Photos, Music, and Videos. These shared folders can be enabled for media streaming from the Windows Home Server Console.

- **Remote Access**
  
  After you have configured a user account in the Windows Home Server Console for remote access, you can use a Web browser from a computer to remotely access your home server and home computers.
Home Networking In Depth

This section explains how Windows Home Server works within a home network.

Recommended Home Network Configuration

The following network configuration is recommended to support Windows Home Server:

- A broadband (or high-speed) Internet connection
- A UPnP™ certified broadband router/firewall device
- A computer running Windows Home Server that is connected through a wired Ethernet connection to your broadband router/firewall device
- Home computers that are connected through a wired Ethernet or a wireless connection to your broadband router/firewall device
Note
Most routers only support 10/100 megabit per second (Mbps) wired Ethernet connections. To improve your network performance, you should consider adding a 1 Gigabit (1000 Mbps) network switch to your network. Connect your home computers and home server to the faster switch, and then connect the switch to your broadband router.

Important
Connecting your Windows Home Server to your home network through a wireless connection is not supported. Windows Home Server must be connected through a wired connection to directly to your router or other home network device. However, using home computers that are connected through a wireless connection is supported.

Windows Home Server uses the UPnP architecture to automatically configure your router, but not all broadband routers properly support the UPnP architecture.

Note
For a list of UPnP certified routers that are also certified for Windows Vista, see the Microsoft Web site (http://winqual.microsoft.com/HCL/Default.aspx?m=v).

The Internet Connectivity Evaluation Tool checks your router to see if it supports certain technologies. You can use this tool on a computer that is running a Windows Vista or a Windows XP operating system.

The Internet Connectivity Evaluation Tool is available at the Microsoft Web site (http://go.microsoft.com/fwlink/?LinkId=100267).
Home Networking Acronyms

While you set up and configure your home network, you will see many acronyms. They may be confusing at first, but this section will help you understand them and how they apply to Windows Home Server.

**IP Address** - Each device on your home network has an Internet Protocol (IP) address assigned to it. IP addresses are usually based on a combination of four number clusters, such as 192.168.1.1. Each device on the Internet also has an IP address so that it can be uniquely identified and other devices can communicate with it.

**Static IP Address** - A fixed IP address that is assigned to a specific device.

**Dynamic IP Address** - An IP address that can change or be assigned to other devices.

**Router/Firewall** - A device on your home network between your broadband modem and the computers and other devices on your home network. Most routers have wireless capabilities, so devices can be directly wired with an Ethernet cable or communicate wirelessly with each other. The wide area network (WAN) connection for the router/firewall is assigned an IP address by your broadband service provider.

🚨 **Note**

One way to determine the external IP address that your broadband provider assigns to your broadband router is to access the WhatsMyIP.org site from a home computer at the Microsoft Web site (http://www.whatismyip.com).

**Internet Domain Name** - A friendly name for a device on the Internet. For example, the Internet domain name for the Web servers at Microsoft is www.microsoft.com.
**DNS (Domain Name System)** - DNS was designed so that you can use friendly names (for example, smithfamily.homeserver.com) to connect to devices on the Internet. You do not need to remember IP addresses because there are multiple DNS Server services on the Internet that lookup friendly names and translate them to the IP address associated with the name.

**Note**
In your home network, the address for Internet accessible DNS servers (as supplied by your broadband provider) can be set in your router/firewall and inherited by your home computers as part of the Dynamic Host Configuration Protocol (DHCP) Server services provided by your router/firewall device.

**DHCP (Dynamic Host Configuration Protocol)** - This service assigns an IP address to each of the devices that are connected in your home network. Your router/firewall device should be configured as a DHCP server, so that the computers are assigned a unique IP address (for example, 192.168.1.47) on your home network. You can configure the DHCP server settings of your router/firewall from the settings web page of your router.

**Note**
The devices on your home network should be set to acquire their IP addresses and DNS server settings automatically from your router/firewall.

**NAT (Network Address Translation)** - This service redirects public network communication from the Internet to a device or computer on your private home network. This allows multiple computers or devices on your home network with different private IP addresses to share your broadband Internet connection. Your router/firewall acts as a translator to ensure that incoming requests are routed to the correct device or computer on your home network.

**Subnet** - A portion of a home network that shares a common address component in the IP address. Most home networks consist of only one logical network, so the network and the subnet are represented by the same network address. For example, on most home networks, all devices with an IP address that start with 192.168.1.xxx are part of the same logical network. Most broadband routers assign IP addresses in the 192.168.0.xxx, 192.168.1.xxx, or the 192.168.2.xxx subnets.
Important

By default, Windows Home Server allows connections to the home server only from home computers and devices that are on the same subnet. If you have configured multiple subnets on your home network, ensure that your home server is on the same subnet as your computers and devices.

Ports - If you think of an IP address as representing the address of a house, then you can think of a port as one of the doors used to enter or exit that house. For example, port 80 is used to respond to Web requests from a browser and port 25 is used for e-mail communications.

Port Forwarding - Your broadband router/firewall device can be configured to forward requests from a specific port number to a computer on your home network. For example, all Web requests from a browser on the Internet to port 80 could be forwarded to the internal IP address (for example, 192.168.1.7) of your home server.

Dynamic DNS - Most broadband providers provide customers with a dynamic Internet IP address for the WAN connection on your broadband router. This means that your Internet address can be changed periodically by your broadband provider. Dynamic DNS (DDNS) is a system that allows Internet domain names to be associated with a dynamic IP address. Windows Home Server has built-in software that allows you to choose a friendly Internet domain name for your home network. Even if your Internet IP address changes, you can still connect to your home network with your personalized Internet domain name (for example, smithfamily.homeserver.com). DDNS ensures that your new Internet IP address is associated with your Internet domain name.

UPnP - UPnP architecture supports automatic discovery of devices on your home network, and it is used by Windows Home Server to configure the port forwarding settings on your router/firewall device for remote access. Many router/firewall devices come with UPnP capabilities, and they can be automatically configured by your home server.

If you enable Media Sharing on your home server through the Windows Home Server Console, your home server will advertise itself on your home network so that other devices can automatically connect to it. From your home network, you can browse to the Windows Home Server UPnP device Web site by using the following address:  http://<servername>/upnp/welcome.aspx?
Windows Home Server Port Reference

A list of ports that Windows Home Server uses within your home network is provided below.

**Ports Used by Windows Home Server Connector**
The Windows Home Server Connector software uses several ports on your home computers to connect and communicate with Windows Home Server. When you initially install the Windows Home Server Connector software, your home computer receives a certificate from the home server and the communications between the home computer and the home server are encrypted.

The ports that are used by Windows Home Server Connector include:

<table>
<thead>
<tr>
<th>Service or Protocol</th>
<th>Ports</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTTP</td>
<td>TCP 55000</td>
<td>Subnet</td>
</tr>
<tr>
<td>HTTPS</td>
<td>TCP 56000</td>
<td>Subnet</td>
</tr>
<tr>
<td>Windows Home Server Computer Backup</td>
<td>TCP 8912</td>
<td>Subnet</td>
</tr>
<tr>
<td>Windows Home Server Transport Service</td>
<td>TCP 1138</td>
<td>Subnet</td>
</tr>
</tbody>
</table>

**Note**

Some firewall programs may block these ports, and this could cause your Windows Home Server Connector software installation to fail. If you have issues installing the Windows Home Server Connector software, you should check your firewall software documentation to learn how to unblock those ports.
Ports Used for Media Sharing on Your Home Network

To enable Media Sharing on your home server, open the Windows Home Server Console, click **Settings**, and then click **Media Sharing**.

Windows Home Server Media Streaming uses the following ports:

<table>
<thead>
<tr>
<th>Service or Protocol</th>
<th>Ports</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPnP Framework</td>
<td>TCP 2869</td>
<td>Subnet</td>
</tr>
<tr>
<td></td>
<td>UDP 1900</td>
<td>Subnet</td>
</tr>
<tr>
<td>Windows Media Connect</td>
<td>UDP 10280-10284</td>
<td>Subnet</td>
</tr>
<tr>
<td></td>
<td>TCP 10243</td>
<td>Subnet</td>
</tr>
</tbody>
</table>

**Important**
When you enable Media Sharing, Windows Media Connect bypasses all user accounts and allows for streaming to any device that supports Windows Media Connect. You should make sure that your home network is secure by enabling wireless security and setting strong passwords on your Windows Home Server and home computers.

Ports Used for Remote Access

By default, Remote Access is disabled for your home server. To enable Remote Access, open the Windows Home Server Console, click **Settings**, and then click **Remote Access**.

Windows Home Server Remote Access uses the following ports on your home server to enable you to access your home server while away from home:

<table>
<thead>
<tr>
<th>Service or Protocol</th>
<th>Ports</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTTP Web requests-</td>
<td>TCP 80</td>
<td>Any computer</td>
</tr>
<tr>
<td>HTTPS Web requests</td>
<td>TCP 443</td>
<td>Any computer</td>
</tr>
<tr>
<td>Remote desktop proxy</td>
<td>TCP 4125</td>
<td>Any computer</td>
</tr>
<tr>
<td>Remote Desktop</td>
<td>TCP 3389</td>
<td>Subnet</td>
</tr>
</tbody>
</table>
Windows Home Server uses a remote desktop proxy—the home server receives requests on port 4125 and communicates with the home computers using port 3389.

Windows Home Server uses UPnP protocols to configure your broadband router to forward these ports from your broadband router to your home server. Any Web request that is sent to your broadband router using these ports is forwarded directly to your home server. To configure your router, open the Windows Home Server Console, click Settings, and then click Remote Access.

**Note**
If your router cannot be configured by your home server, then you need to manually forward the TCP ports 80, 443, and 4125 from your router to the IP address of your home server. For more information, see the documentation for your broadband router or visit the Port Forward Web Site (http://go.microsoft.com/fwlink/?LinkId=100269).

**Important**
You do not need to forward TCP port 3389 from your router to your home server. For more information, see the Technical Brief on Windows Home Server Remote Access at the Microsoft Web site (http://go.microsoft.com/fwlink/?LinkId=103939).

**Caution**
Do not reset the defaults of the Windows Firewall from the Administrator’s desktop. If you do this, you will need to manually reconfigure the port exceptions that are used by Windows Firewall for Windows Home Server. For more information, see Troubleshooting Windows Home Server Connector Installation document on the Microsoft Web site (http://go.microsoft.com/fwlink/?LinkId=103940).
Technical Brief

User Accounts and Shared Folders

Microsoft Corporation
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Abstract
This Technical Brief provides an in-depth look at the features and functionality of Windows Home Server User Accounts and Shared Folders. This brief has been updated to include additional information from Power Pack 1.

To learn more about other aspects of Windows Home Server, see the Microsoft web site at: http://www.microsoft.com/WindowsHomeServer

The information contained in this document represents the current view of Microsoft Corporation on the issues discussed as of the date of publication. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information presented after the date of publication.

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Overview of User Accounts and Shared Folders

You can use the Shared Folders and User Accounts features in Windows Home Server to centrally store, protect and access your data on your home server. Files can be accessed from both within your home network and remotely from the web.

Features & Functionality

After you configure User Accounts and Shared Folders you can easily access your protected data and files from home and remote computers.

- **User Accounts**

  User Accounts dictate who has access to content stored in Shared Folders on your home server and add a higher level of protection to your files. Windows Home Server will ensure that a user has the appropriate permission to view and access folders and files. Windows Home Server makes configuration of user accounts simple by verifying that user accounts and passwords on your home network are synchronized.

- **Shared Folders**

  Shared Folders simplify the task of organizing and sharing your files. This feature of Windows Home Server gives every user in your home the ability to store files in one central location and access the content from any computer on the home network.
You can also access music and other entertainment content through your Xbox 360 or compatible digital media receiver.

- **Shared Folder Duplication**

  Enabling the folder duplication feature on a shared folder will create a second copy of the files on another hard drive on your home server. This redundancy will help prevent data loss in the event of hard drive failure. To conserve space on your hard drive you can turn off folder duplication to prevent large or unimportant files from being duplicated. The ability to control duplication at a shared folder level makes Windows Home Server duplication more practical than a set of mirrored hard drives.

**Benefits**

Windows Home Server User Accounts and Shared Folders provide the following benefits:

- **Organization**

  Centrally storing your photos, videos, music and other important documents helps you always know where to find them. By saving the file to the Windows Home Server, you know exactly where the file is and who has access to the file.

- **Sharing**

  This allows Windows Home Server to act as a media hub for your photos, music, and movies, making them accessible from your multiple home computers and network-attached media players.

- **Protection**

  With Shared Folder duplication enabled on selected folders, Windows Home Server will make sure there is a second copy of your data in that shared folder on another hard drive. This will help prevent data loss in the event that a single hard drive fails. User Accounts enable you to set different user permissions for each shared folder.

**User Accounts and Shared Folders**

**User Accounts**

This section of the technical brief will go into further depth of how Windows Home Server User Accounts work.

Before you begin setting up user accounts and shared folders, you should understand each level of access permission:

- **Full** – The user can view, add, modify, and delete files in the shared folder.

- **Read** – The user can view files in the shared folder, but cannot add, modify, or delete files.
None – The user cannot view, add, modify, or delete files in the shared folder.

If a user has Read access to the Music shared folder wanted to listen to music or copy music from the shared folder they could do that. However, if the user felt the name was wrong on the song, they could not change the song name. If the user had other music to put into the Music shared folder, they would not be allowed unless they were given Full permissions or used another user account with Full permissions.

Important

After you add a shared folder, some users may receive Access Denied errors when they try to access the shared folder. If this happens, they may need to log off and then log on to their home computer before they can access the shared folder.

When a user account has access set at None for a shared folder, they would receive an Access Denied error when trying to open up that shared folder. This means the user cannot see the files in the folder, they cannot add files to the folder, they cannot remove files from the folder, they cannot execute the files from the folder and they cannot copy the folder.

Caution

The guest account can be used to give access to shared folders for users that do not have their own user account for Windows Home Server. Enabling the guest account will provide default Read permission to the shared folders: Music, Photos, Videos, Public, and Software. For security reasons, the guest account cannot be accessed remotely.

Creating and Removing User Accounts

You are allowed to create 10 user accounts on Windows Home Server. By default, only the guest account exists, however it does not get counted against the total of 10 user accounts. Each user will automatically be provided with a shared folder that only they have access to, for example, \server\users\jeff would get created when you add a user named Jeff via the Windows Home Server Console. It is a best practice to create the user accounts on your home server with the same names that you are using on your home computers. This will streamline your home network setup so you can fully benefit from centralized storage without having to remember different usernames and passwords. If you do not maintain user accounts with logon names that match across your home network, you can still access shared folders on Windows Home Server. However, you will be prompted for a valid user name and password when you connect to your home server.

Important

User accounts should be created using the Windows Home Server Console. This document assumes you have already installed the Windows Home Server Connector software on at least one home computer.

Adding User Accounts

You can use the User Accounts tab on the Windows Home Server Console to add, remove, and change user accounts on your home server. You should add a user
account for each person who uses your home network so they can access various shared folders on your home server.

1. From a home computer, right-click the Windows Home Server tray icon, and then click Windows Home Server Console.
2. Type the Windows Home Server password, and then click Next.
3. On the Windows Home Server Console, click the User Accounts tab.
4. Click Add, and then complete the Add User Account Wizard. The following information is displayed for each user account on Windows Home Server:
   a. Name
      Displays the name of the person associated with the user account.
   b. Logon Name
      Displays the user account name that is used to log on to the home server.
   c. Remote Access
      Indicates if Remote Access is enabled for this user account.
   d. Account Status
      Indicates if the user account is enabled or disabled.
5. Repeat for each user account that you want to add.

When you add a new user account, Windows Home Server does the following:

- **Creates a new user account**
  The new user account can have a first name, last name, logon name, and password.
- **Configures the access level for shared folders**
  You can set the type of access to shared folders as Full, Read, or None.
- **Creates a personal shared folder**
  By default, no other user accounts can access each user’s personal shared folder.
- **Configures remote access**
  By default, Remote Access is not enabled for new user accounts.

During the User Account wizard, setup will ask you if you would like to enable Remote Access. Enabling remote access requires a strong password. This is a requirement even if you have changed password settings to weak.

Windows XP and Windows Vista use two different ways to display user information. They both display descriptions and username. Your username is what is used for network authentication. As mentioned above, the username you define on your home server and your home computer should match in order to streamline authentication.

If a user account does not exist on your home server with the same username as on your home computer, the Windows Home Server Connector software on the home computer will display a popup.
The home server software will notify you if the username that you are using on your home computer has not been correctly configured in the Windows Home Server Console. This notification will display the logon name of your user account that you are currently using on your home computer.

Determining your current user accounts

If you missed the above message, you can check the username that you are using on your home computer by doing the following.

Windows XP Home

1. Click start
2. Run
3. Type, “control userpasswords2”
4. Click OK
5. The usernames will be listed in the Windows under User Name.

Windows Vista

1. Click start
2. Type in the search bar, “CMD”
3. When the command window opens type, “whoami”
4. Your username will be displayed as “computer name\username”.

Removing a user account

1. From a home computer, right-click the Windows Home Server tray icon, and then click Windows Home Server Console.
2. Type the Windows Home Server password, and then click Next.
3. On the Windows Home Server Console, click the User Accounts tab.
4. Right-click a user account and click Remove to start the Remove a User Account wizard.

The wizard helps you remove a user account and its associated shared folder. You can choose either to keep the shared folder or to remove it. If you choose to keep the shared folder, you can allow one existing user account to have access to the folder. You can also change this at a later time from the Shared Folders tab.
Configuring User Accounts

After a user account has been created, you can alter the settings and permissions through the User Accounts tab in the console.

You can enable Remote Access for a user in the console. Enabling remote access requires a strong password. This is a requirement that cannot be changed, even if you have set the Password Policy settings dialog to weak.

After clicking settings in the Windows Home Server Console, you can select the passwords page to make changes to the User Accounts Password Policy.

You can choose the following password policies:

- **Medium (default)**
  By default, passwords for user accounts must be at least five characters long, with no complexity requirement.

- **Weak**
  If you want shorter passwords, you can select the Weak password policy, which allows passwords of any length (including zero length, or no password) and which has no complexity requirement. This setting is not recommended because user accounts with short passwords reduce your network security.

- **Strong**
  If you want to make access to your home network more secure, you can select the Strong password policy. The Strong password policy requires complex
passwords that are at least seven characters long. A complex password must contain at least three of the following four character categories:
  o Uppercase letters
  o Lowercase letters
  o Numbers
  o Symbols (such as !, @, #, etc.)

⚠️ Important

Regardless of which password policy you choose, all user accounts with Remote Access enabled require strong passwords. This cannot be changed.

▶ To enable remote access for a user
1. From a home computer, right-click the Windows Home Server tray icon, and then click Windows Home Server Console.
2. Type the Windows Home Server password, and then click Next.
3. On the Windows Home Server Console, click the User Accounts tab.
4. Right-click the user account, and then click Properties.
5. Check Enable remote access for this user
6. Select from the drop down the level of access you would like the user to have
   a. Allow access to shared folders and home computers.
   b. Allow access to shared folders only.
   c. Allow access to home computers only.
7. Click OK

Remote Access is not enabled by default when you add a new user account. To maintain security, you cannot enable Remote Access for the Guest account. You must add a user account and then enable remote access for that user account.

▶ To change users access
1. From a home computer, right-click the Windows Home Server tray icon, and then click Windows Home Server Console.
2. Type the Windows Home Server password, and then click Next.
3. On the Windows Home Server Console, click the User Accounts tab.
4. Right-click the user account, and then click Properties.
5. Click the Shared Folder Access tab
6. Select the Full, Read or None for the level access you would like to give that specific user to that specific shared folder.
7. Click OK

User Accounts and Shared Folders on Your Home Network

A user account must be created and given access to a shared folder in order to view, change or add to the contents of that specific folder. If you are logged into your home computer as a username that is unrecognized by the Windows Home Server, you will be presented with an authentication box in order to access your home server. After you receive the authentication box, type a username and password that already exists in the Windows Home Server Console.

To access the share folders on your home server from a home computer, right-click the Windows Home Server tray icon, and then click Shared Folders. A Windows Explorer window will open displaying all of the shared folders on your home server. Though you
can see all the shared folders, you will only be able to open the folders for which you have **Read** or **Full** permissions. If the user does not have permissions to the folder, an Access Denied message will be displayed. If a user needs permissions to a folder, their settings will have to be changed through the Windows Home Server Console.

**Important**

When users view shared folders from the Remote Access website, they will only be able to view the shared folders for which they have **Read** and **Full** permissions.

**Default Shared Folders**

Windows Home Server creates default folders: Music, Photo, Videos, Software and Public. You can choose which users have access to these folders and the permissions for each user. These default shared folders cannot be deleted.

**Music, Photos and Videos Shared Folders**

With the Media Sharing feature enabled, you are able to copy content into the Music, Photos and Videos shared folders and have the content available to media receivers on your home network, such as Xbox 360.

**Important**

Even if you set every user’s access levels to **None**, with Media Sharing feature enabled, Media Connect Devices will still have **Read** access to these folders. To learn more about media sharing and media streaming, please review the Windows Home Server Media Sharing Technical Brief.

**Software Shared Folder**

By default, Windows Home Server creates the Software shared folder with three subfolders.

**Caution**

Do not delete, move or rename any of the subfolders under the Software shared folder. Windows Home Server relies on these subfolders to exist for the Connector software and Add-Ins to be installed correctly.

- **Home Server Connector Software**

  When you purchased your Windows Home Server, it may have come with a Windows Home Server Connector CD. You can install the Connector software from the CD or you can install the Connector software from the `\Server\Software\Home Server Connector Software` shared folder. This folder is also updated via Windows Update and should not be altered or deleted. If this folder is altered or deleted, you will no longer receive Windows Updates for the Windows Home Server Connector Software. You can also access the Connector software through [http://server:55000](http://server:55000). This can be useful in a scenario where a user does not have access to the Software shared folder.
- **Home Computer Restore CD**

To obtain the latest version of the Home Computer Restore CD, please go to http://go.microsoft.com/fwlink/?LinkID=104683. You can use the Home Computer Restore CD subfolder to store any updated versions of this CD image.

- **Add-Ins**

Windows Home Server has been designed with extensibility in mind, so that software developers can develop innovative Add-Ins, such as home web cameras, home automation, and home security solutions that work with your home server. After placing a Windows Home Server Add-In software solution into the Add-In folder, you will be able to install the Add-In through **Windows Home Server Console - Settings – Add-ins** page.

To install an Add-In

1. On a home computer, right-click the Windows Home Server tray icon, and then click **Shared Folders**.
2. In **Shared Folders**, double-click the **Software** folder.
3. Double-click the **Add-Ins** folder.
4. Copy the .msi file for the Windows Home Server add-in to the **Add-Ins** folder.
5. Close the **Add-Ins** folder.
6. Right-click the Windows Home Server tray icon, and then click **Windows Home Server Console**.
7. Type the Windows Home Server password, and then click **Next**.
8. Click **Settings** on the console.
10. Click the **Available** tab.
11. Click **Install** to install the selected Add-in.
12. Click **OK** on the **Installation succeeded** dialog box to restart the console.
13. Reconnect to the console. If your new Add-in includes a console tab, the new tab now appears in the console.

### Creating and Removing Shared Folders

**Creating Shared Folders**

1. From a home computer, right-click the **Windows Home Server tray icon**, and then click **Windows Home Server Console**.
2. Type the Windows Home Server password, and then click **Next**.
3. On the Windows Home Server Console, click the **Shared Folders** tab.
4. Click **Add**
5. Create a **Name** for your folder and a **Description** and check **Enable Folder Duplication** if you would like this folder duplicated.
6. Choose the desired level of access for each user for this shared folder
7. Click **Finish**
**Important**

Shared Folders must be created using the Windows Home Server Console. This allows you to control user access and enable folder duplication using Windows Home Server. Sub-folders created within Windows Explorer will inherit the permissions of the Shared Folder.

**Removing Shared Folders**

**Important**

It is important to save all contents of a shared folder you wish to keep before following the steps outlined below, as all of the files in the shared folder will be deleted and non-recoverable.

1. From a home computer, `right-click` the **Windows Home Server tray icon**, and then click **Windows Home Server Console**.
2. Type the Windows Home Server password, and then click **Next**.
3. On the Windows Home Server Console, click the **Shared Folders** tab.
4. Click **Remove**

You will be prompted that the shared folder will be permanently deleted along with all of the contents. Click **Finish** to delete the shared folder.

**Accessing Shared Folders**

There are several different ways that you can access your shared folders on Windows Home Server from your home computer:

**Windows Home Server tray icon**

When you install the Windows Home Server Connector software, an icon is added to your the tray on your home computer.

1. Right-click the Windows Home Server tray icon
2. Click **Shared Folders**.
3. Double-click a shared folder in the window to open it.

**Desktop shortcut**

When you install the Windows Home Server Connector software, a shortcut is created on the desktop of your home computer.
1. Double-click this shortcut to see the shared folders on your home server
2. Double-click a shared folder to open it.

Windows Start Menu

Windows Vista

1. Click Start
2. Type \SERVER in the Start Search text box.
3. Double-click a shared folder in the window to open it.

Windows XP

1. Click Start
2. Click Run
3. Type \SERVER in the Open text box.

Home Network

Windows Vista

1. Click Start
2. Click Network
3. Double-click the computer icon next to SERVER. There may be more than SERVER item in the list. Double-click the icon that looks like this one:
Windows XP

1. Click Start
2. Click My Network Places. The shared folders that your user account has access to automatically appear.

Note
This does not work if the home computer has been configured to work on a business network that employs a Windows Domain.

Changing Access to Shared Folders

1. From a home computer, right-click the Windows Home Server tray icon, and then click Windows Home Server Console.
2. Type the Windows Home Server password, and then click Next.
3. Click the Shared Folders tab.
4. Click a shared folder
5. Click Properties to open the properties page for the selected shared folder.
6. On the User Access, you can change the user account permissions for the shared folder. If the shared folder is associated with a specific user account, the name of user account appears in bold.
7. Click OK

Note
You cannot change the name of any of the shared folders that are automatically created; Music, Photos, Videos, Software and Public cannot be deleted or renamed.

If you change the user access to a shared folder, some users may receive Access Denied errors when they try to access the shared folder. If this happens, they may need to log off and then log onto their home computer before they can access the shared folder with the desired permissions.

Shared Folder Duplication

Enabling the folder duplication feature on your shared folders will create a second copy of the selected folders onto another hard drive on your home server. This will help prevent data loss in the event of hard drive failure.

Enabling Shared Folder Duplication

1. From a home computer, right-click the Windows Home Server tray icon, and then click Windows Home Server Console.
2. Type the Windows Home Server password, and then click Next.
3. Click the Shared Folders tab.
4. Click the Shared Folder
5. Click Properties
6. Click Enable Folder Duplication
7. Click OK
Windows Home Server will begin to enable Folder Duplication. There needs to be enough room for Folder Duplication to complete or the Network Health will turn red in the Windows Home Server Console.

**Shared Folder Disk Space Usage**

Windows Home Server tracks the disk space usage history for all of the shared folders on your home server.

- **Viewing Shared Folders History**
  1. From a home computer, **right-click** the **Windows Home Server tray icon**, and then click **Windows Home Server Console**.
  2. Type the Windows Home Server password, and then click **Next**.
  3. Click the **Shared Folders** tab.
  4. **Right-click** a shared folder and click **View History** to see a graph representing the growth of the folder over time.

**Note**

A shared folder must exist for one week before **View History** will display a graph.

**Using Remote Access and Shared Folders**

You can also use Remote Access to create new folders within a shared folder, to rename files and folders, and to delete files and folders on your home server.

**Note**

To add new shared folders on Windows Home Server, you must use Windows Home Server Console. To connect to the console from within Remote Access, click the **Computers** tab, and then click **Connect to your Home Server**.

After logging in remotely to your home server, click on the **Shared Folders** tab. Then click on a specific shared folder to open it. A list of the files and folders in that shared folder is displayed.

To create a new folder

1. Click the new folder icon.
2. Type a name for the folder then click **OK**.
To delete a file or folder
1. Select the check box next to the files or folders that you want to delete, and then click the delete icon.
2. To confirm that you want to delete the selected files and folders, click OK.

To rename a file or folder
1. Select the check box next to the file or folder that you want to rename, and then click Rename.
2. Type a new name in the text box, and then click OK.

Summary

This Technical Brief provided an in-depth look at the features and functionality of Windows Home Server User Accounts and Shared Folders.

Windows® Home Server User Accounts and Shared Folders enables you to easily connect, protect and organize your important content.

To learn more about other aspects of Windows Home Server, please visit the Microsoft web site at: http://www.microsoft.com/WindowsHomeServer. You can also visit the
Technical Brief

Media Sharing

Microsoft Corporation
Published: August 2008
Version: 1.1

Abstract
This technical brief provides an in-depth look at the features and functionality of Windows® Home Server Media Sharing. This brief has been updated to include additional information from Power Pack 1.

To learn more about other aspects of Windows Home Server, see the Microsoft Web site (http://go.microsoft.com/fwlink/?LinkId=100260).
Media Streaming Overview

Windows® Home Server Media Sharing enables you to view, listen, and watch your favorite media stored on your home server by using digital media receivers and playback devices, such as the Microsoft® Xbox 360™.

Features and Functionality

After you turn on Media Sharing in Windows Home Server, you can simultaneously share photos, music, and videos with your home computers and other devices that support Windows Media Connect.

• Presenting Photo Slide Shows

You can store your digital photos in the Photos shared folder on your home server and then access them from any home computer or from an Xbox 360 that is connected to a TV in your home. You can watch photo slide shows, turning your TV into a large picture frame.
• **Streaming Music**  
  When you turn on Media Sharing for the **Music** shared folder, you can access your music from devices that support Windows Media Connect. You do not need to enable or configure any user accounts to stream from the **Music** shared folder after sharing is turned on.

• **Watching Videos**  
  Your home server can be used to store and stream large collections of videos and recorded TV shows to your home computers or other playback devices on your home network. You can stream videos to an Xbox 360 or to a home computer by using Windows Media® Player.

**Benefits**  
Windows Home Server Media Sharing is unique compared to other media sharing solutions. Some of the benefits are:

• **Ease-of-use**  
  When you install Windows Home Server Connector software on your home computers, the software adds a shortcut to the shared folders on your home server. You can copy your photos, music, and videos from your existing home computers into the **Photos**, **Music**, and **Video** shared folders on your home server. To turn on media sharing on your home network, open the Windows Home Server Console, click **Settings**, and then click **Media Sharing**.

• **Access your media from any home computer**  
  Windows Home Server can become a hub for your media files so that they are accessible from any home computers that are connected to your home network. Additionally, you can access your media files from digital media receivers connected to your home network.

• **Listen while you work and play**  
  With Windows Home Server, you can play music while you are viewing a photo slide show, playing an Xbox 360 game, or working in Microsoft Word on one of your home computers. Your music, photos, and videos can be stored centrally and accessed from multiple home computers or from an Xbox 360 all at the same time.
Media Sharing In Depth

This section explains how Windows Home Server Media Sharing works.

Turn On Media Sharing

By default, Media Sharing is turned off.

To turn on Media Sharing:
1. Open the Windows Home Server Console.
2. Click Settings.
3. Click Media Sharing.
4. Click On for each of the shared folders (Music, Photos, and Video) that you want to stream.
5. Click OK.

![Windows Home Server Media Sharing settings]

Windows Home Server automatically tries to open the correct ports in Windows Firewall on your home server. Any media in the Music, Photos, and Videos shared folders will be accessible by devices on your home network that support Windows Media Connect (the media must be stored in a supported file format).

Note
If you have a lot of media files, it may take Windows Home Server some time to catalog all of the media files before they can be accessed by using Windows Media Connect over your home network.

Caution

Windows Media Connect 2.0 is designed to be controlled through the Windows Home Server Console. Altering the Windows Media Connect tool outside of the Windows Home Server Console will likely damage the media streaming functionality.

Before you turn on Media Sharing for a shared folder, you should know that Media Library Sharing bypasses any type of user-account access that you set for the shared folder. For example, if you set No Access to the Photos shared folder for a user account called Bobby, and then you turn on Media Library Sharing for the Photos shared folder, Bobby can still stream any digital media from the Photos shared folder to any supported digital media player or digital media receiver. If you have digital media that you do not want to share, store the files in a folder that does not have Media Library Sharing turned on.

Before you turn on Media Library Sharing, make sure that you secure your wireless network. If you turn on Media Library Sharing for a shared folder, any supported digital media player or digital media receiver that can access your home network can also access your digital media in that shared folder. For example, if you have not secured your wireless network, anybody within range of your wireless network can potentially access your digital media in that folder. For more information, see the documentation for your wireless access point.

Supported Media File Formats

Windows Home Server includes Windows Media Connect 2.0 functionality. The following file formats are supported in this version of Windows Media Connect:

Photos

- Bitmap (.bmp)
- Graphics Interchange Format (.gif)
- Joint Photographic Experts Group (.jpeg, .jpg)
- Portable Network Graphics (.png)
- Tagged Image File Format (.tif, .tiff)

Audio

- Windows Media Audio (.wma)
- Advanced Systems Format (.asf)
- MP3 (.mp3)
- WAV (.wav)
- Windows Media Playlist (.wpl)
- MP3 Playlist (.m3u)

**Video**

- Windows Media Video (.wmv)
- Microsoft Recorded TV Show (.dvr-ms)
- Audio Video Interleaved (.avi)
- MPEG-1 (.mpeg, .mpg)
- MPEG-2 (.mp2, .mpeg, .mpg)

**Note**

Although Windows Media Connect can stream a variety of file formats to your media playback devices, a given device may not be capable of playing every file format that Windows Media Connect supports. For information about which file formats your media playback device supports, see the documentation that came with the device.

Some media files are protected to prevent unauthorized distribution and playback. For example, files downloaded from online music stores are often protected with digital rights management (DRM) technology. Media files that are DRM protected may not be accessible from your home computers or other playback devices on your home network when they are stored on your home server.

Most broadband routers today only support 10/100 megabit per second (Mbps) wired Ethernet connections. To improve your network performance, you should consider adding a 1 Gigabit (1000 Mbps) network switch to your network. Connect your home computers and home server to the faster switch, and then connect the switch to your broadband router. High-definition video can require a lot of network throughput and may require a Gigabit network.

**Important**

By default, Windows Home Server allows connections to the home server only from home computers and devices that are on the same subnet. Please ensure that your Windows Home Server is on the same subnet as your home computers and media playback devices.
Viewing Photo Slide Shows

Photos stored on your home server can be accessed from a variety of devices on your home network.

Windows Vista Screensaver

You can easily set the screensavers on your home computers running Windows Vista® to show slide shows of your favorite photos stored on your home server.

To setup Windows Vista screen saver to show photos from your home server:

1. Click Start, and then click Control Panel.
2. Click Appearance and Personalization.
3. Under Personalization, click Change screen saver.
4. In the drop down list, select Photos, and then click Settings.
5. Under Use pictures and videos from: click Browse and then type \Server\Photos.

By default, Windows Home Server is installed with the name Server. If you have chosen a different name for your home server, substitute that name for Server.

6. Click Save.

Using an Xbox 360

An Xbox 360 is capable of accessing photos that are stored on your Windows Home Server. After your Xbox 360 is configured to stream from your Windows Home Server, all you have to do is browse for the photos that you want to view, or select a folder that you want to play as a slide show.

To configure your Xbox 360 to stream media from your Windows Home Server

1. On your Xbox 360, scroll up to My Xbox.
2. Scroll right to Picture Library.
3. Select Server:1. By Default, Windows Home Server is installed under the name Server. If you have chosen a different name for your home server, substitute that name for Server.
4. After you select your Windows Home Server, the Xbox 360 will display the photos available on your Windows Home Server.

After your Xbox 360 is set up, you can access and stream your photos, music, and videos if you have already enabled Media Sharing for the Photos, Music, and Videos shared folders on your home server.
Using a Digital Picture Frame

Before purchasing a digital picture frame, you should verify that it can access and stream photos from your Windows Home Server. Some digital picture frames are not designed to work with Windows Media Connect 2.0. Ensure that your digital picture frame is compatible with Windows Media Connect 2.0 or Windows Home Server.

The digital picture frame setup instructions may include steps for how to use a home computer. If your Photos shared folder is already enabled for media sharing on your home server, you may be able to skip the steps for setting up your home computer.

Depending on the device, you will want to point the device to access the photos stored in \Server\Photos. This may include enabling the guest account or entering a user name and password. By default, Windows Home Server is installed using the name Server. If you have chosen a different name for your home server, substitute that name for Server. This document assumes that the Windows Home Server name is Server.

You can turn your TV into a large picture frame in a few different ways. Some companies are producing TVs with Windows Media Connect capabilities built in, so you do not need extra devices to display photos and videos or play music that is stored on your home server.

To enable Windows Home Server to share photos with these TVs, turn on the Media Sharing library for photos in the Windows Home Server console, then configure the TV to stream from your Windows Home Server. Review the instructions from the manufacturer of the TV for complete step-by-step instructions. There are media playback devices other than Xbox 360 that offer media streaming to TVs. For a list of compatible devices, see the Microsoft Web site (http://go.microsoft.com/fwlink/?LinkID=103942).

Streaming Music

After you turn on media sharing for your Music shared folder, you can stream your music to your home computers or other media playback devices on your home network. There are a variety of devices and ways that you can access the music stored on your home server. Highlighted below are some of the more common ways for listening to your music.

Windows Media Player

You can view the songs listed on your Windows Home Server in two ways. Using Media Connect is the simplest way to access and share music with your home computers. You can also add your Music folder from your home server to the Windows Media Player library on a home computer. This requires a few extra steps and proper user permissions, and it can clutter your library on that computer.

If you listen to music on a computer that might leave your home network, it is recommended that you use Windows Media Connect for listening to the music that is stored on your home server while at home. This capability is available in home computers running Windows Vista. Using Windows Media Connect on your home computers prevents music that is stored on your Windows Home Server from falsely displaying on your computer when you are away from home. However, using this function instead of
adding Monitored Folders will not allow you to access album art, change star ratings, or modify playlists from within Windows Media Player 11. If you want to use the Windows Media Player 11 functions, see “Adding the Music Shared Folder to the list of Monitored Folders” later in this document.

**Configuring Windows Media Player to use Windows Media Connect**

1. Open **Windows Media Player**.
2. Right-click **Now Playing**, and then select **More Options**.
3. Click the **Library** tab.
4. Click **Configure Sharing**…
5. Select the **Find media that others are sharing** check box.
6. Click **OK** twice.

Windows Media Player displays **User 1 on Server**.

![Figure 2: Windows Media Player Library dialog box](image)

**Note**

The user account used to access the Music shared folder on the home server must have at least Read permissions to add the music to Windows Media Player monitored folders list.
Adding the Music shared folder to the list of monitored folders
1. Open Windows Media Player.
2. Right-click Now Playing, and then select More Options.
3. Click the Library tab.
4. Click Monitor Folders…
5. Click Add…
6. Type `\Server\Music`.
7. Click OK.

Windows Media Player monitors the Music shared folder on your home server and indexes the existing music and music that is added to the shared folder.

Xbox 360
Your Xbox 360 needs to be properly configured and connected to your home network. Make sure that Media Sharing is enabled for Music on your home server before you proceed.

After you configure your Xbox 360 to stream from your Windows Home Server, you can listen to music that is stored on your home server while you watch photo slide shows (if enabled), play Xbox 360 video games, and view the Xbox 360 Dashboard.

Configuring your Xbox 360 to stream music from Windows Home Server
1. Scroll up to My Xbox in the Xbox 360 Dashboard.
2. Scroll right to Music Library.
3. Select Server:1. By default, Windows Home Server is installed with the name Server. If you have chosen a different name for your home server, substitute that name for Server.
4. After selecting your Windows Home Server, the Xbox 360 displays the music that is available on your Windows Home Server.

Windows Media Center Edition
In Windows Vista Home Premium, Windows Vista Ultimate, and Windows XP Media Center Edition 2005 operating systems, you can view the music that is stored on your home server through the Windows Media Center user interface. On your Windows Home Server, you must enable the Guest user account and give the Guest account Read rights to each shared folder that you would like Windows Media Center to view and play. Media
Center Edition creates and uses a random user name, which requires the Guest account to be enabled.

If Windows Media Player has already added the shared folders to its Watched Folder list, you will not have to add those folders in Media Center. Media Center views the Watched Folders list in Windows Media Player and adds them to your Media Center Watched Folder list.

To enable the Guest user account in Windows Home Server

1. Open the Windows Home Server Console.
2. Click the User Accounts tab.
3. Right-click Guest, and then select Enable Guest Account…
4. Click Next.
5. Select No Guest Password, and then click Next.
6. Click Read for any shared folder that you would like to have accessed and viewed using Windows Media Center.
7. Click Finish.

Caution

Enabling the Guest account gives access to anyone on your home network to view the shared folders: Music, Photos, Videos, Public, and Software, without entering a password.

After enabling the Guest user account and giving the Guest account access to your folders, you can enable Windows Media Center Edition to watch the shared media from your home server.

To enable Windows Media Center so that you can watch shared media

1. Open Windows Media Center.
2. Click Settings.
3. Click Library setup.
4. Select Add folder to watch, and then click Next.
5. Select **Add shared folders from another computer**, and then click **Next**.

6. Select the `\Server\Music` folder.

7. Click **Finish**.

**Note**

You can similarly add the Photos and Videos shared folders (or any shared folders that you create). The media stored in these folders on your home server is then accessible through the Windows Media Center user interface on your home computers.

After Windows Media Center searches the Watched Folders that you have added, you will be able to view and play the music, videos, and photos with compatible formats.

**Microsoft Zune**

To synch your Microsoft Zune™ with your Windows Home Server, you need to add the Music, Videos, and/or Photos shared folders to the monitored folders on your Zune software.

**To add shared folders to the monitored folder list in the Zune Library**

1. Open your Zune software.

2. Click **Settings**, then click **Collection**

3. Click **Add Folder ....**

4. Type the following into the **Folder: box and click OK**

   - `\Server\Music`
   - `\Server\Videos`
   - `\Server\Photos`

**Connecting an Old Stereo**

There are a variety of media playback devices that you can connect to an older stereo system to access and stream the music from your home server. For example, ROKU and D-Link support Windows Media Connect 2.0. They provide access across your home network to the music that you store on your home server from your stereo system.

For more information about these options, see the [Microsoft Web site](http://go.microsoft.com/fwlink/?LinkID=103942).
Watching Videos

The setup for sharing videos will differ from device to device. In most cases, with media sharing enabled for the Videos shared folder on your home server, you can attach the device that supports Windows Media Connect to your home network, and then access the content on your home server.

Xbox 360

An Xbox 360 is capable of streaming videos from your Windows Home Server. If your Xbox 360 is already configured to stream from your Windows Home Server, browse for the video that you want to watch and press Play.

➤ To set up your Xbox 360

1. Scroll up to My Xbox on your Xbox 360.

2. Scroll right to Video Library.

3. Select Server:1. By default, Windows Home Server is installed with the name Server. If you have chosen a different name for your home server, substitute that name for Server.

4. After you select your Windows Home Server (Server:1), the Xbox 360 displays the videos that are available from your Windows Home Server.

After your Xbox 360 is set up, you can access and stream the videos that are stored on your home server. You will not be able to stream media from a shared folder that is not enabled for Media Sharing.

Important

Windows Home Server can stream media file types that other devices cannot play. Review the documentation for your digital media playback devices to find out what file types they can access through streaming capabilities.

Windows Media Player

You can watch the videos stored on your Windows Home Server in two ways. You can watch your videos through Windows Media Connect or by adding your Media Share folder from your home server to the Windows Media Player library on a home computer. Using Media Connect is the simplest way to access and watch videos from your home computers. If you are interested in learning how to add videos to the Windows Media Player library on a home computer, refer to the “Streaming Music” section earlier in this document.

➤ Note
If you are watching videos on a computer that might leave your home network, it is recommended that you use the Windows Media Connect feature for accessing the videos that are stored on your home server. This capability is available in home computers that are running Windows Vista. This prevents videos that are stored on your Windows Home Server from falsely displaying when you are away from home.

**Figure 3:** Windows Media Player Library selections

![Windows Media Player Library selections](image)

**Configuring Windows Media Player to use Windows Media Connect**

1. Open Windows Media Player.
2. Right-click **Now Playing**, and then select **More Options**.
3. Select the **Library** tab.
4. Click **Configure Sharing**…
5. Select the **Find media that others are sharing** check box.
6. Click **OK** twice.

**Additional Tips**

**Playlists**

Playlists stored on Windows Home Server can also be set up and shared. Playlists that were created before you move the music to the Windows Home Server should play as long as the hierarchy of the folder structure is maintained after transferring your music from your home computer to the Windows Home Server.
Note
You must have full permissions to a folder before you can create folders or files, even if Windows Media Sharing is enabled.

To create Playlists

1. Open \Server\Music.
2. Create a folder called Playlists.
3. Open Windows Media Player 11 on your home computer running Windows Vista or Windows XP.
4. Click the Now Playing tab. Remove music that is in the Now Playing list.
5. Select music from \Server\Music that you want to use to create a playlist. You can drag single songs, multiple songs, and even folders to the Now Playing section.
6. Click the Now Playing drop-down menu above the songs that you dragged.
7. Click Save Playlist As.
8. Save the playlist to \Server\Music\Playlists.
Abstract
This technical brief provides an in-depth look at the features and functionality of Windows® Home Server Drive Extender. The brief has been updated to include additional information for Windows Home Server Power Pack 1.

To learn more about other aspects of Windows Home Server, see the Microsoft Web site (http://go.microsoft.com/fwlink/?LinkId=100260).
Windows Home Server Drive Extender

Windows Home Server Drive Extender is a new storage technology that enables you to use internal and external hard drives for additional storage on your home server. In addition, you can enable Folder Duplication for specific shared folders on their home servers. Maintaining two copies of a shared folder on separate hard drives helps protect against the failure of a single hard drive.

Features and Functionality

The core features of Windows Home Server Drive Extender are:

- **Predefined Shared Folders**

  Your home server is preconfigured with shared folders named Photos, Music, Videos, Public, and Software. From the Windows Home Server Console you can specify user permissions for these folders and create new shared folders. You can easily move files and folders from your home computers into the shared folders on your home server by using a drag-and-drop operation.

- **Easy to add more storage**
From the Windows Home Server Console, you can add a new hard drive to your home server by following a simple wizard. The amount of storage available to your shared folders and home computer backups increases proportionally. The hard drives you add can be either internal or external (for example, USB 2.0 or FireWire).

- **Shared Folder duplication**

  If you have two or more hard drives on your home server, Windows Home Server helps protect against hard drive failures by ensuring that files stored in shared folders are automatically duplicated to multiple hard drives.

**Benefits**

Windows Home Server Drive Extender offers the following benefits for storage solutions. Some of the benefits are:

- **Allows the seamless addition of more hard drives**

  As you add more hard drives to your home server, they are treated as a single large pool of available storage space. You no longer need to deal with drive letters (such as E:, F:, and G: ) because you can add more hard drives.

- **Works with internal and external hard drives**

  You can add internal or external (for example, USB 2.0 or FireWire) hard drives to your home server to increase the available storage.

- **Shared Folder Duplication**

  Windows Home Server Drive Extender supports reliability by duplicating designated shared folders. Important data is stored on separate hard drives, which provides protection against hard-drive failure. Duplication is configurable for every shared folder—so a shared folder can have multiple copies with each copy stored on a separate hard drive.

- **Makes hard drives and their content easy to move**

  It is easy to remove outdated hard drives. You can store the content on other hard drives in the system and remove old or small hard drives.

Windows Home Server Drive Extender is different than and more powerful than a redundant array of independent disks (RAID) in several ways:

- You can use any hard drive, any time. You are not restricted to adding more hard drives of the same type and size. When you want to grow your home server storage, you can buy and add any hard drive you like.
• Internal and external hard drives can be used to grow your storage. No space in your home computer case? No problem—plug in one or more hard drives of your choice.
• Drive removal is easy. After you have had your home server for awhile, you may want to remove older, smaller hard drives and add new, larger hard drives so that you can store more files.

## Drive Extender In-Depth

This section explains how Windows Home Server Drive Extender works.

### Windows Home Server Console

The Windows Home Server Console enables you to configure the server storage and shared folders on your home server. The Server Storage tab allows you to view, add, and remove hard drives on your home server. You can see the status of your server storage, and attempt to repair hard drives that show a status of Unhealthy. You can also see a graphical representation of the total disk-space usage on your home server.

From the Windows Home Server Console you can add a new hard drive to your home server by following a simple wizard. The amount of storage available to your shared folders and home computer backups increases proportionally. The hard drives you add can be internal or external (for example, USB 2.0 or FireWire).
Caution

Hard drives are formatted before they are added to server storage. Make sure that you back up any important files that are on the hard drive before you add it to server storage. Formatting a hard drive deletes all files on the hard drive.

Note

Do not use USB 1.1. USB 1.1 is much slower than USB 2.0. The home server performs slowly if you connect hard drives to a USB 1.1 port. If you are using external hard drives, ensure that they are connected through USB 2.0 or IEEE 1394 (for example, FireWire). USB 2.0 works best with one drive per controller. Performance suffers if multiple hard drives are connected to a single USB 2.0 controller. Using hubs to connect multiple USB drives to a single controller has a negative impact on system performance and is not recommended.

The Server Storage pie chart shows the space used by Shared Folders, duplication of selected Shared Folders, the Home Computer Backup database, and System files. The amount of space taken up by ‘System’ in the pie chart includes volume shadow copies, files and folders in the Recycle Bin, as well as any files which are stored on a home server outside of the Shared Folders or application folders.

Important

There is no reason for files to end up in the Recycle Bin of your home server, unless you are inappropriately using your home server with a monitor, mouse and keyboard attached. All administrative access to your home server should be done from a home computer using the Windows Home Server Console.

Removing Hard Drives

If you want to remove a hard drive, there must be sufficient storage space on your home server so that the data and files can be duplicated to the hard drive before you physically remove it from your home server system. If there is not enough storage space, you will lose file duplication for some shared folders or lose some files. The home server will provide adequate warnings to prevent you from losing files.

Note

A best practice is to add a new larger hard drive to your home server, prior to removing an older hard drive with less disk space. This usually ensures that there will be adequate space to move the files off of the older hard drive due to the free space on the new larger hard drive.
Be sure to use the Windows Home Server Console to tell your home server that you want to remove your hard drive prior to physically removing it from your home server. The Remove a Hard Disk Wizard will list the files which your home server was not able to move off of the hard drive being removed. The reason for the failure is also noted in a details page which appears at the end of the wizard.

The process of removing a hard drive takes time, so plan the removal when no one needs access to your home server.

![Windows Home Server Console](image)

**Important**

If you unplug an external hard drive prior to using the Windows Home Server Console to remove it, the drive will be listed as Missing. In this case, you should immediately plug the hard drive back into your home server, and then follow the instructions in the Remove a Hard Drive Wizard to safely remove it.

**Hard Drive Partitioning**

In a single hard-drive system, Windows Home Server is configured with a 20-gigabyte system partition for the Windows Home Server operating system, and the remainder of the primary hard drive is allocated to the primary data partition. Each subsequent (or secondary) hard drive is logically added to the data partition. It appears to the user as one large hard drive; however, these drives are considered to be part of the secondary data partition. In reality, your home server consists of multiple hard drives of varying sizes.
The primary data partition is used to store a unique entry for each file. If a home server has more than one hard drive, these files become “tombstones.” Tombstones are NTFS file system reparse points that Windows Home Server Drive Extender understands. They are tiny files that redirect to one or two “shadow” files on the hard drives that make up the secondary data partition. The shadow files are where your data is really stored. If folder duplication is enabled for a Shared Folder, there will be two shadow files. If duplication is Off, there will be one shadow file.

**Note**

The primary data partition in a home server should be as large as possible for two reasons:

- You want to provide sufficient space to grow the file table for all of the files that you will store on your home server.
- Windows Vista® and other home computer operating systems check to see if there is adequate space on the primary data partition prior to starting a copy operation.

You can add additional internal and external hard drives to your home server if you need more storage space for your folders and files. There is no need to use equal capacity hard drives—Windows Home Server will add the additional capacity of the new hard drive to the available storage on your home server.

**Caution**

It is highly recommended that you not use hardware RAID technologies for your home server. Recovering from hard-drive failures becomes increasingly complex when hardware RAID systems are used. The recommended and supported approach is to use multiple hard drives that are configured as Just a Bunch of Disks (JBOD).

**Shared Folder Duplication**

If your home server has multiple hard drives, Windows Home Server Drive Extender will automatically choose a hard drive to store the files. You do not have to configure or manage this. In addition, if you have multiple hard drives, Windows Home Server helps provide protection against hard-drive failures by ensuring that files stored in shared folders are automatically duplicated across multiple hard drives. Duplication is configurable per shared folder, so a given shared folder can have two copies, with each copy stored on a separate hard drive.
Shared folders can be marked **Unhealthy** if there is insufficient disk space for folder duplication to succeed. If you are running low on storage space, you can temporarily disable **Folder Duplication** on one or more of your shared folders until you add a new hard drive to your home server.

When you display the properties of a shared folder on the **Shared Folders** tab, the **size** displayed does not include duplicates if the **Enable Folder Duplication** check box is selected. However, the pie chart that is displayed from the **Server Storage** tab includes a figure for space that the shared folders consume and a figure for shared folder duplication.

**Caution**

Windows Home Server automatically manages the shared folders on your home server. Do not modify the underlying configuration of the shared folders that Windows Home Server manages. Creating shared folders or changing the access permissions outside of the Windows Home Server Console is not supported and may cause future system updates to fail.

To highlight how this works, consider this example. If a new photo is saved to the **Photos** shared folder on your home server, the following happens:
1. A new entry for this file is created in the file table on the primary data partition. On a home server with multiple hard drives, this is a “tombstone” file.

2. The Windows Home Server Drive Extender file system filter creates a pointer (reparse point) for the new file and determines onto which hard drive the photo should be stored. The tombstone is updated with the location of the actual file. This file is known as the “master or primary shadow.”

3. If Folder Duplication is enabled for the Photos shared folder, the Windows Home Server Drive Extender migrator service creates a duplicate copy of the file and updates the tombstone file on the primary data partition with the reparse point to include the second location of the shadow file. This file is known as the “alternate or secondary shadow.”

**Important**

If Folder Duplication is enabled, a shared folder may be marked as Unhealthy if there is not enough room to store two copies of the shared folder contents on different hard drives. There must be two hard drives with enough space to store the contents of the shared folder.

**Caution**

You can lose files if you remove a hard drive. To safely remove a hard drive, click the Server Storage tab on the Windows Home Server Console. If you do not have enough server storage space, Windows Home Server warns you that you could lose files or file duplication as a consequence of removing the hard drive.

**Drive Extender Filter and Migrator Service**

Windows Home Server Drive Extender creates the illusion of having a very large primary data partition by migrating files to one or more secondary data partitions. To complete the illusion, Windows Home Server Drive Extender leaves a “tombstone” file on the primary data partition, so that the user still sees the file in its original location. For example, even though Sample.jpg is not really taking up space on the primary data partition, it shows up if you type “dir” at a command prompt or open Windows Explorer from the primary data partition. These tombstones effectively act as symbolic links to the shadow files.

**Important**

If you want to access files in shared folders, always access them through the shared folder name (\server\SharedFolderName or \localhost\SharedFolderName). If you browse the file system through administrator’s desktop, you will discover multiple places where you might think your data is stored, but your data is likely stored elsewhere. Accessing \server\SharedFolderName or
\texttt{localhost\SharedFolderName} from the administrator’s desktop ensures that you will find your file without a performance issue.

Do not use standard tools to manually create, delete, or change the properties of shared folders. If you want to configure shared folders, use the Windows Home Server Console from your home computer.

\textbf{Caution}

Do not use \textbf{Disk Manager}. Windows Home Server is a powerful system that automatically manages your hard drives for you. Almost any change that you make with \textbf{Disk Manager} will cause the storage system on your home server to fail, and possibly result in data loss.

Every time a new file is created, the Windows Home Server Drive Extender file system filter immediately creates the file as a tombstone. The performance benefit to this approach is that the file is sent directly to a secondary data partition the first time it is introduced to the home server.

The Windows Home Server Drive Extender Migrator service has three major functions:

- To duplicate certain files
- To migrate files that are not already migrated
- To manage the storage across the hard drives

The filter is not always able to migrate files when they are added to the home server, but the Migrator service runs in the background, looking for files to migrate. If a file is in a shared folder that is configured for duplication, the Migrator service selects a second hard drive to store an alternate shadow.
When creating an alternate shadow, the Migrator service prefers to select a secondary data partition to maximize the free space on the primary data partition. If there is only one secondary data partition (such as a home server that has only two hard drives), or if all the secondary data partitions are full, the Migrator service will store an alternate shadow on the primary data partition. This means that the benefits of duplication are available even on systems with only two hard drives.

If a file already has the correct number of shadow files, the Migrator service will keep the alternate shadow files up-to-date and copy the contents of the master shadow to the alternate shadow(s) if the contents of the file change.

When the filter intercepts a change to a duplicated file, it only writes the data to the master shadow. This simplifies the filter, and also offers a performance advantage by allowing the change to complete without waiting for multiple disks to finish writing. The Migrator service detects the change to the file and attempts to duplicate the file. The Migrator service will not duplicate a file while it is open. If an application tries to open a file while the Migrator service is duplicating it, the Migrator service will immediately release its handle to the file, and the Open request from the application will succeed.

The Drive Extender Migrator service is run under the following conditions:
- Every hour, or to be more specific – after resting an hour after the last completion.
- When the Drive Extender Migrator service starts up – typically when you first turn on your home server.
- When a shared folder is added or removed using the Windows Home Server Console’s Shared Folders tab.
- When duplication on a Shared Folder is turned on or off.
- When a hard drive is added to Server Storage using the Windows Home Server Console.

The Magic of Tombstones

When a file is migrated from the primary data partition to a secondary data partition, Windows Home Server Drive Extender leaves behind a tombstone file on the primary data partition to make it appear as though the file is still located on that primary data partition. The tombstone is an ordinary NTFS file, with the typical file metadata such as file name, time stamps, security access control list, and file size.

To make Windows Home Server Drive Extender transparent to applications, the apparent size of the file must be accurate, for example, a 4 MB picture must appear to have a size of 4 MB. Clearly Windows Home Server Drive Extender could not live up to its name if the 4 MB picture actually consumed 4 MB of space on the primary hard drive. So Windows Home Server Drive Extender relies on the sparse file feature of NTFS—when a file is sparse, regions of it can be emptied, freeing the associated disk space. Windows Home Server Drive Extender makes every tombstone a sparse file and the entire file is emptied. Storing the metadata for a tombstone still requires 4 KB per file on the primary data partition (size on disk) due to the cluster size of the hard drive.

Every shadow file that is created has the same name as the tombstone file. This makes it easier to recover from drive failures and keeps the tombstone and shadow file names in synch if the tombstone is renamed. When the Windows Home Server Drive Extender filter receives a request to rename a tombstone, it renames all the shadows at the same time. Marking a file for deletion when closing it also propagates to all the shadow files, so deleting a tombstone immediately deletes all the shadow files for it.
Balancing Storage

The Windows Home Server Drive Extender Filter determines which hard drive to initially write a file to. One goal of the algorithm the Filter uses is to keep related files together on the same hard drive. Copying music from a CD to a hard drive illustrates why this is important. If a single secondary hard drive failed, it is more convenient to lose all the music from a few CDs and then re-copy those CDs than to insert hundreds of CDs to re-create one track from each. One way to achieve this is to ensure that a set of files created around the same time are stored on the same secondary hard drive.

An obvious method for choosing the secondary hard drive would be to use the one with the most space free, but that would result in sometimes alternating among secondary hard drives. Consider the CD scenario again. A moment ago, the second hard drive had the most space available, so Track 1 of this CD was saved there. Now that the second hard drive has this new file on it, the third hard drive has the most room to hold Track 2, but we would really prefer to store it on the second hard drive with Track 1. Choosing the hard drive with the least available space is a good choice because the hard drive with the least free space tends to remain the hard drive with the least free space for a long time, and the same secondary hard drive will be chosen.

The Drive Extender Migrator service uses the secondary data partitions with the most free space to store the secondary or alternate shadows of new files. When Folder Duplication is enabled, the Migrator service fills the secondary data partitions with the most free space, and uses the primary data partition as a last resort.

Another goal in selecting the secondary hard drive for a file is to ensure that migrated files have room to grow. If a migrated file is later opened and data is added to it, you need enough free space on the secondary hard drive to hold that new data. This suggests that there should be a buffer of free space remaining on the lowest-space secondary hard drive before placing a shadow file on it. The Drive Extender Migrator service will attempt to keep a buffer of 10 GB on each hard drive and increase that buffer to 20 GB of free space, by migrating files to other secondary hard drives that have 20 GB or more free space available.

If all of the secondary hard drives are so full that there may not be room for existing shadow files to grow, the Migrator service may move some shadow files to the primary data partition or alert the user that the home server is running low on storage. The Migrator service makes the appropriate updates to the tombstones whenever it moves...
a shadow from one secondary data partition to another or from a secondary data partition to the primary data partition.

**NTFS and Drive Extender**

Every hard drive and data partition that Windows Home Server Drive Extender manages, primary or secondary, is an NTFS volume. Volume management technologies such as RAID (where drives are combined below the file system layer) potentially result in a directory on one disk that points to a file on another disk. In this case, the file can be lost if either disk fails. Being resilient to single drive failure enables Windows Home Server Drive Extender to support external drives, interfaces including USB and IEEE 1394 (such as FireWire), and internal integrated device electronics (IDE) or Serial ATA hard drives.

When Windows Home Server Drive Extender migrates a file, it creates the shadow with the same name as the tombstone. To prevent name conflicts, Windows Home Server Drive Extender puts every shadow file under the \DE directory, but it preserves the rest of the path. For instance, if Windows Home Server Drive Extender migrates \photos\poodles.jpg, the shadow file would have the path \DE\photos\poodles.jpg. If the primary hard drive fails, the Migrator service can re-create the tombstones on a new primary hard drive by scanning the files on the secondary hard drives. Continuing with the same example, if the Migrator service is re-creating a new primary data partition, and it finds the file \DE\photos\poodles.jpg on a secondary data partition, the Migrator service can create a tombstone file called \photos\poodles.jpg on the primary data partition and link it to that shadow file.

Windows Home Server Drive Extender does nothing unique to the secondary data partitions or the files on them, which enables you to recover most of the lost data—even in worst-case scenarios. If the home server fails completely, all the surviving drives can be attached to a computer that is not even running Windows Home Server Drive Extender, and you can copy the files from the drives to that computer. Because the files retain their original names and paths (under the \DE directory), the files can be used with no specific recovery steps.

**Important**

Although this works as a disaster recovery method, moving a secondary hard drive between computers is not a recommended or supported use of Windows Home Server Drive Extender.
The following are known differences between Windows Home Server with Drive Extender and the business editions of Windows Server. The Drive Extender functionality alters some of the core NTFS functionality that some people may use on file servers running Windows Server Standard and Enterprise editions. Please note the following differences:

- Files on Windows Home Server shared folders which are encrypted with NTFS encryption or compressed with NTFS compression will not be migrated or duplicated.
- Files containing NTFS reparse-points or NTFS extended attributes are not supported on Windows Home Server shared folders.
- NTFS Hard-links pointing to a file on Windows Home Server shared folders cannot be created.

**Unhealthy and Missing Hard Drives**

Windows Home Server runs CHKDSK once a day on all of the hard drives on the home server to look for potential issues. At the end of a CHKDSK pass, a hard drive can be marked as **Unhealthy** in the home server console. If you select an unhealthy hard drive and then click **Repair**, the Repair a Hard Drive Wizard starts. It attempts to fix errors by doing the following:

- Scanning the hard drive by using the CHKDSK utility to verify the integrity of the hard drive. If the primary hard drive is marked **Unhealthy**, the user is asked to reboot the home server.
- Correcting hard drive errors, if possible.
- Rebuilding shared folder duplications, if necessary.

The design of Windows Home Server Drive Extender assumes that when a secondary hard drive becomes unavailable, it will eventually come back. Often the issue is as simple as an unplugged cable. While the secondary hard drive is unavailable, Windows Home Server Drive Extender will not migrate new files to it. If the duplication fails or if the file is not duplicated, the filter cannot open the file, and it returns an appropriate error message.
Note

Internal hard disks are recommended over external hard disks, as it is harder to inadvertently unplug or remove an internal hard disk.

You can use the Windows Home Server Console to inform Windows Home Server Drive Extender that a missing hard drive will never be used again by using the Remove a Hard Drive wizard. The Migrator service will enter a special repair mode, and it will inspect every tombstone file. If the tombstone had an alternate shadow on the missing hard drive, that link is removed from the reparse point on the tombstone. The Migrator service attempts to make an extra copy, so the file is duplicated again. If the master shadow was on the missing hard drive, the most recent alternate shadow is promoted to become the master shadow. If a file was not duplicated and the only shadow copy of the data was on the missing hard drive, that data is lost. The Migrator service still has work to do because a file with no remaining shadow files cannot be opened or deleted. If the Migrator service left the tombstone alone, it would continue to appear in the directory, and the user would have no easy method for deleting it. While in repair mode, when the Migrator service finds a tombstone file for which the only shadow was on a permanently missing hard drive, the Migrator service deletes the tombstone.

File Conflict Notifications

Windows Home Server proactively checks the health of all files stored in the shared folders during a migration pass. If any issues are discovered, a yellow health notification will be issued containing a detailed conflict reason for each file.

Files on Windows Home Server cannot be migrated or duplicated while in-use by other applications that are running on Windows Home Server or on a home computer accessing files on the home server. One of the primary reasons for file conflicts is caused by files that remain open for more than 24 hours; these are reported with a conflict of “File is open” as the Migrator service needs the files to be closed to allow migration or duplication to occur. Please close any open files to enable the Migrator service to work properly.

For more information about other types of file conflicts, see the Microsoft Web site at http://go.microsoft.com/fwlink/?LinkId=119695
Additional Tips

Following are a few additional tips and techniques for situations that you may run into with Windows Home Server Server Storage after upgrading to Windows Home Server Power Pack 1.

Viewing Orphan Shadow Files

Windows Home Server with Power Pack 1 proactively searches for orphan shadows on home server hard drives, and places them in an application folder on the primary data partition. Orphan shadows could get created when hard drives appeared as ‘missing’ on home server systems running the initial release of Windows Home Server. Orphan shadows are secondary copies of files stored in shared folders and in certain circumstances these shadow files may not have been properly cleaned up when hard drives went ‘missing’.

During the installation of the Power Pack 1 update to a home server running the initial release of Windows Home Server, the hard drives are analyzed to look for any orphan shadow files. If any orphan files are found they are stored in an application folder in the following location - D:\folders\{1618D36B-F4E7-4360-B070-A32070519DC9}\

The special location above will maintain the folder structure of the original file which allows the user to understand in which Shared Folder the original file was stored.

To view any orphan shadow files

1. Run mstsc.exe to start a Remote Desktop Connection session to your home server.

   ▶️ Caution
   Be careful when using a Remote Desktop Connection to your home server. You can damage Windows Home Server functionality if you use it incorrectly.

2. Open Windows Explorer and navigate to D:\folders\{1618D36B-F4E7-4360-B070-A32070519DC9}\
Disabling Volume ShadowCopy Services

The initial release of Windows Home Server used Volume ShadowCopy Services to support Previous Versions functionality for files stored in Shared Folders on the home server. Windows Home Server triggered a snapshot every 12 hours, enabling users to access previous versions of files stored in Shared Folders on a home server, through the Previous Versions functionality available in some Windows client operating system editions.

The new media editions of Windows Home Server Power Pack 1 ship with Volume ShadowCopy Services for home server Shared Folders turned off. If you purchased the initial version of Windows Home Server and upgraded to Power Pack 1, then this feature is still turned on and may take up considerable storage space on your home server. The amount of space taken up by ‘System’ in the Server Storage pie chart includes the space used by volume shadow copies, which in some cases can be significant.

Disabling Volume ShadowCopy Services and reclaiming the disk space

1. Run mstsc.exe to start a Remote Desktop Connection session to your home server.

   Caution
   Be careful when using a Remote Desktop Connection to your home server. You can damage Windows Home Server functionality if you use it incorrectly.

2. Open a Command Prompt, Click Start, Run and type CMD

3. To delete all of the existing volume shadow copy snapshots and reclaim the disk space used by the snapshots, type vssadmin delete shadows /all

4. To disable the Windows Home Server storage manager service from taking future snapshots, type regedit

5. Navigate to HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows Home Server\Storage Manager\Volumes.

6. Find a sub key which has a MountPoint value equal to D:

7. Under that key set the value of SnapPeriod to 0
Abstract
This technical brief provides an in-depth look at the features and functionality of Windows® Home Server Home Computer Backup and Restore. This brief has been updated to include additional information from Power Pack 1.

To learn more about other aspects of Windows Home Server, please visit the Microsoft Web site (http://go.microsoft.com/fwlink/?LinkId=100260).
Home Computer Backup Overview

Windows® Home Server will automatically backup your home computers to the home server and allow you to easily restore the entire computer or an individual file or folder to a previous point in time. The Windows Home Server Backup solution backs up only the data that has not already been backed up. Even if you have several copies of the same data on different computers, the data is backed up only once on your home server and your home server keeps track of what data was stored on each home computer on each day. This makes it efficient in the time it takes for backups to complete and the amount of space that is used on your home server.

Features and Functionality

The core features of Windows Home Server Home Computer Backup and Restore are:

- **Performs Automated Daily Backup of your Home Computers**
  
  Computer backups are automatically configured when you install the Windows Home Server Connector software on your home computers. Backup is performed on a daily basis for every configured computer. You can connect 10 computers at one time to Windows Home Server.

- **Restores an Entire Home Computer**
  
  If you want to restore your computer to a previous point in time, you restart the home computer from the Home Computer Restore CD. The computer connects to your home server and provides a wizard to follow for restoring a single hard drive or multiple hard drives from the backup of that computer that is stored on your home server.

- **Restores Individual Files and Folders**
  
  You can also restore individual files or folders by selecting a specific backup of a home computer from the Windows Home Server Console application. Windows Explorer displays a window with the files and folders that were backed up for that computer on that day. You can drag individual files or entire folders from this window to your Windows Desktop or another location on your home computer.
Benefits

Windows Home Server Home Computer Backup is unique compared to other solutions. Some of the benefits are:

- **Peace of Mind**

  Imagine the peace of mind that comes from automatic daily backups. Windows Home Server helps keep your family's important files safe, backing up every computer in your home, every day.

- **Simple to Restore an Entire Computer**

  You can restore a home computer to a previous point in time by using the Home Computer Restore CD and answering a few questions.

- **Saves Disk Space on Your Home Server**

  When your home server has a copy of a given piece of data, it keeps track of which home computer had that data on which day. The data is only stored once on the home server.

- **Saves Time**

  When your home server has a copy of a given piece of data, it does not have to be copied to the server again even if the data is on another home computer. After you initially back up your first personal computer, subsequent backups take less time to complete. In a home network, there are many duplicate files on your home computers, especially the files belonging to the operating systems and applications that are installed on every computer.
Backup and Restore In Depth

This section of the technical brief explains how Windows Home Server Home Computer Backup and Restore works.

Windows Home Server Console

The Windows Home Server Console provides you with the ability to see which home computers have been configured to be backed up and the backup status of each of your home computers. After you install Windows Home Server Connector on each of your home computers, they are automatically backed up each night to your home server.

The options on the Computers & Backup tab allow you to:

- **View Backups** Browse the existing backups of a home computer.
- **Backup Now** Initiate a manual backup of a home computer.
- **Configure Backup** Change the backup settings of a home computer.
- **Remove Computer** Delete computer and backups from the home server.

![Windows Home Server Computers & Backup tab](image)

Figure 1: Windows Home Server Computers & Backup tab
Configuring Backups

If you add or remove hard drives from your home computers, you need to use the Configure Backup option from the Windows Home Server Console to inform your home server of the new hard-drive configuration on the home computer.

You can also use the Configure Backup option to exclude certain folders from being backed up from a home computer to a home server. By default, Windows Home Server avoids backing up certain files and folders each day. This list includes:

- User temporary files
- System page file
- Hibernation file
- Client-side cache folders
- Shadow volume implementation folders
- Media Center temporary files

**Caution**

To save space in the backup database on your home server, recorded TV shows on Windows Media Center are not backed up from a home computer to your home server. If you want to have a backup copy of your recorded TV shows, one option is to copy the Recorded TV folder from your computer running Windows Media Center to a shared folder on your home server.

You can temporarily turn off backups for one or more of your home computers. You may want to do this for a computer that will be out of your home for a week or more or for a home computer that you no longer use but you want to keep a backup image.

**To turn on or turn off backups**

1. Open the Windows Home Server Console.
2. Click the Computers & Backup tab.
3. Right-click a computer, and then select Turn Off Backups or Turn On Backups

Daily automatic backups do not occur on a computer if you turn off backups. However, you can manually back up the computer if you right-click it in the Windows Home Server Console, and then click Backup Now.
Removing Computers

If you no longer want to save the backups for a home computer, you can remove that computer from the Windows Home Server Console, by using the Remove Computer option.

If possible, uninstall the Windows Home Server Connector software from the computer before you remove the computer from the console. If your computer is still on you will be required to do this. If you cannot remove the Windows Home Server Connector software because the computer is no longer available, you can still safely remove the computer from the console.

To remove a computer from the console

1. Open the Windows Home Server Console.
2. Click the Computers & Backup tab.
3. Right-click a computer, and then click Remove.

Caution
All existing backups for a home computer are deleted from the home server if you remove the home computer from the console.

How Backup Is Implemented

When you install the Windows Home Server Connector software on your home computers, they are configured to automatically back up every day during the backup time that you choose. Your computers must be turned on or they must be in sleep or hibernate mode to be automatically backed up. If a computer is in sleep or hibernate mode, it wakes up, runs Backup, and then goes back in to sleep or hibernate mode.

Important
Laptops and other battery-powered computers must be plugged in to AC power to be automatically backed up. Although the home computer on battery power will be awakened, Windows Home Server will recognize it as battery-powered and automatic backup will not initiate. On home computers running Windows XP, there is no easy way to tell whether the computer was awakened from sleep or hibernate, so the computer is put back to sleep when the backup process completes. You can also disable this functionality by un-checking the "Wake This Computer For Backup" item by right clicking the Windows Home Server Connector in the system tray.
You should back up all of the hard drives on each home computer including the system volume (typically, drive C:). If the hard drive that contains the system volume fails, you can restore it by using the Home Computer Restore CD and restarting the computer. You should also back up any volume that contains valuable or important files that you do not want to lose. For example, you may have irreplaceable pictures or videos, which you can back up to protect them from a hard drive failure.

**Important**

Windows Home Server backs up only the NTFS file system volumes. If the volume on a home computer was created as a FAT or FAT32 volume, it is not displayed in the list of volumes to back up. Changing the existing file system on a hard disk volume from FAT or FAT32 to NTFS can be time consuming, but after the system is converted to NTFS, Windows Home Server can back it up. If you decide to upgrade your file system to NTFS, you should back up your data by copying it to an external hard drive and then reformat the volume using NTFS.

**Note**

You can use the Convert.Exe program to change a hard disk volume from FAT or FAT32 to an NTFS volume without formatting the volume. If you use the Convert.Exe program, your NTFS file system will be formatted with 512 byte clusters, thereby reducing the efficiency of the Windows Home Server backup database.

The home computer backup solution in Windows Home Server has a single-instance store at the cluster level. Clusters are typically collections of data stored on the hard drive, 4 kilobytes (KB) in size. Every backup is a full backup, but the home server only stores each unique cluster once. This creates the restore-time convenience of full backups (you do not have to repeat history) with the backup time performance of incremental backups.

The home computer backup occurs as follows:

- When a home computer is backed up to the home server, Windows Home Server software figures out what clusters have changed since the last backup.
- The home computer software then calculates a hash for each of these clusters and sends the hashes to the home server. A hash is a number that uniquely identifies a cluster based on its contents.
- The home server looks into its database of clusters to see if they are already stored on the home server.
- If they are not stored on the home server already, then the home server asks the home computer to send them.
- All file system information is preserved such that a hard disk volume (from any home computer) at any backup point (time) can be reconstituted from the database.

![Figure 2: Windows Home Server backup solution stores unique data once](image)

The copies of the clusters that are stored on the home server in the order they are received. Additionally, the home server stores metadata files which allow it to deduce which clusters belong to which home computer at which times. The metadata that is typically stored for each home computer usually takes less than 5 percent of the space of the clusters that are backed up.

Some of the implications of this backup approach are:

- The first backup always needs to send the entire contents of the disk to the home server.
- The first backup of a different home computer needs to read all of its data but only transmit the content of those clusters that the home server does not already have from another home computer.
- Subsequent backups after little change typically only read a small amount of data on the home computer and send the new clusters to the home server.
After you defragment a home computer, the next backup may need to read a large amount of data from the disk (many files will appear to have been changed), but it only sends a relatively small amount of data to the home server because the clusters have been reorganized, but they have not changed.

**Note**

The first backup should be of the home computer with the largest hard drive that is connected through a wired Ethernet connection, because the first backup of a home computer to your home server sends the entire contents of the disk to the home server over your home network.

**How Backups Are Stored**

The home server side of the solution is a database that is specifically designed to efficiently backup multiple home computers on a daily basis. The cluster data and metadata from each home computer is stored on the home server hard drives.

The backup database is stored entirely in the folder `D:\folders\{00008086-058D-4C89-AB57-A7F909A47AB4}\`. The content of this folder is migrated by Windows Home Server Drive Extender from the primary data partition to a secondary data partition if the home server has more than one hard drive.

The Windows Home Server backup engine stores data at the cluster level. Clusters are typically 4 kilobytes (KB) in size. The backup database records include clusters and hashes of these clusters (a hash is a number that uniquely identifies a cluster based on its contents). The database also contains information on the structure of a hard disk volume (NTFS information).

During the backup process, a cluster from one home computer that is identical to a cluster from a different home computer is sent to the server exactly once and stored exactly once. Because Windows Home Server backs up multiple computers (space) every day (time) to a single database, it in essence supports “single instancing of home computer backups across space and time.”

When the cluster size is different among volumes, no data is shared between the volumes in the backup database. By default, every newly created NTFS volume gets a cluster size of 4 KB. A few volumes that started out as FAT and were converted to NTFS
have a cluster size of 512 KB. The only way to get any other cluster size is to format the volume yourself and explicitly request a different size.

Note
You can maximize the efficiency of the home server backup database by ensuring that all of the hard drives on your home computers are formatted with NTFS and with a cluster size of 4 KB.

The backup database is a collection of files that can be broken into three categories:

- **Global files** - Files that track the history of all home computer backups and all of the other files in the backup database.
- **Cluster files** - Files that store the actual cluster data from the home computers. These are usually in 4096 byte increments. These files grow to 4 GB in size before a new file is created. These files are stored as Data.XXX.X.dat, where XXX=cluster size in bytes, and Z=0,1,2,...
- **Home Computer specific files** - A boot record and data for each hard drive volume that gets backed up from each home computer.

**Restoring Individual Files and Folders**

To restore individual items from a previous backup stored on the home server, a virtual volume driver is loaded on the home computer. This allows a previous image of a hard drive to be mounted, as if it were a read-only volume, across the home network. This driver opens a connection to the home server, and it receives the relevant clusters from the home server to build a virtual view into what a given hard drive looked like on a given day. The read-only volume is displayed in Windows Explorer where a user can drag the files and folders that they want to restore to the Windows Desktop of the home computer they are using.

Important
A home computer that is behind your home firewall and has the Windows Home Server Connector software installed can create a backup without further authorization or authentication. However, restoring individual files and folders and restoring home computers using the Home Computer Restore CD requires the Windows Home Server password.
To browse and restore individual files and folders from a backup

1. Open the Windows Home Server Console.
2. Click the **Computers & Backup** tab.
3. Select a home computer, and then click **View Backups**.
4. Select a backup, and then click **Open**.
5. Select a volume to open, and then click **Open**.

**Important**
The Opening Backup status window appears while the backup opens. If you are prompted to restart your computer after the virtual volume driver is installed, ignore this message; you do not need to restart your computer.

![Figure 3: Status window to ignore when you restore files and folders](image)

To restore files and folders

1. When the backup library window opens, drag the backup files and folders that you want to restore to a folder on your home computer.
2. Close the window when you are done copying the files and folders that you want to restore.
Restoring a Home Computer

After backups for a home computer are stored on the home server, you can use the Home Computer Restore CD to restore the entire content of one or more home computer hard drives to a previous point in time.
The system volume of a home computer contains the hardware-specific files that you need to start your Microsoft® Windows operating system. This is usually the C: drive. If this volume is damaged, you will not be able to start your home computer, and you need to start your computer from your Home Computer Restore CD.

To restore a hard drive volume of a home computer

1. Place the **Home Computer Restore CD** in the optical drive of the home computer for which you want to restore one or more hard drive volumes.
2. Restart the computer, and boot from the CD.
3. Follow the instructions in the **Restore Computer Wizard** to restore the hard drives on your home computer.

**Important**

Your home computer must be connected to the home network with an Ethernet network cable before you begin the restore. In most cases, you cannot use a wireless connection, and attempting to use a wireless connection is an unsupported scenario.

Every time Windows Home Server backs up a home computer, it saves the drivers for the home computer in the backup that is stored on the home server. When you use the Home Computer Restore CD, you will be prompted if your home computer requires drivers that are not available on the Home Computer Restore CD. If you need to access the drivers for any of your home computers (for example, during a computer restore), you can open a backup for that home computer and copy the drivers to a USB flash drive.

To copy drivers for a home computer from a backup stored on the home server

1. Open the Windows Home Server Console.
2. On the **Computers & Backup** tab, click the computer that you need drivers for.
3. Click **View Backups**.
4. Select the most recent backup, and then click **Open**.
5. Select a volume to open (any volume will work), and then click **Open**. A window opens showing the files and folders in the backup.
6. Plug in your USB flash drive.
7. Copy the **Windows Home Server Drivers for Restore** folder from the open window to your USB flash drive.
8. Remove the flash drive, and then insert it into the home computer that is being restored.

![USB flash drive](image)

**Figure 6:** Home computer drivers to use for Home Computer Restore

You can use the USB flash drive to install drivers for your home computer's specific hardware when you restore the home computer. The Home Computer Restore CD looks for additional drivers on a USB flash drive as part of the initial boot process. The drivers you are most likely to need during a home computer restore are the network driver and the storage-device driver.

⚠️ **Important**

If you are restoring from a 64-bit computer the drivers that are stored in the backup will be 64-bit. These will not function with the 32-bit restore CD. Therefore it is may be necessary to obtain 32-bit versions of the network driver and storage-device drivers for your 64-bit computer, while doing a restore of your home computer.
Backup Settings and Backup Cleanup

There are a few settings that you can configure for Windows Home Server Backup from the Windows Home Server Console. The **Backup Time** defines what hours during each day that backup processes will run, and the **Automatic Backup Management** settings define a retention policy for the home computer backups.

![Backup settings](image)

**Figure 7:** Backup settings

If you have multiple home computers, they back up sequentially. Therefore, backups can potentially happen during the entire backup window. If a backup is still in progress when the backup time ends, it finishes but no new backups can start. Any computer that has not yet started its backup tries again during the next backup time. The **Backup Time** setting is limited so that your computers are not busy backing up when you want to use them.

**Note**

In general, the **Backup Time** should be set for a time when people in your household will not be using the home computers. The longer the time period, the more likely it is that all of your home computers will be backed up each day.
Home computers initiate the backup process as a hidden scheduled task. The home computers randomly select a time each day during the Backup Time to initiate their daily backup to the home server, and they alternate which computer will back up first on a given day. Only one home computer can back up at a time, so if another computer tries to start a backup to the home server, it will wait until the first computer’s backup completes.

Daily backups of all your home computers accumulate on your home server over time. To help you manage these backups, Windows Home Server provides **Automatic Backup Management**. With **Automatic Backup Management**, you can configure how many backups to keep for each of your home computers. To configure how many backups to keep, set the number of months to keep the first backup of the month, the number of weeks to keep the first backup of the week, and the number of days to keep the first backup of the day.

If you click **View Backups** from the Windows Home Server Console, you can see the three options for each home computer backup:

- **Manage automatically** (processed as part of Backup Cleanup)
- **Keep the backup** (kept until users decides to change this option)
- **Delete at next Backup Cleanup**

![Figure 8: Available backups for NEW-LAPTOP home computer](image-url)
Important

Home computer backups that are manually initiated by using the Backup Now option are marked with the Keep this backup option, until someone explicitly changes them from the Windows Home Server Console.

Backup Cleanup runs once a week at the beginning of the Backup Time on Sunday. It has two purposes:

1. Delete the metadata about home computer backups that are no longer needed
2. Delete copies of clusters that are no longer referenced by any home computer backup.

Deleting the metadata is relatively fast (typically a few minutes per home computer), but it does not recover much space because the metadata for each home computer backup is usually less than five percent of all of the space consumed by the backup database. Deleting copies of clusters rarely recovers much space because the backup database is a single instance store of the unique clusters stored on your home computers. If another home computer backup that references a given cluster still exists, then the cluster will continue to be stored in the backup database.

Important

If you temporarily stop the backup of a home computer, Windows Home Server continues to apply the Automatic Backup Management settings for your home computer backups. For example, assume your Automatic Backup Management settings are set for 3 days, 3 weeks, and 3 months. If you stop backing up a home computer, your home server will continue to keep the last three daily backups, weekly backups, and monthly backups, if they exist.

If you remove a computer from the Windows Home Server Console, all of the backups for that home computer will be deleted during the next Backup Cleanup. This is when you will see the largest decrease in the size of the backup database, especially if the home computer had a lot of unique data.

Note

Windows Home Server checks for Windows Updates at the beginning of the Backup Time. Depending on the requirements of the updates, your Windows Home Server may restart during this time.
Additional Tips

Following are a few additional tips and techniques for situations that you may encounter or you may want to experiment with in Windows Home Server Backup and Restore.

Backup service is not running
You may see the following error: “If backup service is not running, please restart the console.” If you see this error, try resetting the console before connecting to Windows Home Server.

To reset the Windows Home Server Console
1. Right-click the Windows Home Server icon in the taskbar, and then click Windows Home Server Console.
2. On the console Password page, click Options.
3. Click Reset the Windows Home Server Console.
4. Click OK.

Caution
Ensure that Backup Cleanup is not running and that none of the home computers are being backed up during the following tasks: Saving a Copy, Deleting, and Restoring the Backup Database.

Saving a Copy of the Backup Database
The Windows Home Server backup database is not duplicated by Windows Home Server Drive Extender. So if you lose a single hard drive on your home server, you could possibly lose all of the backups of your home computers.

You may want to periodically copy the entire backup database from your home server to an external hard disk that you attach to your home server. The external hard disk should not be added to the Server Storage on your Windows Home Server.

Important
The cluster data files stored in backup database can grow to 4 GB, so it is important that the external hard disk is formatted as NTFS to support copying these large files. Some file systems, such as FAT-32 allow a maximum file size of 2 GB.
The backup database is stored entirely in the folder D:\folders\{00008086-058D-4C89-AB57-A7F909A47AB4}.

To copy the backup database from your Windows Home Server
(In this example, assume that the external hard drive is given a drive letter of E:)

3. Run mstsc.exe to start a Remote Desktop Connection session to your home server.

Caution
Be careful when using a Remote Desktop Connection to your home server. You can damage Windows Home Server functionality if you use it incorrectly.

4. Plug in an external hard drive to your home server (do not add it to the Server Storage through the Windows Home Server Console).
5. Open a Command Prompt, Click Start, Run and type CMD
6. Type net stop PDL.
7. Type net stop WHSBackup to stop the Windows Home Server Backup service.
8. Copy the contents of D:\folders\{00008086-058D-4C89-AB57-A7F909A47AB4} to the external hard drive E:.
9. Type net start WHSBackup to restart the Windows Home Server Backup service.
10. Type net start PDL.

The only relevant settings that Windows Home Server backup stores in the registry on the home server are Backup Time and Automatic Backup Management.

Deleting the Backup Database
You may want to delete the entire backup database from your home server to reclaim the disk space. The backup database is stored entirely in the folder D:\folders\{00008086-058D-4C89-AB57-A7F909A47AB4}.

To delete the backup database on your Windows Home Server

1. Run mstsc.exe to start a Remote Desktop Connection session to your home server.
2. Open a Command Prompt, Click Start, Run and type CMD
3. Type net stop PDL.
4. Type net stop WHSBackup to stop the Windows Home Server Backup service.
5. Delete the contents of D:\folders\{00008086-058D-4C89-AB57-A7F909A47AB4}. Do not delete the folder.
6. Type net start WHSBackup to restart the Windows Home Server Backup service.
7. Type net start PDL.

Important
After deleting the backup database, you need to re-install the Windows Home Server Connector software or run the Discovery.exe program on each of your home computers to re-establish a relationship between your home computers and your home server so new backups will occur.

Restoring a Backup Database
You may want to restore an entire backup database, which you previously saved on an external hard drive, to your home server. Prior to restoring a backup database, you need to delete the existing backup database from the home server. Currently, there is not an option to merge backup databases into a single database.

To restore the backup database to your Windows Home Server
(In this example, assume that the external hard drive is given a drive letter of E:, and it has a copy of a home server backup database that was previously saved as described in the Saving a Copy of the Backup Database section earlier in this document.)
1. Run mstsc.exe to start a Remote Desktop Connection session to your home server.
2. Plug in an external hard drive to your home server (do not add it to the Server Storage through the Windows Home Server Console).
3. Open a Command Prompt, Click Start, Run and type CMD.
4. Type net stop PDL.
5. Type net stop WHSBackup to stop the Windows Home Server Backup service.
6. Delete the contents of D:\folders\{00008086-058D-4C89-AB57-A7F909A47AB4}. Do not delete the folder.
7. Copy the contents from the external hard drive E:\folders\{00008086-058D-4C89-AB57-A7F909A47AB4} to D:\folders\{00008086-058D-4C89-AB57-A7F909A47AB4}.

8. Type `net start WHSBackup` to restart the Windows Home Server Backup service.

9. Type `net start PDL`.

More Information

For more information about Windows Home Server, see the Microsoft Web site (http://go.microsoft.com/fwlink/?LinkId=100260).
Technical Brief for

Windows Home Server Remote Access

Microsoft Corporation
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Abstract
This Technical Brief provides an in-depth look at the features and functionality of Windows Home Server Remote Access.

To learn more about other aspects of Windows Home Server, see the Microsoft Web site (http://go.microsoft.com/fwlink/?Linkid=100260).
Overview of Remote Access

You can use the Remote Access feature in the Windows® Home Server operating system to connect to your home server and your home computers while you are away from home.

Features and Functionality

After you configure a user account for remote access in the Windows Home Server Console, you can use a Web browser on a computer that is outside your home to remotely access your home server and home computers.

- **Remote Access to Shared Folders**

  Users can download files and folders, and they can upload one or more files to the shared folders on the home server while they are away from home. Users can also search through the Shared Folders when they are trying to find a specific file.

- **Remote Access to Home Computers**

  You can connect remotely to the computers in your home. You can run an application or print to your home printer, just like you can when you are sitting in front of your home computer.
• **Remotely Connect to the Windows Home Server Console**

  If the need arises, you can access the Windows Home Server Console while you are away from home to add new user accounts, to create new shared folders, or to check on the status of your home network.

**Benefits**

In Windows Home Server, Remote Access is unique from other solutions. Some of the benefits are as follows:

• **Personalized domain name**
  You can register for your own Internet domain name (for example, SmithFamily.HomeServer.com), and then you can use your personalized domain name to remotely access your home server (for example [http://SmithFamily.HomeServer.com/Home](http://SmithFamily.HomeServer.com/Home))

• **Remote access to home computers**
  After you log on to your home server, you can quickly connect to your home computers and run applications, just like you can when you are sitting in front of that computer. With Remote Access, families and home-based businesses can easily access their home computers, using the same user interface.

• **Remote access permissions set for each user**
  You can add up to 10 user accounts, and for each one you can easily enable and disable the ability to remotely connect to your home server.
Remote Access In-Depth

This section explains in more detail how Remote Access in Windows Home Server works.

Enabling Remote Access

By default, Remote Access is disabled for your home server. To enable Remote Access, do the following:

6. Open the Windows Home Server Console, click **Settings**, and then click **Remote Access**.

7. Ensure that **Web Site Connectivity** is **Turned On**. If it is, three network ports (80,443 and 4125) on the Window Home Server firewall are open, so that your home server accepts incoming requests from the Internet.

8. Configure your router. In this step, Windows Home Server configures the persistent port forwarding from your UPnP™-certified router to your home server, as follows:
   - Port 80: http:// web requests
   - Port 443: https:// web requests using Secure Sockets Layer
   - Port 4125: remote desktop proxy

9. Select a Domain Name. Choose a personalized domain name for your home server (for example, SmithFamily.homeserver.com). Click **Setup...** to run the Domain Name Setup Wizard which prompts you to enter your Windows Live ID, and then you can select a domain name for your home server.
Important
You may need to add services from your broadband provider to use Windows Home Server’s remote access features. For example, you will need certain “ports” to be open to use these features. Some broadband providers block certain ports for users on some service plans. Also, some broadband providers’ terms of service may limit or prohibit setting up and running of “servers” on their networks. Please contact your broadband provider if you have questions about their terms of service.

Windows Home Server includes a built-in dynamic DNS client feature that binds your personalized domain name to the external IP address that is assigned by your ISP.

Important
You do not need to forward TCP port 3389 from your router to your home server. To remotely connect to your home computers and to the Windows Home Server Console, you only need to enable port 4125.

Note
Windows Home Server needs the UPnP architecture in order to automatically configure your router, but not all broadband routers properly support the UPnP architecture. The Internet Connectivity Evaluation Tool checks your router to see if it supports certain technologies. You can use this tool on a computer that is running either the Windows Vista® or the Windows XP operating system. The tool is available at: http://go.microsoft.com/fwlink/?LinkId=100267

If your router does not pass these tests, then you need to manually forward the TCP ports (80, 443, and 4125) from your router to the IP address of your home server. For more information, see the documentation for your broadband router or visit the PortForward web site at: http://go.microsoft.com/fwlink/?LinkId=100269

Next, enable Remote Access on at least one user account in the Windows Home Server Console. User accounts that have Remote Access enabled must have a strong password. The strong-password policy requires passwords that are at least 7 characters long and that contain characters from at least three of the following four categories:
• Uppercase letters
• Lowercase letters
• Numbers
• Symbols (such as !, @, #, etc.)

Note
For improved security, choose long, complex user names and long, complex passwords for your user accounts that have Remote Access enabled.

Testing Remote Access Connectivity
After you configure Remote Access, test the remote connectivity from within your home and from outside of your home. Run the following tests from one of your home computers to see if Remote Access is working properly:

• [http://servername]/home - Connects over your home network to the Windows Home Server home page, using port 80.
• [https://servername]/remote - Connects over your home network to the logon page for Windows Home Server Remote Access, using a Secure Socket Layer connection on port 443.

You can run the following tests from a computer when you are outside of your home and you have access to an Internet connection. These tests check if your personalized domain name (for example, SmithFamily.HomeServer.com) is working properly:

• [http://yourname].HomeServer.com/home - Connects over the Internet to your home server, using port 80. You should see the Windows Home Server home page.
• [https://yourname].HomeServer.com/remote - Connects over the Internet to your home server, using port 443. You should see the logon page for Windows Home Server Remote Access.

Important
Some broadband providers restrict the use of port 80, so you may find that, although you can connect to your home server by using https://, you cannot connect by using http://. Please contact your broadband provider if you have questions about their terms of service.
If these tests give negative results, try to connect directly to your home server with the external IP address that your broadband provider assigns:

- **http://<external_IP_address>/home** Connects over the Internet to your home server, using port 80. You should see the Windows Home Server home page.
- **https://<external_IP_address>/home** Connects over the Internet to your home server, using port 443. You should see the logon page for Windows Home Server Remote Access.

**Note**

One way to determine the external IP address that your broadband provider assigns to your broadband router is to access the WhatsMyIP.org URL from one of your home computers at: [http://go.microsoft.com/fwlink/?LinkId=100270](http://go.microsoft.com/fwlink/?LinkId=100270)

**Remote Access to Shared Folders**

After a user logs on via Remote Access, they can access the shared folders to which they have either “Full” or “Read” access. You can set the level of access in the Windows Home Server Console. From the **Shared Folders** tab, users can navigate to a particular shared folder, and then they can download or upload files to their home server. Also, because Windows Home Server indexes all of the content in the shared folders, users can use the **Search** bar to find a file that is stored on the home server.
If a user selects multiple files to download at the same time, Windows Home Server will ask you if you would like to download the file in a .zip format or a self executable .exe format. This reduces the amount of time needed to download your files.

Users can also upload files to shared folders. Click the upload button, which will open the upload area. You can drag and drop multiple files directly to the upload area, or **Browse to select files** to choose individual files. When you are done, hit the **Upload** button and your files will be sent to your home server.

![](image)

**Troubleshooting Remote Access to Shared Folders**
The following issues may limit your ability to remotely access shared folders.

**Remote Access Has an Upload Limit of 2 GB**
You cannot upload a file or a combination of files that is larger than 2 GB. If you want to upload files that total more than 2 GB, separate the files, and then upload them in batches that are less than 2 GB.

**Large File Uploads May Time Out Before Finishing**
If you upload a large file or group of files by using Remote Access, the session may time out before the upload finishes. To resolve this problem, you can increase the time-out parameter with the Windows Home Server toolkit.
To increase the Remote Access time-out parameter

1. Download Windows Home Server Toolkit
2. Install Toolkit by copying it over to the add-in share.
3. Log onto the Console
4. Navigate to the settings tab and select the Support Toolkit page
5. Change time out.
6. Restart IIS
7. Click OK

Important
If you increase the time-out parameter, you increase your security risk. Do not leave a computer that has an active session unattended in a public place. Always remember to log out.

Remote Access to Home Computers
When you are away from home, you can use your Web browser to remotely access your home computers and your Windows Home Server Console. When you connect to the console, you can manage Windows Home Server just like you were at home. You can perform all of the usual console tasks, such as adding user accounts, adding shared folders, and setting access to shared folders. When you connect to your home computers, you can access the desktops of those computers as if you were sitting in front of them at home.
Important
You must use Internet Explorer to remotely access to your home computers, because Remote Access requires an ActiveX® control. If you use another Web browser, you cannot access your home-computer desktops, but you can access your shared folders.

Note
When you connect via Remote Access, you cannot browse shared folders from the console. However, you can browse them from the Shared Folders tab.

To connect to one of your home computers, on the Computers tab, click the name of the home computer. You can connect only a computer that is Available for connection and that is running one of the following operating systems:

- Windows XP Professional with Service Pack 2 (SP2)
- Windows XP Media Center Edition 2005
- Windows XP Tablet Edition with SP2
- Windows Vista Ultimate, Windows Vista Business, or Windows Vista Enterprise
Also, make sure that the home computer is configured to allow remote access. For detailed instructions about how to complete this configuration, see "Why can't I connect to some computers?" in Windows Home Server Console Help.

**Important**

Some third-party firewall programs block traffic on port 3389, which is the port that your home server uses to connect to your home computers. Verify that the firewall programs on your home computers allow network traffic on port 3389.

Some corporate firewalls restrict the use of port 4125 for communicating with systems outside of the corporate network. Windows Home Server requires access via port 4125 to be enabled from the remote computer and the remote network, so that you can connect to your home computers after logging on to Windows Home Server Remote Access.

**Troubleshooting Remote Access to Home Computers**

Check the following items if you cannot connect to your Windows Home Server Console.

**Make sure that Remote Desktop is enabled on your home server**
Remote Desktop is enabled by default on Windows Home Server, but it might have been disabled.

To check if Remote Desktop is enabled

1. Using mstsc.exe, start a Remote Desktop Connection session to your home server.

   **Caution**

   Be careful when using a Remote Desktop Connection to your home server. You can damage Windows Home Server functionality if you use Remote Desktop incorrectly.

2. Click **Start**, right-click **My Computer**, and then click **Properties**.
3. Click the **Remote** tab, and then see if the **Enable Remote Desktop on this computer** check box is selected.

**Make sure that the Windows Firewall settings are correct on your home server**
Windows Home Server configures Windows Firewall to allow remote connections, but this might have been manually changed.

To check Windows Firewall settings on your home server

1. Using mstsc.exe, start a Remote Desktop Connection session to your home server.
Caution

Be careful when using a Remote Desktop Connection to your home server. You can damage Windows Home Server functionality if you use Remote Desktop incorrectly.

2. Click Start, click Run, type firewall.cpl, and then click OK.
3. Click the Exceptions tab.
4. Make sure RDP proxy (TCP port 4125) is checked. Select RDP proxy, and then click Edit. Click Change scope, and then make sure that Any computer (including those on the Internet) is selected.
5. Make sure that Remote Desktop (TCP port 3389) is checked. Select Remote Desktop, and then click Edit. Click Change scope, and then make sure that My network (subnet) only is selected.

Check the following items if you cannot connect to your home computers.

Check the firewall settings your home computers

The firewall software on your home computers must be configured to allow remote connections. Use the following procedure to check the settings for Windows Firewall. For more information about other firewall software, see the documentation for that software.

To check the settings for Windows Firewall on your home computer

1. Log on to your home computer with an administrator account.
2. On Windows XP, click Start, click Run, type firewall.cpl, and then click OK.
   On Windows Vista, click Start, type firewall.cpl in the Search text box, and then press ENTER.
3. Click Change settings.
4. Click the Exceptions tab.
5. Make sure Remote Desktop (TCP port 3389) is checked.
6. Click the General tab.
7. Make sure that the Don’t allow exceptions (Windows XP) check box or the Block all incoming connections (Windows Vista) is clear.
8. If you made any changes, restart the computer.

Make sure that a home computer running Windows Vista allows connections from any computer

Computers running Windows Vista have an additional system property that you should check.
To check Windows Vista system properties

1. Log on to your home computer with an administrator account.
2. Click Start, right-click Computer, and then click Properties.
4. In Remote Desktop, make sure that the Allow connections from computers running and version of Remote Desktop (less secure) check box is selected.
5. If you made any changes, restart the computer.

Customizing Remote Access

There are a few ways that you can customize the Remote Access experience for your home server. All of them require access to the Administrator’s desktop of your home server through a Remote Desktop session over your home network.

Caution

All of these changes are overwritten if you reinstall Windows Home Server. Be sure to save the original versions of any files that you change. You will need to be logged on to the Windows Home Server using remote desktop. Many standard Windows Server administration tools available from this desktop can break Windows Home Server.

To change the image that appears on the Remote Access home page

1. You can download the Whiist Add-in from Andrew Grant's webpage:
   http://www.andrewgrant.org/whiist
2. After installing the Add-in, you can go into the settings page in the Windows Home Server Console and select Whiist.
3. Click Edit
4. Click Select Image
5. Browse for Image and click Open
6. Click Apply

To change the image that appears after logging on via Remote Access

1. Using mstsc.exe, start a Remote Desktop Connection session to your home server.
   Caution
   Be careful when using a Remote Desktop Connection to your home server. You can damage Windows Home Server functionality if you use Remote Desktop
incorrectly.

2. Click Start, click Run, type `c:\inetpub\remote\images`, and then press ENTER.
3. Open `i_default_photo.png` with Microsoft Paint.
4. Change the image.
5. Save the file, and then close Paint.

Also, you can provide links to Web sites on either your public-facing Web page or your intranet. The links appear when a user logs on to your home server. To provide these links, edit the file `websites.xml` in `c:\inetpub\home` or in `c:\inetpub\remote`.

### Additional Tips

#### Showing Additional Web Page Error Information
If the Web page for Windows Home Server Remote Access shows an error, you can configure Windows Home Server to display additional information about the error.

1. Download Toolkit from:
2. Install Toolkit by copying it over to the add-in share.
3. Log onto the Console
4. Navigate to the settings tab and select the Support Toolkit page
5. Check Customer Error Mode
6. Click Restart IIS
7. Click OK

#### Windows Server 2003 Administrative Tools
Do not use the administrative tools in the Windows Server® 2003 operating system to modify user-account properties. Modify user-account properties only with the Windows Home Server Console. You can break Windows Home Server functionality if you use the Windows Server 2003 administrative tools.

For example, if you use the administrative tools to add a Windows Home Server user account to the Administrators group, that user account cannot log on using Remote Access.
**Auka efni:**

**Uppsetning á uTorrent inn á Windows Home Server box**

Hugmyndinn er sú að vera með uTorrent viinslu í gangi, tilbúna að taka á móti efni. Með þessu móti er hægt að stilla sjálfvirkni móttökunar í gegnum uTorrent á þeim tínum sem innanhús umferðin er ekki í gangi til að minnka hættuna á hægagangi á netinu og nýta bandbreidd internetsins til fullnustu. Eftir þessa uppsetningu þá mun uTorrent vinna í bakgrunninum inn á WHS netþjóninum án þess að notandi þurfti að vera loggaður inn á WHS boxið.

**Útbúa nýjan notanda.**


Þetta er gert af öryggis ástæðum og einnig til þess að hægt sé að keyra uTorrent upp sem bakgrunnsþjónustu. Þessi notandi þarf að vera í Administrators grúppunni.

**Uppsetning og stillingar.**

Tengdu þig í gegnum “Remote Desktop Connection” (mstsc.exe) ásamt notandanum sem þú stofnaðir í byrjun.


Ef þetta er í fyrsta skiptið sem verið er að setja inn uTorrent á þennan server þá mun koma upp val-gluggi sem er að spyrja þig um hvaða skrár eigi að tengja við .torrent skrám í uTorrent. Staðfestið með “Yes”. Ef það kemur upp athugasemd frá Windows Security þar sem verið er að benda á að Blokkera eða Afblokkera uTorrent, staðfestið að Afblokkera uTorrent ef það birtist athugasem frá “Speed Guid” stilið tenginguna ykkar og “Current Port” á það sem þið viljið nota.

Þið þurfið næst að áframvisa þessu Porti sem þið völduð frá routurnum ykkar og inn á netþjóninn ykkar.

Inn í uTorrent, veljið “Options and söðan Preferences” og sjáíð til þess að stillingarnar séu eins og í eftirfarandi myndum:
Næst þurfa stilltingar inn á drif og möppur að vera í lagi, sjá stilltingar í meðfylgjandi mynd hérna að neðan. Pú getur breytt staðsetningu hvar þú setur ný niðurhól (downloads) enAth. ekki velja eða nota hérna server share. Það þarf að vera stillt inn á drif heiti inn á WHS annars mun Drive Extender Migrator þjónustan valda því að gögn geta tapast þegar Migratorinn reynir að færa skrárnar milli drifa á meðan uTorrent er ennþá að skrifa gögn niður á diskinn. I “Move completed downloads”, þar er hægt að nota hvaða server share staðsetningu sem er. Í “Automatic load torrents in directory location”, þar er einnig hægt að nota hvaða server share staðsetningu sem er. Þessi uppsetning leyfir uTorrent að fylgjast með ákveðni möppu þar sem .torrent skrárar eru settar inn og byrja sjálfvirk viðurhal á því efni sem .torrent skrára segir til. Það eins sem notandinn þarf að gera er að færa .torrent skránna í þessa möppu og uTorrent mun gera sitt.
Með því að nota “Scheduler”, getum við stillt tímalega sjálfvirkni kerfisins og þannig jafnað út þann tíma og truflun sem niðurhalið getur haft í för með sér.

Myndin hérna að neðan sýnir okkur stillingar á “Web UI Interface”. Stillinger á notandanafni og lykilorði velur þu sjálfur. Einnig er hægt að virkja gesta aðgang í gegnum þetta interface.
Veljið OK hnappinn til að loka uTorrent.


EKKI KEYRA þessa útgáfu strax, setjið niðurhalið inn í ADD-Ins Shared skránna (\SERVER\Software\Add-Ins).

Loggið ykkur næst inn í WHS consolinn og farið inn í Settings, veljið næst Add-ins hnappinn og þar inn í “Available valmöguleikan, veljið uTorrent installið og veljið Install undir “Windows Home Server – uTorrent”.

IP talan þín er nafnið á Home servernum þínum eða IP talan á honum og Port númerið er Portnúmerið sem þú valdir í uppsetningunni á uTorrent forritinu fyrr í uppsetningunni.

Næst er valið að setja inn notandanafn og lykilorð, setið inn notandanafn og lykilorð sem þú valdir að hafa í upphafi þessara uppsetningar. Þú getur prófað uppsetninguna með því að velja “Test Configuration”. Rautt þýðir að eitthvað sé í ólagi en grænt í lagi.
Útbúa notenda skilgreinda þjónustu.

Þarf að vera kominn inn í RDT tengingu við serverinn þinn í gegnum mstsc.exe forritið.

Frá netþjóninun þínun “Windows Home Server (Remote Desktop Connection)” veljið Start og síðan Run sláð inn cmd. Sláð inn eftirfarandi texta og hafið gæsalappirnar með:

“c:\Program Files\Windows Resource Kits\Tools\instsrv.exe” uTorrent “c:\Program Files\Windows Resource Kits\Tools\srvany.exe”

Athugið: Cut og paste mun ekki virka, í staðinn veljið allan textan og afritið línuna og síðan er hægt að líma hana inn í opinn CMD glugga.

Veljið Enter á lyklaborðinu. Þegar að skjá skilaboðin “The service was successfully added!” koma upp, þá má loka Cmd glugganum.

Núna þarfum við að útbúa Registry skrá (.Reg skrá). Best er að nota notepad og líma eftirfarandi linur inn:

```
Windows Registry Editor Version 5.00

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\uTorrent\Parameters]
"Application"="C:|\Program Files|utorrent|utorrent.exe"
```

Þegar skráinn er vistuð veljið Save type á ALL Files *.* og vistið skránna með eftirfætinu .reg. Tviklikkið á vistuðu skránna til að setja hana inn í registry’ið á þessum netþjóni.

Næst veljið Start hnappinn og farið inn í All Programs ->, Administrative Tools og veljið Services. Finnið uTorrent hægri smellið á músini og veljið Properties.

Veljið Log On möguleikann. Veljið “This account” hnappinn og veljið “This account” og setjið inn notandanafn og lykilord þess aðila sem að þu stofnaðir í upphafi.

Veljið OK og lokíð Service glugganum.

Veljið Start hnappinn ->, Shut Down og Restart.

Með þessu þá ætti uTorrent að virka bæði í vef glugga (web interface) með vafraranum þínun þar sem þú notar eftirfarandi format: http://ÞínIPtala:Port/gui/ eða í gegnum WHS console (uTorrent haus).

Það eina sem að þarf að gera núna til þess að torrent niðurhal geti hafist er að setja .torrent skránna inn í eftirfarandi möppu \SERVER\Public\Torrents og gleyma henni þar. 😊
Record Music from a Vinyl Record to Your Computer

This Windows Media Workshop explains how to connect a turntable to your computer, record music from a vinyl record and save it to your computer, and then play the recorded music in Windows Media Player.

What You’ll Need

To complete this workshop, you will need the following software and hardware.

Software:
- Plus! Analog Recorder in the Plus! SuperPack
- Windows Media Player 10

Hardware:
- Stereo RCA cable (2 RCA connectors and a mini-jack connector)
• Stereo RCA cable (2 RCA connectors on each end)

• Turntable

• Audio/video receiver, with built-in pre-amp and Phono inputs

• Sound card (with Line In jack)
Step 1: Connecting a Turntable to Your Computer

The first step in recording music from a vinyl record is to connect a turntable to your computer.

To connect a turntable to your computer

1. Connect a ground wire from the ground connector on the receiver to the ground connector on the turntable, as shown in the following figure. This helps to reduce the humming or buzzing that might occur when you connect the turntable to the receiver.

2. Plug one end of one of the stereo RCA cables with the red-and-white, male RCA connectors into the red-and-white, female RCA jacks on the turntable, as shown in the following figure.
3. Plug the other end of this RCA cable into the red-and-white, female RCA jacks labeled **Phono** on the receiver, as shown in the following figure.

4. Plug one end of the other RCA cable into the red-and-white, female RCA jacks labeled **Tape (Rec Out)** (or similar) on the receiver, as shown in the following figure.
5. Depending on whether you are using a Y-cable or stereo RCA cable, do one of the following:

- If you are using a Y-cable that already has a mini-jack stereo connector on the other end of the cable, go to the next step.

- If you are using a stereo RCA cable that has red-and-white, male RCA connectors on both ends of the cable, plug the end not already connected to the female RCA jacks on the receiver into the female red-and-white RCA jacks of a mini-jack stereo adapter, as shown in the following figure.

- Plug the mini-jack stereo adapter into the female **Line In** jack on the sound card in your computer, as shown in the following figure.
6. On the front of your receiver, select Phono as the input, and then select Phono as the output. Depending on your receiver, these input and output selectors are often buttons or knobs located on the front of the receiver.

Step 2: Recording Music from a Vinyl Record in Plus! Analog Recorder

After you connect your receiver to your computer, use Plus! Analog Recorder to start recording the music to your computer.

To detect audio levels
2. On the Welcome to Plus! Analog Recorder page, click Next.
3. On the Adjust your recording level page, in the Sound device list, click the device you want to use. (The sound device is usually the name of the sound card that is installed on your computer.)
4. In the Input channel list, choose Line In. This is the jack that the mini-jack connector is plugged into on the sound card that is installed on your computer.
5. To begin detecting audio levels, play the record, and then click Start in Plus! Analog Recorder. Detecting audio levels helps to make sure that the recording volume is set correctly.
6. After an acceptable audio level has been detected, click Next.
7. If necessary, move the tone arm back to the beginning of the record.

To record music from the vinyl record
1. On the Record your music page, click Record, and then play the record.
   For tracks that you don’t want to record, click Pause, move the tone arm to the desired track, and then click Record again.
2. Let the music play to the end of the record, and then click **Stop** in Plus! Analog Recorder.
3. On your turntable, stop playing the record.
4. Flip the record over.
5. Repeat steps 1-3 to record the music on the other side of the record.
6. After recording the second side of the record, in Plus! Analog Recorder, click **Next**.

**To enter track information**

1. On the **Review and name your tracks** page, click the first recorded track named Track 1.
2. To preview the recorded track, click the **Preview** button.
3. Do the following:
   - In the **Name** box, type the name of the track.
   - In the **Artist** box, type the name of the artist.
   - In the **Album** box, type the album name.
   - In the **Genre** box, type the appropriate genre (for example, **Rock** or **Jazz**).
4. For the other recorded tracks, type the name for each individual track. The information in the Artist, Album, and Genre boxes stays the same.
5. If necessary, do one or more of the following, and then click **Next**.
   - If there is a short recorded track that does not contain music, click **Delete** to delete the empty track (the short tracks are usually just recorded noise).
   - If the number of recorded tracks differs from the number of tracks listed on the record, two tracks may have been recorded as one long track (possibly because there was only a short pause between tracks on the record). To correct this, click the **Preview** button, play the music until the end of the first track, and then click the **Split** button to split the track into two tracks.

**To clean the recorded tracks**

1. Select the **Reduce pops** and **Reduce hiss** check boxes.
   This turns on filters that can improve the sound of the recorded tracks by reducing unwanted noise. The filters are applied for all of the recorded tracks.
2. Click **Preview** to play the recorded track with the cleaning filters applied. If you like the results, click **Next**.

**To save the tracks to your computer**

The **Save music tracks to this location** area indicates where the recorded music will be saved. By default, the recorded music is saved in the My Music folder.
1. To change the save location, click \textbf{Change}, choose the appropriate folder location, and then click \textbf{OK}.

2. In the \textbf{Save settings} area, select or clear the \textbf{Protect content (use DRM)} check box. If you select this check box, you will not be able to share your tracks with friends.

3. On the \textbf{Save music at this quality} setting, drag the slider to the appropriate location.
   
   To save the music at a high-quality setting, drag the slider towards the right. However, note that as the quality setting increases, so does the file size of the saved Windows Media Audio (WMA) files.

4. To add the recorded music to a new or existing Windows Media Player playlist, click the \textbf{Add tracks to Windows Media Player playlist} drop-down box, and then click an existing playlist or click \textbf{New} to add the recorded tracks to a new playlist.

5. To save the tracks, click \textbf{Next}. The progress of saving the tracks as WMA files appears on the \textbf{Saving your tracks} page.

6. To close Plus! Analog Recorder, click \textbf{Finish}.

---

\textbf{Step 3: Playing the Recorded Music in Windows Media Player 10}

After you have recorded the music from a record to your computer, you can then play the music on your computer.

\textbf{To play the recorded music}


2. Click \textbf{Library}, and then do one of the following:
   
   - To play the recorded music by selecting the album title, expand \textbf{All Music}, click \textbf{Album}, and then double-click the album name for the record you recorded.
   
   - If you added the saved WMA files to a new playlist, expand \textbf{My Playlists}, and then double-click the playlist that includes the recorded tracks.
Storing your entire digital media collection in Windows Media Player 11 has many great benefits, but what about options for enjoying your digital media library away from your computer? New devices like the iriver clix and the Creative Zen Vision:M offer a great experience when teamed with Windows Media Player 11, helping you stay connected with your music, video, and pictures no matter where you are. Check out more great devices.

- Simplified device setup
- New sync features
- Going mobile
- Share it
- Creating custom CDs
Simplified device setup

Syncing portable devices with Windows Media Player 11 is as simple as 1-2-3. Windows Media Player 11 now features a smart, easy-to-use wizard that guides you through device sync after connecting a device for the first time. You can simply connect one of the more than 100 Windows Media-enabled devices and Windows Media Player 11 will automatically recognize it and allow you to customize the name of the device. The Player then defaults to the Sync tab with an icon of your device, enabling quick and easy syncing of content. You can either choose to drag content to the Sync list or set up a permanent sync relationship using Auto Sync.

With Auto Sync, content syncing is automated in the background once the device is connected, ensuring that you always have the latest content on your device. Learn more about syncing.

New sync features

Cool new portable device features were added to Windows Media Player 11. The Sync tab includes several new enhancements that simplify the portable device experience, including a new device capacity meter and the ability to explore the contents of your device using the same Instant Search and visual navigation that you find in the Library view.
Browse from device

A device icon in the left navigation pane appears when a device is connected and allows browsing of all device content using the Library pane. Just like navigating content in the local library, you can browse device content using album art views, scrolling and Instant Search.

Shuffle Sync

With just one click, the new Shuffle Sync feature can calculate your device capacity and fill the device with a random sampling that is weighted toward the highest-rated content in your library.

Reverse Sync

The new Reverse Sync feature allows you to transfer digital media captured on your device back to your PC. Content, such as a photo captured on a phone or camera or music purchased over the phone can easily be transferred from a device to the Player library.

Guest Sync

Do you find yourself juggling multiple Player libraries between your home and work computer? The Guest Sync feature offers a great solution for keeping your device current with selections from multiple PCs.

Sync Gauge

A gauge appears in the Sync pane next to content when device syncing begins, providing a visual estimate of how much room is available on the device. Content download status is also shown in the bottom-left corner.

Help icons and troubleshooting

Windows Media Player 11 provides a much more transparent sync and management experience with protected content.

New help icons attach visual alerts next to content when a known issue with protected content is about to take place. These alerts appear before syncing and burning of protected content, which pre-empts sync and burn errors. Each icon is interactive, providing clear solutions, with links to available online sources to correct incompatibility or rights issues.
Going mobile

But portable audio devices aren't the only options for enjoying music, video, and pictures on the go. As flash storage capacity increases, the mobile phone has grown in importance as a portable media device. With Windows Media Player 11, you also receive a great sync experience with a host of mobile phones, including Windows Mobile-powered devices and other Windows Media-enabled phones, such as the Nokia N91, a mobile jukebox phone with room for thousands of songs (with 4 gigabytes of storage).

Share it

The new Media Sharing feature of Windows Media Player 11 lets you enjoy the contents of your Windows Media Player library from anywhere in your home. If you have a home network (wired or wireless), you can use Windows Media Player 11 to stream the contents of your library to networked devices. For example, if you have an Xbox 360 or other digital media receiver (DMR), you can use Windows Media Player to stream music and pictures from your computer to that device. This even works with music that you've downloaded from online music stores and services. For more information, see Digital Media at Home.

Creating custom CDs

Burning custom CDs is one of the benefits of having a large digital music library. The Burn tab in
Windows Media Player 11 has been enhanced to make this experience even better.

When you insert a blank CD into your PC, a capacity meter will appear in the Burn list, the same gas gauge as is used for device sync. As you drag and drop items into the Burn list, the meter will adjust accordingly. This helps you to better manage the work of getting the most music into your custom mix.

Gas gauge

When burning a CD, a gas gauge icon, similar to the one that appears when you sync a device, provides a visual estimate of the remaining space on a CD.

Disc spanning feature

If you want to burn a larger amount of items than will fit on one disc, the new disc-spanning feature in Windows Media Player 11 queues up the next disc when you reach maximum capacity on the first disc. This provides an intuitive way to burn multiple custom CDs on the fly while providing the opportunity for last-minute reordering of content. After the first disc is finished burning, your disc drive opens and you are prompted to insert the next disc.

Burning data CDs

Switching from burning Redbook audio CDs to data CDs provides an easy way to back up your entire music collection. Simply click the arrow on the Burn tab and click Audio CD or Data CD.
Stream Music from Your Computer to Xbox 360

This Windows Media Workshop explains how to use Windows Media Player 11 media sharing to stream music over your home network to your Xbox 360 video game and entertainment system.

What You’’ll Need

To complete this workshop, you will need the following software and hardware.

**Software:**
- Windows XP Service Pack 2
- Windows Media Player 11 for Windows XP

**Hardware:**
- Xbox 360
- TV
Step 1: Connect Xbox 360 to Wireless Home Network

The first step to streaming music from your computer to your Xbox 360 is to make sure that your Xbox 360 is connected to your home network. (This article assumes that you have a wireless home network.) For general information about connecting your Xbox 360 to a home network, see the Introduction to Home Networking article on the Xbox 360 Web site.

To connect your Xbox 360 to your home network

1. Turn on your console and any wireless networking devices (such as a router or access point).
2. Plug the Xbox 360 wireless adapter into the USB port on the Xbox 360 game console.
   Your Xbox 360 should use the same router that your computer uses to connect to your home network and the Internet.
3. On the Xbox 360 dashboard, select the System blade.
4. Select Network Settings, select Edit Settings, and then select the section that begins with Wireless Mode.
5. Select your wireless network, and then enter your network password (if necessary), and then select Done.
   Your Xbox 360 console should be connected to your wireless home network.
For detailed information about setting up your Xbox 360 on your wireless home network, see the Xbox 360 Wireless Networking Adapter article on the Xbox 360 Web site.

**Step 2: Set Up Media Sharing in Windows Media Player 11**

After you download and install Windows Media Player 11 for Windows XP, you need to set up media sharing so that you can share music and other digital media with your Xbox 360. The following steps describe how to set up media sharing in Windows Media Player 11.

**To set up media sharing in Windows Media Player 11**

1. In Windows Media Player 11, click the arrow below the Library tab, and then click Media Sharing.

2. In the Media Sharing dialog box, select the Share my media check box, and then click OK.

3. In the list below the Share my media to check box, click your Xbox 360, click Allow, and then click OK.

   It might take a little bit of time for your Xbox 360 to appear in the list of devices. The following figure shows an Xbox 360 as a device that is allowed to receive shared music.
Step 3: Play Shared Music on Xbox 360

After you have set up media sharing in Windows Media Player 11 and allowed Xbox 360 to receive and play shared content, you can now stream music from your computer and play it on your Xbox 360.

To play music streamed from your computer on Xbox 360

1. Using your Xbox 360 controller, select the media blade.
2. Select music.
3. Select Computer.
4. On the Windows-based PC screen, select Yes, Continue.
   After a few moments, your computer with the shared media name should appear.
5. Under Select your computer, select your computer and the shared media name.
6. Find the music that you want to play, and then select Play.
   The music streams from your computer to your Xbox 360.
Streyma gögnum frá Windows Home Server yfir til Playstation 3

Það geta verið smávægilegir örðuleikar að streyma gögnum yfir og í gegnum Playstation3 leikjatölvu í gegnum Windows media Connet búnaðarins í Windows Home servernum. Þegar þú tengir Playstation 3 vélina þína við Home serverinn þá er komið samband þarna á milli og Windows Home serverinn sér leikjatölvuna þína strax, en þegar þú reynir að skoða samnýtt efni “shared content” sem er vistað inn á WHS þá getur þú fengið DLNA villu.

Það eru margar uppástungur inn á netinu, hvernig hægt er að komast framhjá þessu vandamáli en hérna kemur góð aðferð til að stilla inn Playstation 3 leikjatölvú við WHS og komast framhjá þessum leiðinlegu DLNA villum.

Configure Windows Media Connect


2. Veljið að fara inn í moppuna: C:\Program Files\Media Connect
3. Tvílikkið á músina á forritið WMCCFG.exe sem keyrir upp Windows Media Connect tengi og uppsetningar forritið.
4. Í Windows Media Connect skjáglugganum, veljið “shared folders” og verið viss um að þarna séu samnýttar möppur sem þið viljið að PS2 sjái.

Stream Music from Your Computer to a Digital Media Receiver

October 2006

This Windows Media Workshop explains how to use Windows Media Player 11 media sharing to stream music over your home network to a digital media receiver. This workshop shows how to set up and configure the Roku SoundBridge Radio R1000.

What You’ll Need

To complete this workshop, you will need the following software and hardware.

**Software:**
- Windows XP Service Pack 2
- Windows Media Player 11 for Windows XP

**Hardware:**
- Router
Digital media receiver, such as the Roku SoundBridge Radio.

**Step 1: Set Up Your Digital Media Receiver**

You need to make sure the device can connect to your home wireless network. Depending on the security settings you have enabled on your wireless network, you may first need to add the device to your network by using the software that came with your base station (also known as a router or gateway). Then, enter the appropriate password information on the Roku SoundBridge Radio.

**Note** This section assumes that you have security features turned on for your wireless network.

**To power on the Roku SoundBridge Radio**

1. Plug the AC power connector into the AC power jack on the SoundBridge Radio.
2. Plug the power supply adapter into an AC power outlet.

**To enter password information**

1. If necessary, on your computer, start the software program that came with your base station and provide the necessary information and permissions for the SoundBridge Radio to connect to your wireless network. The software you use and the steps you take depend on the specific base station you are using.

For complete information about entering wireless settings on common base stations, see the [Roku Web site](http://www.roku.com).
2. On the SoundBridge remote control, press the **Home** button.

3. Scroll down the menu using the SoundBridge remote control, select **System Configuration**, and then press the **Select** button.

4. Highlight **Select Wi-Fi SSID and Password**, and then press the **Select** button.

5. Do one of the following:
   - If your wireless network name appears in the list of available networks, using the SoundBridge remote control, highlight your wireless network name, press the **Select** button, and then go to the next step.
   - If your wireless network name does not appear in the list of available networks, using the SoundBridge remote control, scroll down and highlight **Specify a wireless network**, and then press **Select**. Using the SoundBridge remote control, enter the name of your wireless network (the name of your network is known as a service set identifier or SSID).

6. If your wireless network requires a password, at the prompt **Does this wireless network require a password**, select **Yes**.

7. Read the information on the SoundBridge display that describes the two password formats, ASCII or HEX. Scroll down to the end, and then select **OK**.

8. At the prompt **Is your password in HEX or ASCII format?** select the appropriate format, and then press **Select** on the remote control.

9. Enter your password by using the **Left**, **Right**, and **Select** buttons on the SoundBridge remote control. After entering your password, press the **DOWN ARROW** on the remote control, select **OK**, and then press the **Select** button.

10. To connect to your network, at the prompt **Hit SELECT to connect to “NameOfNetwork”**, press **Select**.

11. Verify that the Roku SoundBridge Radio is connected to your home network (see the following procedure).

**To verify that the Roku SoundBridge is connected to your network**

1. On the SoundBridge remote control, press the **Home** button.

2. Scroll down the menu, select **System Configuration**, and then press the **Select** button.

3. Scroll down, select **Show Wi-Fi Status**, and then press **Select**.

4. Scroll down the screen and verify that the Roku SoundBridge Radio is connected to your home wireless network, and then press the **Home** button on the remote control to go back to the main menu.

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Step 2: Set Up Media Sharing in Windows Media Player 11

After you download and install Windows Media Player 11 for Windows XP and connect your digital media receiver (DMR) to your network, you need to set up media sharing so that you can share music and other digital media with your DMR. The following steps describe how
To set up media sharing in Windows Media Player 11

1. In Windows Media Player 11, click the arrow below the Library tab, and then click Media Sharing.

2. In the Media Sharing dialog box, select the Share my media check box, and then click OK.

3. In the list below the Share my media to check box, click your SoundBridge Radio, click Allow, and then click OK.

It might take a little bit of time for your DMR to appear in the list of devices.

The following figure shows a DMR as a device that is allowed to receive shared music.
Step 3: Play Music on a Digital Media Receiver

After installing and configuring your digital media receiver and Windows Media Player 11, you are now ready to play music wirelessly. How you play music depends on the specific device you own. Many digital media receivers let you browse your music library by song, artist, or album. The following steps describe how to play music using the Roku SoundBridge Radio.

To play music using the SoundBridge

1. Using the SoundBridge remote control, select **Play:**
   - **ComputerName:****LibraryName**.
2. Press the DOWN ARROW, select **Browse**, and then press **Select**.
3. Use the SoundBridge remote control to browse by artist name, album, song, genre, composers, or server containers, and then press **Select**.
4. Select the music you want to play, and then press the **Select** button. Enjoy the music!