

Improving Your Network Performance

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Quick Tips

Introduction

The high quality TV video sent between a Media Center PC and a Media Center Extender requires significantly more performance from home networks than is typically used for browsing the web, checking email, or for other network related productivity tasks. Many problems with network performance can go unnoticed with these types of activities since the network is not in constant heavy use. With high quality TV video, even very minor problems can affect the quality such that there is a noticeable interruption in the experience. The convenience and flexibility of wireless networks makes them an attractive option for many people but the downside is that their performance is much more difficult to optimize. Even once wireless networks are working well they are susceptible to occasional interference which can cause temporary reliability problems.

Many seemingly trivial factors can have substantial effects on home networks. The Media Center Extender Network Performance Tuner utility and this companion troubleshooting guide exist to help provide a way to better understand how a home network is performing, and what kinds of things can be done to improve the Media Center Extender experience.

Printing this guide is recommended so that it is more easily available during troubleshooting.

Basic Troubleshooting

Reducing Obstructions in the Wireless Path

Imagine a straight line between your two wireless components, every object that exists between them will likely degrade your wireless performance. If you've hidden your wireless access point or router behind a potted plant so that it will look nicer, that's going to affect on performance. If the antenna on your Media Center Extender is placed in the back of a crowded A/V rack, and the access point it communicates with is located somewhere in house that caused the signal to go through the other A/V components, that's going to drastically affect performance.

Think if there are relatively small and easy changes you can make to the position of your wireless components or other household items which will minimize the number of obstructions the wireless signal must travel through. Metal obstructions including mirrors are particularly important to remove from the path if possible. Use the Automatic Test or the Bandwidth Monitor to see the effects of changes.

Changing Location or Orientation of Wireless Components

Even with no change to the number of obstructions in the wireless path, seemingly insignificant changes to wireless networking components can cause meaningful changes to the performance.

Try moving your components to higher or lower elevations if possible, also try rotating them 45 or 90 degrees from how they normally sit. For example, if your wireless access point or router is on the first floor of your house and your Media Center Extender is on the second floor, try putting the wireless access point or router up on a shelf. Use the Automatic Test or the Bandwidth Monitor to see the effects of changes.

Modifying Antenna Positioning

The small antennas used in wireless networking devices are extremely sensitive to relatively minor changes in orientation and position. A good analogy to consider is "rabbit ears" antennas which were once widely used for TV reception, an inch one way or the other and TV reception could suffer significantly but there might be one small spot where reception came in fairly good, the same is true for wireless networking antennas.

Sometimes performance works best when the antennas at both components of the wireless network are pointing vertically straight up. In other cases positioning the antennas on all devices at a 45-degree angle yields the best results. Performance usually degrades significantly if the antennas are positioned vertically on one device (i.e. your home networking access point/router) and horizontally on the other device (i.e. the Media Center Extender). Try different antenna positions while the Bandwidth Monitor is running to see how it affects your network performance.

NOTE: Some wireless networking components have fixed internal antennas instead of external antennas; in these cases it may look as if the device doesn't have an antenna at all. For devices with internal antennas you can rotate the device to change the antenna reception.

Fully Wired Networks

If you have a completely wired Ethernet network connecting from your Media Center PC to your Media Center Extender, double-check that all networking components support 100 Mbps. Older 10 Mbps Ethernet networking “hubs” are not supported and will cause network bandwidth problems.

Advanced Troubleshooting

Elements That May Cause Wireless Network Interference

802.11g wireless networks share their airspace with a number of other devices and technologies which may influence overall performance. The following are things to consider which might affect your wireless network if they are in your house or nearby:

- Microwave oven use
- 2.4 GHz cordless phones
- 2.4 GHz baby monitors
- 2.4 GHz analog wireless video senders
- Neighboring wireless networks

Solving these types interference problems can be challenging. If a significant interruption occurs for a short period of time someone may be using a microwave oven nearby. Consider replacing your 2.4 GHz cordless phones or baby monitors with 900 MHz models if that's feasible. See “Changing Wireless Networking Channels” below for

options for options on how to assign your wireless network to a different channel which may have less interference from neighbors.

Changing Wireless Networking Channels

Within a wireless networking standard such as 802.11g, individual channels exist which allow for multiple wireless devices to use different portions of the available bandwidth (for example in 802.11g there are channels 1 through 11). Many wireless access points and routers are pre-configured to use a specific channel and if your neighbor has a wireless network many times you are both using the same channel. This can cause both of your wireless networks to slow down since they have to deal with traffic that doesn't belong to them, changing to a different channel may improve your performance.

For 802.11g even though there are 11 available channels, there are actually only 3 that do not overlap. You don't need to test all the channels, checking 1, 6, and 11 should be sufficient to see if you can improve performance with this technique. To change your wireless networking channel you need to use the web page administration utility of your access point or router. See your wireless access point or router instruction manual for more details on advanced configuration of your wireless network.

Network Topology Changes

One of the difficult modifications to make to your home network is also the thing which could have the most significant impact on overall performance, network topology changes. You may for example have a Media Center PC in your living room, a productivity PC in an office or den, and want to put a Media Center Extender in your master bedroom. If your DSL internet access is coming into your house at your office or den, then you may want to have both the Media Center PC and the Media Center Extender connected wirelessly. This type of configuration is not supported because video must travel over wireless twice, and may result in seemingly unsolvable network performance problems.

Consider more complex modifications to your home network such as changing the point of entry of internet into your house. If you have a phone jack near the Media Center PC in the living room, perhaps the DSL modem and your router can move there and the office PC can connect wirelessly. This configuration change allows the Media Center PC to connect to the router with wired Ethernet and places significantly less stress on the network for TV playback.

Another option to consider is moving your wireless access point or router to a different room in the house that reduces the overall wireless distances or obstructions. Perhaps it's reasonably easy to run a longer Ethernet wire between your Media Center PC and the access point but still get it into another room.

Record TV Shows at Lower Quality Levels

If you're unable to solve your network performance problems, one option to consider is setting Media Center to record TV shows at a lower quality level. Each of Media Center's recording levels uses less storage, but also requires less network bandwidth to watch on your Media Center Extender. Try successively lower quality levels until you get more reliable recorded TV playback on your Media Center Extender.

NOTE: Recording shows at lower quality levels will not affect the playback of Live TV on your Media Center Extender. Live TV is always sent from the Media Center PC to the Extender at the best quality level.

Using the Network Performance Tuner

Media Center Extender Wireless Network Requirements

Streaming high quality video over a wireless network is a demanding task for currently available wireless networking products, as a result there more restrictive requirements for wireless use of Media Center Extenders than for general use. If the Network Performance Tuner indicates that you may have potential problems, first check to make sure that your wireless network meets the following requirements:

- For the best Media Center Extender experience, use a fully wired 100 Mbps Ethernet network between all components. If wireless is required, use 802.11a if possible.
- Imagine a straight line between your two wireless components; in most cases this line can pierce a maximum of 2 walls or floors. In a clear "line-of-sight" path with no obstructions the maximum range is likely around 50ft (significantly reduced with walls, floors, or other obstructions).
- 802.11b wireless networks are not supported due to inadequate bandwidth.
- 802.11g wireless networks are supported, but not if you're also connecting other 802.11b devices to the same network (this slows the 802.11g network down for 802.11b compatibility).
- The Media Center PC or the Media Center Extender can be connected wirelessly but not both, regardless of whether you're using 802.11a or 802.11g.
- "Ad-hoc" wireless networks are not supported even on 802.11a or 802.11g, your

network must be in “Infrastructure” mode.

- If your Media Center PC is connected to the wireless network, it must be connected with an internal wireless networking PCI card or with an Ethernet wireless adapter (bridge). USB wireless adapters are not supported.

Accessing the Network Performance Tuner

When a Media Center Extender is initially set up with your Media Center PC the Network Bandwidth Monitor is launched in “Automatic Test” mode after setup is complete to ensure that the current network configuration is capable of delivering a quality TV video experience.

The Network Performance Tuner is also accessible at any time from the Windows Start menu under “All Programsà Accessoriesà Media Center”.

Getting Started

In order to use the Network Performance Tuner ensure your Media Center Extender is setup successfully and when turned on it shows the Media Center “Start” main menu. To accurately understand the performance of your network make sure no media playback is occurring on the Media Center Extender while the Network Performance Tuner is in use (Live TV, Recorded TV, Music, My Videos, or Radio). For best results, turn off your Media Center Extender then turn it back on again before use so that all Media Center Extender resources are cleaned up.

The Network Performance Monitor

The Network Performance Monitor is an advanced utility which measures the overall bandwidth between a Media Center PC and a Media Center Extender in the same way as the Automatic Test. The difference is that the Network Performance Monitor runs indefinitely continually showing the results of the testing on a graph displayed on the screen. The purpose of this utility is that it allows you to make changes to your network configuration, such as changing the location of your access point or modifying the position of antennas, while you can see the results of those changes in real-time.

When using the Network Performance Monitor the objective is to make adjustments to your network configuration until you can keep the green graph line consistently above the solid yellow line in the middle of the screen. The higher above the yellow line you can get your network performance the less likely you are to have problems watching TV on your Media Center Extender. See the troubleshooting sections below for more detailed suggestions for how to improve your network performance.

Testing Your Network with the Automatic Test

The Automatic Test within the Network Performance Tuner measures the available network bandwidth between your Media Center PC and your Media Center Extender for a short period of time. The test checks to see if video transmitted over your home network would have any quality problems which would be noticeable when watching live or recorded TV. When the test completes it indicates if there are any potential problems or if the network performance looks acceptable for TV usage.

NOTE: Successful completion of the Automatic Test is not a guarantee against future performance problems. The Automatic test is only run for a short time and wireless networks are susceptible to occasional interference from a variety of sources including 2.4 GHz cordless phones, microwave ovens, nearby wireless networks, as well as other seemingly random influences.

Problems Using the Network Performance Tuner

If you run into problems using the Network Performance Tuner please check the following:

- Your Media Center Extender has been successfully set up on your Media Center PC
- The Media Center Extender is turned on and showing the Media Center “Start” menu
- No media playback is occurring on the Media Center Extender (Live TV, Recorded TV, Music, My Videos, or Radio)
- No one else in your house is using the Media Center Extender while the Network Performance Tuner is in use
- Your home network is not in use with significant network traffic from other computers or devices
- If all else fails, reboot your Media Center PC then disconnect/reconnect the Media Center Extender from its power source.

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