Multicasting sends a single copy of the Advanced Streaming Format (ASF) stream to those network clients that choose to view it. Multiple copies of data are not sent across the network, nor is data sent to clients that do not want it. Multicasting allows multimedia applications to be deployed on the network while minimizing their demand for bandwidth. In contrast, unicasting sends a separate stream to each client that requests it. Multicasting saves bandwidth because only one stream is sent across the network, and it is shared by only those clients that choose to view the stream.

Codecs are compression/decompression algorithms that are used to make audio and video files a more manageable size. Windows Media Encoder applies a codec to audio and video content to compress it. This makes the file easily transferable over a network. Microsoft Windows Media Player uses the codec to decompress the content, and present it to the user. Codecs are created by many different companies to meet a variety of customer needs. You also can add other codecs to Windows Media Encoder.

I-frames are independent video frames that contain all of the content from the frame. In contrast, P-frames (delta frames) contain only data about what has changed in the video frame since the previous frame was transmitted.

The base Uniform Resource Locator (URL) is the point or directory that all relative paths use as their starting point. To set the base URL, either set the **BaseURL** property in Microsoft Windows Media Player (for instructions on how to do this, see *Microsoft Windows Media Player Software Development Kit*), or set **BaseURL** in the .asx file that launches the .asf file or Advanced Streaming Format (ASF)   stream. If you do not set this property in either location, and the Windows Media Player client does not find this information there, then Windows Media Player uses the path from the current **FileName** property. It does this by truncating the final portion of the **FileName** property, which is either an .asf or .asx file name extension.

Quarter Common Interface Format displays images at a resolution of 176 by 144 pixels, and often is used for low-bandwidth video applications.

Common Interface Format displays images at a resolution of 352 by 288 pixels; however, it requires higher bandwidth for transmission.

An I-frame is a single video frame that contains all the information necessary to display an image in that frame.

Media Stream Broadcast Distribution (MSBD) is the Microsoft transport protocol for streaming media.

Hypertext Transfer Protocol is the set of rules for exchanging files (text, graphic images, audio, video, and other multimedia files) on the World Wide Web.

An .nsc file is a file that describes a Windows Media Services station to Windows Media Player. Windows Media Player accesses the station file indirectly by way of an .asx file that directs the client to a specific .nsc file.

Advanced Streaming Format (ASF) is a data format for streaming audio and video content, images, and script commands in packets over a network. ASF content can be an .asf file or a live stream generated by Windows Media Encoder. ASF content that is in the process of being delivered over a network is called an ASF stream.

ASF Stream Descriptor (.asd) files are configuration files created and read by Windows Media Encoder. The file contains Encoder settings that describe the characteristics of a multimedia stream. The file also is read by Windows Media Station service to define the stream format supported by a given station.

ASF Stream Redirector (.asx) files are metafiles in ASCII format that use Extensible Markup Language (XML) and that load quickly on a client. An .asx file contains information for purposes such as the following:

- Transferring control from the browser to the Windows Media Player control so that streams can be directed to Windows Media Player.

- Representing an announcement of information necessary to access a program on a station.

- Providing references to multiple pieces of content and rules for the protocol rollover that the client uses to process the content pieces.

- Providing a playlist that defines the order in which pieces of content are streamed to Windows Media Player.

Template stream formats (TSFs) are a predefined group of settings that match content type and bit rate with appropriate audio and video codecs. Windows Media Encoder uses this feature to assist the user in quickly configuring the encoder to create ASF content.

Multiple bit rate video

Multiple bit rate video creates multiple content streams within one encoded ASF stream or file. The streams are encoded at different target bandwidths to allow a player to render content when network bandwidth is reduced. Multiple bit rate video also encodes an additional band that is calculated at 20%-33% below the lowest band selected in your configuration. This provides scalability to users who connect at the lower network bandwidth.
Note: Using multiple bit rate video when encoding content requires an encoding platform that has at least a Pentium II processor running at 266 megahertz (MHz).   Multiple bit rate video content can only be decoded accurately by Microsoft Windows Media Player and Windows Media Services.

ASF Statistics

This tab provides statistics about the content stream being encoded. An <u>ASF</u> content stream has the following components: audio stream, video stream, and script command stream. If <u>multiple bit rate video</u> is used, select the video stream for which you want to view statistics.

ASF Panel

This panel presents information about the ASF stream being encoded by Windows Media Encoder.

Data Sent (ASF)

This statistic shows how much ASF content Windows Media Encoder has sent out since it was started. **Data Sent** is measured in kilobytes (KB) until Windows Media Encoder has sent out more than 1 megabyte (MB) of ASF information. After that, **Data Sent** is measured in MBs. The **Data Sent** number changes only when an additional MB of information is sent; depending on the amount of bandwidth that the encoder is streaming, the **Data Sent** number can stay the same for a while (especially if you are delivering data using a bandwidth of 28.8 kilobytes per second [Kbps]).

Padding

This statistic shows how much of the encoded data packet was padded. Padding is extra data added to packets to make each the same size. If you are using script commands, they take up a portion of the bandwidth. **Padding** is added when the **Script Commands** option is selected, but no script commands currently are being sent. Also, if the compressed video does not fill up the entire bandwidth, any remaining space in the network bandwidth is filled with padding.

Bit Rate (ASF)

This statistic represents the actual amount of the network bandwidth that is being used to deliver the ASF stream.

Audio Panel

This panel contains statistics about the audio portion of the ASF stream.

Data Sent (Audio)

This statistic shows how much audio information has been sent out since the encoder was started.

Bit Rate (Audio)

This statistic represents the actual amount of the network bandwidth that is being used to deliver the audio portion of the ASF stream.

Script Commands   Panel

This panel provides information about script commands included in the <u>ASF</u> stream.

Data Sent

This statistic shows how much script command information has been sent as part of the ASF stream.

Commands

This number represents the number of script commands sent during the encoding session.

Video Panel

This panel provides statistics about the video content stream.

Video Stream setting

This drop-down box allows you to choose which video stream statistics you want to view.

Data Sent (Video)

This statistic shows how much video information has been sent as part of the ASF stream.

Data Loss

This statistic provides the number of video frames lost, the size of this information loss, and the total percentage of data lost during transmission of the ASF stream.

Frames Lost.

This statistic shows how many video frames were lost during transmission of the ASF stream.

Frames Statistics

This column shows the comparative *frame rate* of the encoded video. Frame rate is one of the indicators of quality video content. If the current frame rate is considerably lower than expected, your video content appears choppy. If the current frame rate is below average, then the current encoded content sometimes is changing at too fast a rate for the encoder to capture. If all statistics are within a reasonable range of difference, the content is being encoded correctly.

Bitrate Statistics

This column shows the comparative bit rates of the encoded video. Comparing this information between encoding sessions can help you choose the best codecs for your content, and also can alert you to possible problems in your content stream.

Current Value

The statistics in this row reflect the current output of the encoder.

Average Value

The statistics in this row reflect the output of the encoder averaged across the time since the encoding process was started.

Expected Value

The values in this row are the established benchmarks for the codec configuration you are using.

Max Value

This statistic shows the largest amount of video information included in the ASF stream.

Min Value

This statistic shows the smallest amount of video information included in the <u>ASF</u> stream.

Connections Tab

The **Connections** tab lists the IP addresses of the computers that are connected to Windows Media Encoder.

Current Connections

This panel shows the IP addresses and connection protocol of clients that are connected to Windows Media Encoder.

IP Address

This is the IP address of the client that is connected to Windows Media Encoder. Windows Media Encoder can support up to 15 concurrent connections.

Connection Protocol

This is the protocol   the client used to connect with Windows Media Encoder.   Windows Media Encoder supports two protocols:
MSBD and HTTP.

To configure and start Windows Media Encoder using QuickStart

1. In the Welcome window, select **QuickStart**.

2. Select the **template stream format** for this session.

3. To begin encoding the <u>ASF</u> stream, on the **Encode** menu, click **Start**.

Windows Media Encoder takes a few seconds to begin encoding the source information. The **Summary Statistics** panel displays how long the encoder has been encoding information and the amount of data sent.

To configure and start Windows Media Encoder using a template

1. In the Welcome window, select **Template with Input/Output Options,** and click **OK**.

2. In the **Compression and Formats** screen choose a template stream format for this session.   Select the **Show multiple bit rate video templates**   checkbox if you want to see only multiple bit rate video templates.

3. In the **Input Settings, Input Source** screen, select either **Live Source** or **AVI/WAV/MP3 File**.

   If you select **Live Source**, the capture devices are determined automatically by your preferred devices. To use different capture devices, click **Custom**.

   If you select **AVI/WAV/MP3 File**, you automatically indicate you are going to output an .asf file. To indicate you want to deliver the content to a Windows Media server for immediate streaming, select **Audio only**; video content cannot be transcoded directly to a content stream.

4. In the **Output Settings, Output Options** screen, select where the ASF stream is to be sent. The ASF stream can be delivered to a Windows Media server for multicasting, can be written to disk as an .asf file for unicasting, or both. After selecting the output destination for the ASF stream. (If you select both, you must complete the next two steps.)

5. If you output to a Windows Media server, in the **Output Settings, Transmission** screen, select the method that Windows Media Encoder uses to transmit the ASF stream to the Windows Media server. Either use a fixed IP port, or initiate the connection to the Windows Media Station service through DCOM. If you choose the fixed port method, you also can select an HTTP port. If you choose to initiate the connection to the Windows Media Station service, specify the name of the server you want to connect to in the **Station Manager** box, and name the ASF stream coming from the encoder in the **Stream alias** box.

6. If you output to a local ASF file, enter a file name for the output file in the **Output settings, Output File** screen. You also can limit the ASF file by file size and encoding duration. By selecting the **Automatic Indexing** check box, you can index your ASF file so that users can fast-forward and rewind while viewing the file.

7. Click **Finish**. The Windows Media Encoder Start window appears. On the **Encode** menu, click **Start**. Windows Media Encoder starts encoding the ASF stream.

8. On the **File** menu, click **Save** or **Save as**, and type in a file name to save the configuration to an .asd file.

Windows Media Encoder takes a few seconds to begin encoding the source information. The **Summary Statistics** panel displays how long the encoder has been encoding information and the amount of data sent.

To configure Windows Media Encoder using custom settings

1. In the Welcome window, select **Custom**.

2. In the **Input Settings, Input Source** screen, select either **Live Source** or **AVI/WAV/MP3 File**.

   If you select **Live Source**, the **Input Settings, Capture Source & Media Types** screen appears. The capture devices are determined automatically by your preferred devices. To use different capture devices, click **Custom**, and click the device in the list. Select the **Script Commands** check box if you want to include script commands in your <u>ASF</u> stream.

   If you select **AVI/WAV/MP3 File**, the **Input Settings, Source File** screen appears. Under **File name**, type the name of your source file, or click **Browse** to locate it on your computer. Leave this box blank to create a generic configuration for use with many different input files. To transmit the .asf file directly to a Windows Media server for streaming, select **Audio only**; video content cannot be streamed in real-time due to the transcoding that occurs when transforming the video from .avi to .asf format.

3. In the Configure Stream, Bandwidth Selection screen, select either **Use multiple bit rate video** or **Use single bit rate video**.

   If you select **Use multiple bit rate video** you can choose several network bandwidths to be used with your ASF stream.

   If you select **Use single bit rate video** you choose one network bandwidth to use with your ASF stream.

4. In the **Configure Stream, Compression & Formats** screen, for each type of content, choose the compression algorithm (or codec) that you want to use from the list. Most audio codecs have multiple formats. Choose the audio format you want from the list.

5. Under **Audio,** click **Advanced** to change **Audio Loss Concealment** settings. If you adjust **Audio Loss Concealment**, test your content stream afterward.

6. Under **Video**, click **Advanced** to specify high-level video.

7. In the **Output Settings, Output Options** screen, specify the destination of   the ASF stream. Click either:

   To Windows Media server(s) over a network. To deliver the ASF stream to a Windows Media server for unicasting or multicasting.
   To a local ASF file. To save the stream as an .asf file for on-demand unicasting.
   -or-
   To both.

8. If you output to a Windows Media server, from the **Output Settings, Transmission** screen, select the method that Windows Media Encoder uses to transmit the ASF stream to the Windows Media server. Use either a fixed IP port, or initiate the connection to the Windows Media server through distributed Component Object Model (DCOM). If you choose the fixed port method, you also can select an HTTP port. If you choose to initiate the connection to the Windows Media server, specify the name of the server to which you want to connect in the **Station Manager** box, and name the ASF stream coming from the encoder in the **stream alias** box.

9. If you output to a local ASF file, in the **Output Settings, Output File** screen specify a file name for the output file. You also can limit the ASF file by file size and encoding duration. By selecting the **Automatic Indexing** check box, you can index your ASF file so that users can fast-forward and rewind while viewing the file.

10. Click **Finish** to move to the Start window **.** On the **Encode** menu, click **Start**. Windows Media Encoder begins encoding the ASF stream.

11. On the **File** menu, click **Save** or **Save as**, and type in a file name to save the .asd file.

   Windows Media Encoder takes a few seconds to begin encoding the source information. The **Time** display under **Summary Statistics** begins first; this verifies that your content is encoding. After a three-second delay, the amount of data being sent begins to accrue.

To check your video setting

1. On the **File** menu, click **Open**. Click the .asd file that contains the video setting you want to check.

2. On the **Encode** menu, click **Video.**

3. Review the settings, make changes if necessary**.**

Note

- The video settings available are provided by your video capture card manufacturer. For more information on the settings, use the context-sensitive Help available in the **Video Settings** dialog box.

To change the capture devices during configuration

1. On the **File** menu, click **New.**

2. Choose either the **Template with I/O Options** or **Custom** configuration method in the Welcome window. The Windows Media Encoder configuration wizard starts.

3. Use the wizard to configure Windows Media Encoder, click **Next** until the **Input Settings, Capture Source** screen appears.

4. To change the audio capture device, under **Audio Capture**, click **Custom**.

5. In the list, click the device.

6. To change the video capture device, under **Video Capture** in the **Input Settings, Capture Source** screen, click **Custom**.

7. In the list, click the device. Then click **Next**, and finish configuring the encoder.

To change the capture devices from the property pages

1. On the **Encode** menu, select **Properties**.

2. Click the **Input** tab.

3. Under **Audio Capture**, click **Custom**.

4. In the list, click the device.

5. Under **Video Capture,** click **Custom**.

6. In the list, click the device**.**

To specify a permanent source file during configuration

1. Select either the **Template with I/O Options** or **Custom** configuration method in the Welcome window. The Windows Media Encoder configuration wizard starts.

2. Use the wizard to configure Windows Media Encoder, and click **Next** until the **Input Settings, Source File** screen appears.

3. In the **Input Settings, Source File** screen, in the **File name** box, enter the path to the .avi or .wav file that you want to use.
   - or -
   Click **Browse** to select the file.

4. Click **Next**, and finish creating the configuration.

5. On the **File** menu, click **Save** or **Save as**, and type in a file name to save the .asd file.

To specify a permanent source file after configuration

1. On the **Encode** menu, click **Properties**.

2. Click the **Input** tab.

3. Under **AVI/WAV/MP3 File**, type the name of the source file in the **File name** box
   - or -
   Click **Browse** to select the source file.

4. Click **OK** to accept the changes.

5. On the **File** menu, click **Save** or **Save as**, and type a file name to save the .asd file.

To specify the source file at encoding time

1. Choose either the **Template with I/O Options** or **Custom** configuration method in the Welcome window. The Windows Media Encoder configuration wizard starts.

2. Use the wizard to configure Windows Media Encoder, and click **Next** until the **Input Settings, Source File** screen appears.

3. In the **Input Settings, Source File** screen, do not enter information in the **File name** box.

4. Click **Next**, and finish creating the configuration.

5. Optionally, on the **File** menu, click **Save** or **Save as**, and type in a file name to save the .asd file.

6. Before you start the encoder, on the **File** menu, click **Input File**.
   The **Open** box appears.

7. Click an .avi, .wav, or .mp3 file, and then click **Open**.

8. On the **Encode** menu, click **Start** to begin encoding the ASF stream.

When you start Windows Media Encoder, it uses the selected file. If you save the .asd file after you have specified which stored file to use as input, that stored file is not associated with the .asd file. When you open the .asd file to encode an ASF stream, you must select an .avi, .wav, or .mp3 file, unless you edit the properties of the file.

To set the output properties of a configuration to send content to a Windows Media server

1. On the **Encode menu**, click **Properties**. The property pages appear.

2. Click the **Output** tab.

3. To enable the network options, click **To Windows Media server(s) over a network**, and then select the options for your network connections. There are two methods that can be used to connect with a Windows Media server.

   Select **Allow Remote server(s) to connect via a fixed port,** and choose the protocol to be used for the connection.
   A Windows Media server can connect with the encoder via the MSBD protocol. To do so, the encoder must be at an identifiable IP address and have a dedicated port out of which   the content can be streamed. MSBD is always available as a connection method. A Windows Media server also can connect with the encoder via HTTP. This is useful for streaming content over firewalls. If your encoder and server are separated by a firewall, HTTP is a good option. However, streaming data via HTTP has inherent limitations that result in poorer performance. HTTP streaming is not available if the encoder initiates the connection to the Windows Media server.
   To select an open port on your encoder, click **Query**.
   -or-

   Select **Initiate connection to a Windows Media Station Manager,** and set the alias and server information.
   In the **Station Manager** box, type the name of the Windows Media server that broadcasts the encoded ASF stream.
   In the **Stream Alias** box, type a unique name for the ASF stream.

4. To apply the settings and exit the property pages, click **OK**. The Start window appears.

5. To save your changes to the .asd file, on the **File** menu, click **Save.**

To set the output properties of a configuration to send content to a local ASF file

1. On the **Encode menu**, click **Properties**. The property pages appear.

2. Click the **Output** tab.

3. Click **To a local ASF file.**

4. Type the name of the .asf file in the box, or click **Browse** to select an existing .asf file. The .asf file name extension is added automatically.

5. Optionally, enter any combination of the following .asf file elements.

   Maximum Size. Enter a number that limits the size of the .asf file (in kilobytes) being encoded. When that limit is reached, the encoder stops. This is useful if you have limited storage space available for the .asf file.

   Maximum Duration. Enter a period of time (in minutes, hours, or days) that limits the encoding of the .asf file. When that limit is reached, the encoder stops. This is useful if a file must play for a specific amount of time. If you select both **Maximum Size** and **Maximum Duration**, the encoder stops when the first of these limits is reached.

   Automatic Indexing. Select this check box to turn **Automatic indexing** on or off. Indexing is turned on by default. Indexing the .asf file allows Windows Media Player to fast-forward or rewind the file during playback.

6. To apply the settings and close the property pages, click **OK**. The Start window appears.

7. To save your changes to the .asd file, on the **File** menu, click **Save**.

To set the output properties of a configuration to send content to both a Windows Media server and a local .asf file

1. On the **Encode menu**, select **Properties**. The property pages appear.

2. Click the **Output** tab.

3. Select both **To Windows Media server(s) over a network** and **To a local ASF file**.

4. Complete each section as described in their related procedures.

   To set the output properties of a configuration to send content to a Windows Media server
   To set the output properties of a configuration to send content to a local ASF file

5. To apply the settings and close the property pages, click **OK**. The Start window appears.

6. To save your changes to the .asd file, on the **File** menu, click **Save.**

To configure Windows Media Encoder to allow a Windows Media server to connect to the ASF stream via a fixed IP port

1. Choose either the **Template with I/O Options** or **Custom** configuration method in the Welcome window. The Windows Media Encoder configuration wizard starts.

2. Use the wizard to configure Windows Media Encoder; click **Next** until the **Output Settings, Transmissions** screen appears.

3. Click **Allow Remote server(s) to connect via a fixed port**.

4. In the **MSBD on port** box, type a port number, or click **Query** to have the encoder choose an IP port.

5. To enable an HTTP connection to Windows Media Encoder, select the **HTTP on port** check box, type a port number, or click **Query** to have the encoder choose an open port.

6. Click **Next**, and finish creating the configuration.

7. Optionally, to save the .asd file, on the **File** menu, click **Save** or **Save as** and type in a file name.

You have specified the IP port that the encoder uses to send the <u>ASF</u> stream; it is also the port that you must specify when identifying the ASF stream to a Windows Media server. If the Windows Media server is separated from Windows Media Encoder by a firewall, you can connect via HTTP on a fixed port. If you choose to use a port other than port 80 for the HHTP connection, you must open that port in the firewall. HTTP streaming has inherent limitations that   lower the quality of the content provided, and must be used with care.

To configure Windows Media Encoder to connect to a Windows Media server using a stream alias

1. Choose either the **Template with I/O Options** or **Custom** configuration method in the Welcome window. The Windows Media Encoder configuration wizard starts.

2. Use the wizard to configure Windows Media Encoder; click **Next** until the **Output Settings, Transmissions** screen appears.

3. Select **Initiate connection to a Windows Media Station Manager**.

4. In the **Station Manager** box, enter the name of the Windows Media server.

5. In the **Stream alias** box, enter a name for the ASF stream. This alias can be used by a Windows Media server or a Windows Media Player client to identify the ASF stream.

6. Click **Next**, and finish creating the configuration.

7. To save the .asd file, on the **File** menu, click **Save** or **Save as**, and type in a file name.

Note

- If you are running Windows Media Encoder on a Microsoft Windows 95-based computer, portions of Windows Media Encoder require DCOM95 to communicate with Windows Media component services. The encoder still functions without DCOM installed, but in some instances you need DCOM95 to use Windows Media Encoder with the Windows Media component services. To install DCOM95, see the Microsoft Web site (http://www.Microsoft.com/com/dcom95/dcom95.htm).

To verify that the video card is configured correctly

1. On the **Encode** menu, click **Video Capture Settings**.
   The **Video Capture Settings** dialog box appears.

2. Use the information displayed in the **Video Capture Settings** dialog box to make sure that the proper video card input has been selected. If you are unsure of the proper settings, see your video card documentation for instructions.

3. To verify that you are using the correct video card settings, start the encoder. On the **View** menu, click **Preview Video.** The video, as it will appear after encoding, appears.

To verify that the audio card is configured correctly

1. On the **View** menu, click **Volume Control**.
   The **Volume Control** dialog box appears.

2. In the **Volume Control** dialog box, on the **Options** menu, click **Properties**.

3. In the **Properties** dialog box, click the audio card you are using in the **Mixer device** list.

4. Under **Adjust volume for**, select **Recording** because Windows Media Encoder is using your audio card to *receive* the audio.

5. Under **Show the following volume controls**, make sure that you have selected the proper audio inputs. If you are not sure which to select, turn on all of them. The **Wave Input** mixer control dialog box appears.

6. Select the appropriate audio input.

7. To verify that the correct input is selected, start your audio source. The signal indicator in the **Wave Input** dialog box under **Wave Input** must light up. Close the **Wave Input** dialog box.

To start and stop encoding with Windows Media Encoder

1. On the **Encode** menu, click **Start.**
   Under **Summary Statistics**, the camera icon turns green, and its caption reads **On Air**. This signals that you are encoding an ASF stream.

2. To stop encoding the ASF stream, on the **Encode** menu, click **Stop**. The color of the camera icon changes to gray, and its caption reads **Off Air**.

To insert a script command into the ASF stream

1. In the **Script Commands** dialog box, type a command.
   Typing in the **Script Commands** dialog box activates the **Send** button.

2. To send the command, click **Send**.

3. The commands are placed into the ASF stream.

Note

- The Windows Media Encoder configuration must support script commands.   Several template stream formats support script commands as do custom configurations. If you want to use a configuration that does not support script commands, you can edit the properties of the configuration to enable them.

To edit a Windows Media Encoder configuration file

1. On the **Encode** menu, click **Properties.**

2. Click the tabs you want to edit. The tabs displayed differ depending on the configuration method used.

   - **Template tab.** Click this tab to select a different template stream format. (QuickStart or Template configurations only).
   - **Input tab.** Click this tab to change the audio and video content sources.
   - **Output tab.** Click this tab to change the output options for the ASF stream.
   - **Bandwidth tab.** Click this tab to change the target bandwidth(s) for the ASF stream. (Custom configurations only)
   - **Compression tab.** Click this tab to change the audio and video codecs used to compress the ASF stream. (Custom configurations only)

   Make the desired changes. You are returned to the Start window.

3. To save your changes to the configuration file, on the **File** menu, click **Save**.

To view Windows Media Encoder Statistics

1. On the **Encode** menu, click **Start**.

2. Once Windows Media Encoder begins to encode an <u>ASF</u> stream, on the **View** menu, click **Statistics**.

3. The **Windows Media Encoder Statistics** dialog box appears with the **ASF Statistics** tab selected.

To adjust the audio/video synchronization

Windows Media Encoder must be running and you must be able to view the ASF stream with a   Microsoft Windows Media Player client.

- On a Windows Media Encoder computer, press the plus key (+) to temporarily increase the speed of the audio, or press the minus key (-) to temporarily decrease the speed of the audio relative to the video. To adjust longer delays between the audio and video content, press the plus or minus key repeatedly until the timing is corrected.

Each time you press the plus or minus key, you increase or decrease the speed by 25 milliseconds.

To test Windows Media Encoder

1. In the Start window, note the information under **Connections**. It must contain the reference for the stream. Record the Media Stream Broadcast Distribution (MSBD) reference. For example, **MSBD://***encoder_name:7007*, **MSBD** is the transport protocol, *encoder_name* is the name of the encoding computer, and *7007* is the IP port to which the data is being streamed. Having this information allows another computer to access the data stream for the encoder. If **Connections** is dimmed, you are encoding the stream only to a local file. Change your <u>output properties</u> to encode   a stream directly to a Windows Media server.

2. On the **Encode** menu, click **Start**.

3. On another computer on the same network, start Microsoft Windows Media Player.

4. On the **File** menu in Windows Media Player, click **Open**.

5. In the **Open** dialog box, type the stream reference from Windows Media Encoder. For example, type:

    > **msbd://***encoder_name*

    This opens a TCP link between the Windows Media Player client and Windows Media Encoder. Windows Media Player buffers some information, and then begins rendering the <u>ASF</u> stream. If you do not use the default port on the encoder (port 7007), the port must be specified in the location name (for example, **msbd://***encoder_name:7009*).

6. If the stream can be viewed successfully from the encoder, then test the stream coming from the Windows Media server.

7. In the **Open** dialog box, type the stream reference of   the Windows Media server. For example, type:

    > **mms://**server_name/stream_alias

    This opens a TCP link between the Windows Media Player client and the Windows Media server. Windows Media Player buffers some information, and then begins rendering the ASF stream. If the stream cannot be viewed, verify that the stream reference is correct and then test the connectivity between the server and encoder.

8. Provided all streams are tested successfully, the content is ready to be published to your users.

Note

- Use the MSBD protocol only to test Windows Media Encoder. Windows Media Encoder supports a maximum of 15 concurrent MSBD connections.

To adjust the MaxBufferTime or DiscardPercentage values

1. On the Windows taskbar, click **Start**, and then click **Run**.

2. Type **Regedit**, and click **OK.** Registry Editor opens**.**

3. In Registry Editor, open \\HKeyLocalMachine\Software\Microsoft\NetShow\REX\Parameters.

4. In this directory key, add a DWORD value named **MaxBufferTime,** and set a value for this parameter.

5. In the same directory key, add another DWORD value named **DiscardPercentage,** and set a value for this parameter.

Note

- Incorrectly editing the registry may severely damage your system. Before making changes to the registry, you should back up any valued data on the computer.

Windows Media Encoder Overview

Windows Media Encoder encodes audio and video content into an <u>ASF</u> stream. The content can be from a live source or an existing .avi, .wav, or .mp3 file. The output from Windows Media Encoder is a stream of information that can be heard or viewed with Microsoft Windows Media Player, or sent to a Windows Media server for <u>multicasting</u>, unicasting, or storage. Because the process of encoding and compressing video and audio content requires a high percentage of the computer's processing capability, it is advised that you run Windows Media Encoder on a separate computer from the one that is running the Windows Media server components.

Along with encoding the <u>ASF</u> stream, Windows Media Encoder is used to create an <u>.asd file</u>. An .asd file contains information about the media types, codecs, and bandwidth setting used to create an ASF stream; this information is referred to as the stream format. If you do not use a <u>template stream format (TSF)</u> to create your content stream, then it is necessary to propagate the .asd file to the Windows Media server so that the Windows Media component services can recognize the stream format. The stream format is added to the Windows Media program through Windows Media Administrator, which saves the stream format in the <u>.nsc file</u>. This makes the stream format accessible to Windows Media Player clients and other Windows Media servers that access the stream. Template stream formats are known to the Windows Media component services, so you do not have to supply the .asd file in order to interpret a stream encoded using a template. For more information about .nsc files, programs, and stations, see *Windows Media Server Components* in the documentation installed with the Windows Media server components.

Note

- Portions of Windows Media Encoder require DCOM95 to communicate with the Windows Media component services. The encoder still can function without DCOM95 installed. If you need to install DCOM95, see the <u>Microsoft Web site</u>.

{button Related Topics,AL(`Introduction')}

Understanding hardware and installation requirements

When you open Windows Media Encoder, it checks whether there is an audio or video card installed on the computer. You must have at least an audio card to encode from a live source. If you have multiple audio and video cards installed, you can select which cards Windows Media Encoder uses as its input source. If you have neither an audio nor video card, you can only encode content that has been stored as an audio (.wav or .mp3) or video (.avi) file.

The Windows Media Encoder QuickStart Wizard is designed to create encoder configurations that receive live input through an audio or video card. To take input from audio or video files stored on a computer, use the template with Input/Output (I/O) options, or design a custom configuration.

While Windows Media Encoder is streaming ASF information, if the demands of the encoding process exceed the ability of the central processing unit (CPU) or capture device, Windows Media Encoder stops encoding, and displays a message. If the output from Windows Media Encoder is being streamed over a network, the clients stop receiving information when the encoder stops.

{button Related Topics,AL(`Hardware')}

Selecting Windows Media Encoder configuration methods

Before you can start encoding with Windows Media Encoder, you must configure it to stream live information to a Windows Media server and/or create an .asf file. After you open the encoder, you then either open an existing configuration file (an .asd file), or create a new configuration. The first time you open Windows Media Encoder, the Welcome window appears. This window provides three configuration methods to choose from:

- **QuickStart.** Microsoft recommends that you use QuickStart for the easiest configuration possible. The QuickStart wizard utilizes a set of <u>template stream formats (TSFs)</u> based on the type of content you want to deliver.

- **Template with I/0 (Input/Output) options.** If you have existing content that you want to use, the customizable template is a good choice. It allows you to specify the input and output files instead of using your default settings.

- **Customized configuration.** Advanced users can customize the encoding to the exact parameters they need.

{button Related Topics,AL(`Configuring')}

Understanding Windows Media Encoder configuration

The Windows Media Encoder configuration determines all the settings Windows Media Encoder uses to create an ASF stream. After you specify the settings used to configure Windows Media Encoder, you can save those settings as an .asd file. The next time that you want to recreate that scenario, you can open the .asd file instead of creating a new configuration.

To make the configuration process easier, Windows Media Encoder comes with several template stream formats (TSFs) that are modeled after possible network scenarios. Use the template stream formats to begin creating your own .asd files either through the **QuickStart** configuration wizard, or through **Template with I/O Options** wizard. Template stream formats are used throughout Windows Media to identify the specifics of a content stream to the Windows Media component services and Windows Media Player clients.

The Windows Media Encoder template stream formats are designed for:

- Audio-only content over the Internet.

- Video with audio content over the Internet.

- Multiple bit rate video with audio content over the Internet.

- Video with audio content over an intranet.

To create a configuration that is customized for your network and your content, use the **Custom configuration** option. When you choose the custom option, you control the bandwidth, codecs, and audio and video settings for your content stream. This configuration produces a *custom stream format*. If you are going to multicast this content stream, you must identify this stream format to the Windows Media component services. To do this save the configuration to an .asd file and then provide that .asd file to the Windows Media component services. The Windows Media component services reads the stream format from the .asd file, and supplies it to the Windows Media Player clients so that the stream generated from the encoder can be interpreted.

Note

- If you create a custom encoder configuration and do not propagate the .asd file to the Windows Media server, the server displays the error message: "Stream format not recognized"**.**

{button Related Topics,AL(`Configintro')}

Understanding template stream formats

Template stream formats (TSFs) are preconfigured settings for Windows Media Encoder to help you achieve the best quality for your encoded content. The codecs and bandwidths have been tested to ensure that they can provide the highest-quality presentation of your audio and video content. Not all scenarios can be envisioned; sometimes you must customize the settings if you have special content or network requirements.

The TSFs identify the configuration of standard ASF streams to the Windows Media component services and the Windows Media Player clients. The TSFs contain information on the following parameters:

- **Target network bandwidth.** This value identifies the minimum bandwidth of the user's network connection. If the user's network connection does not support the target bandwidth, the user cannot receive the stream. Windows Media TSFs range in bandwidth from 28.8 kilobits per second(Kbps) to 3 megabits per second (Mbps). If your users range over a variety of bandwidths, consider using a multiple bit rate video template to create a stream that supports multiple bandwidths.

- **Content type.** The type of content you plan to stream has a great impact on the audio and video codecs used and the video settings that provide optimal performance. There are a variety Windows Media TSFs for audio only streams as well as multimedia streaming templates.

- **Multiple bit rate video.** Multiple bit rate video templates use multiple bit rate video to encode multiple video bands into a single ASF stream or file so that the content can stream over variable network bandwidths. This provides for the best client experience at higher bandwidths while still supporting lower bandwidth network connections. It also is useful for times when available network bandwidth is constrained and the stream needs to adapt to different conditions. When encoding multiple bit rate video at Internet bandwidths the minimum processor required is a Pentium II 266 MHz. To encode multiple bit rate video on higher bandwidths a dual Pentium II 400 MHz is required.

{button Related Topics,AL(`TSFintro')}

Specifying the input source

Select **Live Source** or **AVI/WAV/MP3 file** to include that medium in the <u>ASF</u> stream. Windows Media Encoder can use a live source or a file stored on a disk. The live source can be any audio or video content that the encoder can receive via the sound or video input jacks. The stored source can be any accessible .avi, .wav or .mp3 file.

- Select **Live source** to encode from a live source.
- Select **AVI/WAV/MP3 File** to encode from a stored source.

{button Related Topics,AL(`Input')}

Choosing video capture devices

You can have several different video capture devices on your encoding platform. Windows Media Encoder selects the preferred devices on your encoding platform by default. You can change your input devices from the Input Settings, Capture Source & Media Types window when you create your configuration, or from the **Input** tab of the Properties page of an existing configuration. In either case, to use a different device, under **Video capture**, click **Custom,** and then select the device in the list. After you change your video device, save your configuration file, and check your video setting.

If you are going to save this configuration file for use on another encoder, choosing the default input devices allows the encoder to use whatever device is preferred on the system on which it is running, without reconfiguring the .asd file.

{button Related Topics,AL(`Vcapture')}

Choosing audio capture devices

When your system was set up, a preferred audio recording device was specified. This device is chosen by Windows Media Encoder as the default audio recording device. Often, this device is the main sound device on your system. However, you can have several different audio recording devices in your system to provide different types of content. A custom audio recording device can be selected from the Input Settings, Capture Source & Media Types screen of the configuration wizard, or from the **Input** tab of an existing configuration's property pages.

In either case, to use these devices with Windows Media Encoder, under Audio Capture, select Custom, and then choose the device from the list. You can run many encoding sessions concurrently on your system, provided each session has its own input device. If you are going to save this configuration file for use on another encoder, choosing the default input devices allows the encoder to use whatever device is preferred on the system on which it is running, without reconfiguring the .asd file.

{button Related Topics,AL(`Acapture')}

Specifying capture devices

If you have multiple input devices on your encoding platform, you can select which devices originate the live content for each configuration file. The preferred audio and video capture devices on the encoder are selected by default, but you can choose other available devices t by clicking custom on the capture device configuration page.

You can specify live capture devices during the configuration process, or from the property pages. If you use QuickStart to configure your encoder, you can change the capture devices through the property pages only.

{button Related Topics,AL(`Capture')}

Specifying a stored source file

If you use the **Template with I/O Options** or **Custom** configuration method, you can create a configuration for Windows Media Encoder with or without an associated source file. To specify a permanent source file for the configuration, save the configuration file with the source file selected. To specify the source file at encoding time, save the configuration file without an identified source; each time you encode content with the configuration, you must specify a source file.

{button Related Topics,AL(`Sourcefile')}

Using advanced audio settings

Use the **Advanced Audio Settings** dialog box to change the **Audio Loss Concealment options.**

Audio Loss Concealment blends the audio so that if information is lost during transmission, there is no audible gap. There are two options that provide different types of concealment. If the audio track has a low dynamic range, such as when someone is speaking, select **Voice**. If the audio track has a large dynamic range, such as when a band is playing, select **Music**.

{button Related Topics,AL(`Advaudio')}

Choosing a network bandwidth

Select a target bit rate for the output <u>ASF</u> stream. The first four choices are based on common network capabilities. The fifth choice allows you to customize the bandwidth if required by your application. The difference in the values shown between the capacity of the network connection and the actual bandwidth used allows for other network traffic.

- **Internet 28.8** (22 kilobits per second [Kbps] actual). This bandwidth selection supports streaming of both audio and video content to clients using a network connection that operates at a minimum of 28.8 Kbps.

- I**nternet 56 Modem** (37 Kbps actual). This bandwidth selection supports streaming of both audio and video content to clients using a modem network connection that operates at 56 Kbps.

- **Single Channel ISDN** (50 Kbps actual). This bandwidth selection supports network connections at Integrated Services Digital Network (ISDN) rates.

- **Intranet** (100 Kbps actual). This bandwidth selection supports clients on an intranet or local area network (LAN).

- **Custom** (bits per second [bps]). This bandwidth selection is for users whose system requires a customized bandwidth setting, such as those using a dedicated network that does not use one of the preceding bandwidths. When specifying the bit rate, consider other traffic that must pass over the network. Unlike the preconfigured bandwidth settings, Windows Media Encoder uses the entire bandwidth you specify for streaming ASF information. Note that this value is entered in bits per second, rather than kilobits per second.

{button Related Topics,AL(`Bandwidth')}

Compressing the audio and video content

Use this screen to select which compression algorithms (codecs) to apply to your audio and video content. Your codec choices are defined by the codecs that are installed on the encoding platform. This screen has two panels, **Audio** and **Video.**

- **Audio panel**
  Because some of the audio codecs have multiple formats, the **Audio** panel has options for both the codec and the format. Use the **Codec** list to select the audio codec. If the codec has multiple formats, use the **Format** list to select the amount or type of compression. The format of a codec is the sampling rate (in kilohertz [KHz] or hertz [Hz]) and sample depth (in bits). The larger the sampling rate and sample depth, the more information is recorded. When more information is recorded, the audio content usually sounds better; however, the audio portion of the total bandwidth allocated also is larger. Remember that the audio file must share the bandwidth with any video or script commands.
  Click **Advanced** to select the audio loss concealment setting.

- **Video panel**
  Choose a video codec from the list next to **Codec**. Be sure to select a codec that can share the bandwidth with the audio codec you have chosen.
  To adjust some advanced video settings, such as the size of the window displayed for the Windows Media Player client, the number of frames per second, and the number of I-frames, click **Advanced**.

{button Related Topics,AL(`Codecs')}

Adjusting input properties

This property page controls the type of media that can be included in the ASF stream. Windows Media Encoder can use a live source or a file stored on a disk. The live source can be any audio or video content that the encoder can receive via the sound or video capture cards. The stored source can be any accessible .avi, .wav, or .mp3 file.

Encoding from a live source

- Select **Live source**.

Use the **Audio Capture** and **Video Capture** check boxes to select the audio or video cards that receive the live input. For more information on verifying that the audio and video cards are configured correctly, see Verifying the Audio and Video Card Configuration. To change the capture source for audio or video content, under the capture type, click **Custom,** and select the desired capture device.

The ability to select the **Audio Capture** and **Video Capture** check boxes varies depending on the configuration method used. If you use a template stream format to configure the encoder, the template defines the input options. For example, a Music Video configuration must have both audio and video capture devices, whereas a 28.8 Audio configuration is restricted to solely an audio device. However, if a custom configuration is used, you can turn **Video Capture** on and off. **Audio Capture** is the minimum required for live content encoding, and cannot be turned off in any configuration.

To include script commands in your ASF stream, select **Script Commands**. The **Script Commands** box sometimes is not accessible if your configuration is created with a template stream format. If you use a template stream format and want to enable script commands, select the **Template** tab, and choose a template stream format that specifies **with Scripts**.

Encoding from a stored source

- Select **AVI/WAV/MP3 File**.

This option allows you to specify an .avi, .wav, or .mp3 file for Windows Media Encoder to use as its input. You can specify this file now, or you can wait until you are ready to start the encoder.

Note

- If you are transmitting this content to a Windows Media server, rather than saving it to an .asf file, you must select **Audio only**. This setting applies only to custom encoder configurations.

{button Related Topics,AL(`Propinput')}

Adjusting output properties

Use the **Output properties** tab to control how the encoded <u>ASF</u> content is distributed. You can encode content directly to a Windows Media server, save it to a local .asf file, or do both.

{button Related Topics,AL(`Propoutput')}

Specifying the output

Select how you want Windows Media Encoder to output the <u>ASF</u> stream. The encoder can output the ASF stream to a Windows Media server or to a file. For streaming live events, the encoder sends the ASF stream to the Windows Media component services where it can be provided as a broadcast unicast or a multicast station. For on-demand unicasts, the encoder sends an ASF stream to be saved to disk as an .asf file so that the content can be played back later. You also can set the encoder to do both.

{button Related Topics,AL(`Output')}

Sending the ASF stream to a Windows Media server

You can select the method used to transmit the ASF stream to the Windows Media server during Windows Media Encoder configuration if you use the **Template with I/O Options** or **Custom** configuration wizard. You also can change the method from the property page after configuration is complete.

Windows Media component services can identify the ASF stream using any of the following methods:

- IP port. The IP port is a direct connection between the encoder and the server.   This method requires that the encoder remain on a static location on the network. IP port connections are normally used for stream testing.

- HTTP port. Using the HTTP port enables your to stream across a network firewall. You can stream over both the IP port and the HTTP port simultaneously.

- Stream Alias. The encoder creates an alias on the Windows Media server that references its current address and port on the network. This alias is updated each time the configuration is started. Windows Media services can reference this alias in broadcast configurations and always have the correct stream reference. Thus, it is recommended that you use the stream alias method when delivering the ASF stream to Windows Media component services for broadcasting.

{button Related Topics,AL(`Serveroutput')}

Sending the ASF stream to a local file

Saving the ASF content to a local .asf file allows you to provide the content via on-demand unicast later. The following control elements are available for the .asf file:

- **Name**. Type a file name in the text box, or click **Browse** to select an existing .asf file.

- **Maximum Size**. Limit the size of the .asf file to a specific number of kilobytes. This parameter is optional, but can be useful if you have limited storage space for your .asf file.

- **Maximum Duration**. Limit the encoding time of your .asf file by minutes, hours or days. This parameter is optional, but can be useful if your .asf file must conform to a specific time requirement.

- **Automatic Indexing**. Provide indexes within the .asf file to allow the user to fast-forward and rewind while viewing the content. This option is enabled by default. Indexing an .asf file can be a lengthy process. If you need to free your encoder to encode more content and your content does not include script commands, turn off indexing and use ASFChop or Windows Media ASF Indexer to index the file later.

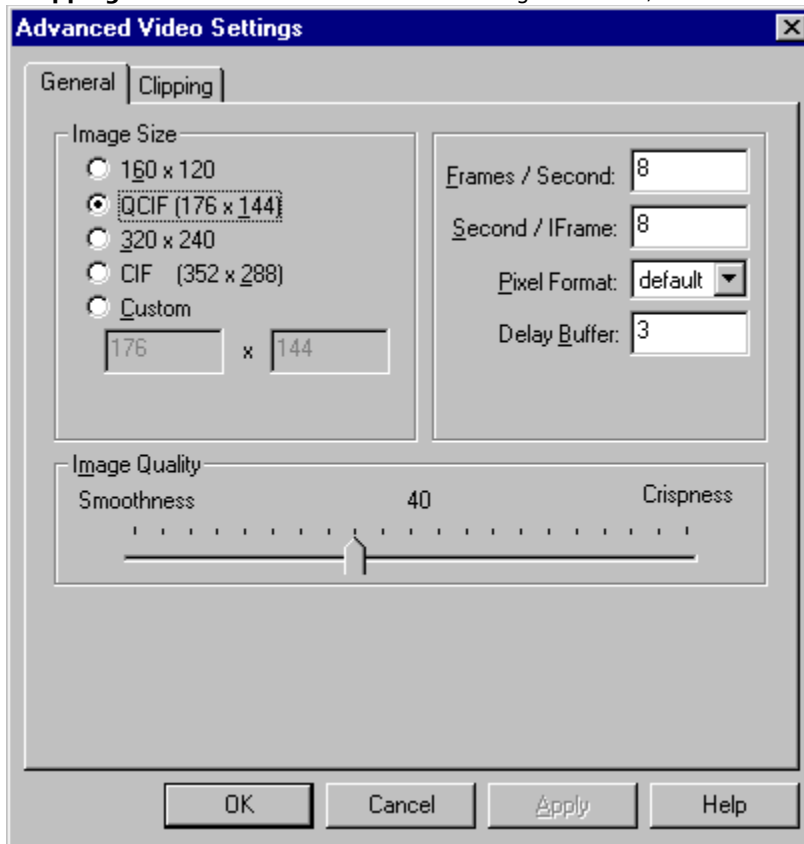{button Related Topics,AL(`Fileoutput')}

Verifying the audio and video card configuration

If you think that Windows Media Encoder is configured correctly, but your audio or video content is not encoding properly, check the card configuration.

{button Related Topics,AL(`Verify')}

Using advanced video settings

Change specific aspects of the video output in the ASF stream by manipulating advanced video settings. Changes made here have a great impact on the quality of content that users see and hear. Increasing the image size and number of frames per second, and decreasing the number of seconds per I-frames, places greater demands on your central processing unit (CPU) by Windows Media Encoder. The faster your CPU, the more frames per second and I-frames you can include in the ASF stream. If you make changes to these settings, test the content before delivering it to users. The **Advanced Video Setting** dialog box has two tabs, **General** and **Clipping.** For more information about a setting on the tab, click an area in the picture.

{button Related Topics,AL(`Adv_video')}

General Tab

Use the **General** tab in the **Advanced Video Setting** dialog box to adjust settings that impact overall video quality.

Image Size Panel

To determine the height and width of the <u>ASF</u> content when it is viewed, use the **Image Size** panel. Quarter Common Interface Format (**QCIF)** and Common Interface Format (**CIF)** are predefined image standards; notice that **CIF** height and width are exactly double those of **QCIF**. These standards are provided because their image size (both height and width) is a standard that is supported by many codecs and video editing tools. The **160x130** and **320x240** options provide video windows that are slightly smaller than QCIF and CIF, respectively. The slight decrease in image size allows for more bandwidth to be used for video frames, and can improve content quality in some scenarios. Use these options if video sharpness is more important than video size for your content.

Use **Custom** to define your own image size. When resizing an ASF stream with the **Custom** setting, be aware that many codecs require image size settings in multiples of 16.

Frames/Second

To set the number of frames per second for the <u>ASF</u> stream, use the **Frames/Second** dialog box. The **Frames/Second** value can be set from 1 through 30. How much you adjust this value depends on the speed of the computer's processor and whether the computer is encoding high-motion or low-motion video. If more frames per second are used, there are smaller changes between frames, and the video looks smoother. If fewer frames per second are used, the video has a slower motion transition rate, and thus video with a lot of motion can appear disjointed. However, the more frames per second your computer is required to encode, the harder the processor must work. It is possible to overwork your processor by requesting it to encode more action than its capability allows. If this happens, Windows Media Encoder stops encoding, and displays a message.

Second/IFrame

The **Second/IFrame** dialog box displays the number of seconds that separate I-frames. All frames in between I-frames are called *delta frames*. Delta frames contain only the information used to display change, and are considerably smaller than I-frames; however, the visual quality of delta frames is poor. As I-frames get farther apart, the size of the video (in bytes) gets smaller. As I-frames get closer together, the size of the video (in bytes) gets larger, and the computer's processor must work harder.

Pixel Format

The **Pixel Format** dialog box displays the color depth standard that has been selected. The video card that the computer is using to receive the video source has certain color standards that it can display best, for example, RGBH = 64k thousand colors and RGBT = 16 million colors. For information about which pixel format your card works best with, see the video card's documentation. The pixel format is set automatically for the video card when you select one of the template stream formats.

Delay Buffer

The **Delay Buffer** dialog box is the amount of video coming in from the video card (measured in seconds) that Windows Media Encoder stores before it starts transmitting <u>ASF</u> information. Five seconds is the default; it allows enough information to build up so that the client does not have to wait (that is, buffer information) and the memory of the computer on which Windows Media Encoder is installed is not overloaded with delayed ASF information. Increasing the **Delay Buffer** can overload the computer's memory, and affect the computer's ability to encode information. Decreasing the **Delay Buffer**, in some circumstances, can cause clients to wait on Windows Media Encoder.

Image Quality

The **Image Quality** slider lets you fine-tune the image quality. You can emphasize either video smoothness or image crispness. Video content is *smooth* when objects easily move from one position to another on the screen and the edges of objects are not jagged. Video content is *crisp* when images and motion are well defined and clearly delineated. As you increase the image crispness, the video becomes less smooth. In some cases, decreasing the image crispness makes the video look better.

About the clipping tab

Clipping is used to determine what part of the video image is shown to the user. Clipping can be used to show specific portions of a video, increase image resolution, and increase perceptive quality. For more information about a setting on the tab, click the area in the picture.

Clipping

Use the **Clipping** tab to change how much of the image is shown to the user.

Left

Defines the left edge of the viewing area. The default value is zero (0). Increasing this number crops the number of pixels you specify from the left edge of the client window. The following screen shot shows a representation of the window. The line along the left edge moves as the **Left** value is changed.

Top

Defines the upper edge of the viewing area. The default value is zero (0). Increasing this number crops the number of pixels you specify from the top edge of the client window. A representation of the window is shown below. The line along the upper edge moves as the **Top** value is changed.

Width

Defines the width of the viewing area. The default value is determined by the image size specified. For example, if you specify 160 x 120 pixels as the image size, the default width is 160 pixels. This is also the maximum width of the image. Decrease this number to crop pixels from the right edge of the image. The width is always relative to the left-edge setting. A representation of the window is shown below. The line along the right edge moves as the **Width** value is changed.

Height

Defines the height of the viewing area. The default value is determined by the image size specified. For example, if you specified 160 x 120 pixels as the image size, the default height is 120 pixels. This is also the maximum height of the image. Decrease this number to crop pixels from the lower edge of the image. The height is always relative to the upper-edge setting. A representation of the window is shown below. The line along the lower edge moves as the **Height** value is changed.

Viewing Area

This area represents the amount of the captured video content that is shown to the user. The image is captured at the image size specified (that is, 160 x 120 pixels), but it is presented to the user at the size depicted here. Therefore, if you clip to a height and width of 50 pixels, the user views a content window of 50 x 50 pixels.

Troubleshooting buffer problems

Periods in which there are high volumes of network traffic can cause buffer problems. Most of the time, clients connect to Windows Media Encoder using TCP. When using TCP, clients are not likely to lose packets. However, during periods of high network traffic, Windows Media Encoder sometimes cannot send data as fast as it should. When this happens, it buffers the data instead.

Windows Media Encoder can buffer for up to a maximum period of time set in **MaxBufferTime** in the registry. The default is 20 seconds. When the buffer is full and Windows Media Encoder still cannot send any data, the encoder attempts to create room in the buffer by discarding the oldest data. The amount of data that is discarded is determined by the **DiscardPercentage** setting in the registry. The default setting is 50 percent. When information is discarded from the buffer, Microsoft Windows Media Player indicates that packets have been lost.

MaxBufferTime and **DiscardPercentage** have default values, but do not appear in the registry. **MaxBufferTime** is the number of seconds of data that Windows Media Encoder can buffer. **DiscardPercentage** is the amount of data in the buffer that is deleted when the buffer fills up.

For example, using the default values--**MaxBufferTime** equals 20 seconds, and **DiscardPercentage** equals 50 seconds--each time 20 seconds of data is buffered, the oldest 50 percent (that is, 10 seconds worth) is deleted to make room for more incoming data.

To adjust the **MaxBufferTime** or **DiscardPercentage** values, you must add and then modify the values in the registry editor.

{button Related Topics,AL(`Buffers')}

**Viewing Windows Media statistics**

The **Windows Media Encoder Statistics** dialog box provides information about the <u>ASF</u> stream that Windows Media Encoder is sending, Windows Media Encoder settings used to send the stream, and the IP addresses of the computers that are receiving the stream.

{button Related Topics,AL(`Stats')}

Understanding the ASF statistics tab

While Windows Media Encoder is running, the **ASF Statistics** tab is being updated constantly with current information about the ASF stream and the audio and video files, and script commands used in the ASF stream. The **ASF Statistics** tab consists of four panels that show specific information about the encoding of the ASF stream. Click an area in the picture to find out more information about that item.
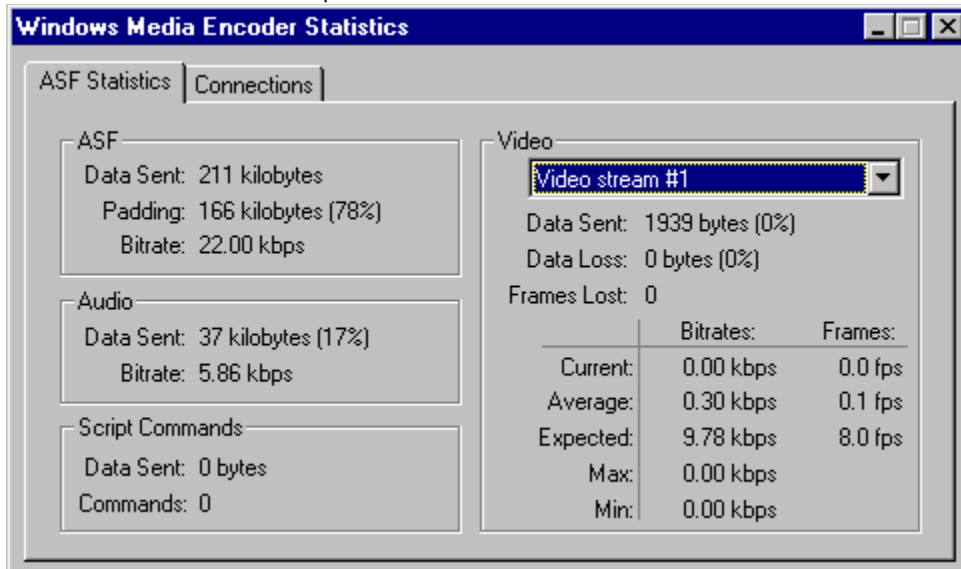
{button Related Topics,AL(`ASFstat')}

Understanding the connections tab

The **Connections** tab lists the IP addresses of the computers that are connected to Windows Media Encoder. For more information about an area of the tab, click the following picture:

```
Windows Media Encoder Statistics                    _ □ ✕

 ┌ ASF Statistics ┐┌ Connections ┐
                   └─────────────┘

 ┌─ Current Connections ──────────────────────────────┐
 │  ┌──────────────────────────────────────────────┐▲ │
 │  │157.56.216.123 [MSBD]                         │  │
 │  │                                              │  │
 │  │                                              │  │
 │  │                                              │  │
 │  │                                              │  │
 │  │                                              │  │
 │  │                                              │  │
 │  │                                              │▼ │
 │  └──────────────────────────────────────────────┘  │
 └────────────────────────────────────────────────────┘

```
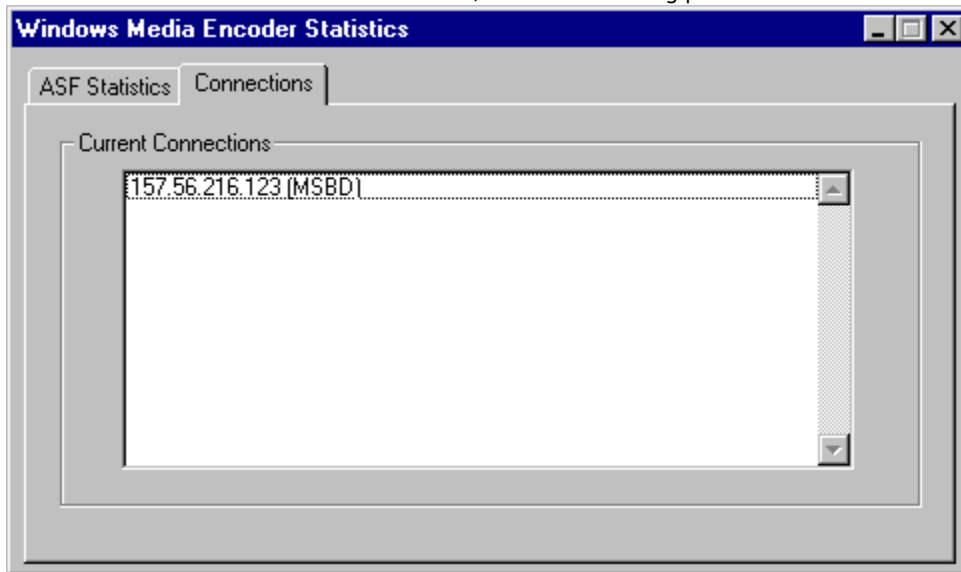
{button Related Topics,AL(`Connections')}

Stopping Windows Media Encoder

Stopping Windows Media Encoder causes the content stream to stop encoding. Any computer that is receiving the content stream stops receiving content. After stopping the encoder, it can take a few seconds for the capture cards to be reset. If you try to restart the encoder before they have been reset, a message appears telling you that the video device could not be started. Wait a few seconds, and then try to start the encoder again.

Windows Media Encoder can be stopped by clicking the **Stop** button, or by placing limits on the encoding session, such as limiting the file size or file duration.

{button Related Topics,AL(`Stopping')}

Starting Windows Media Encoder

After configuring Windows Media Encoder, you can start streaming <u>ASF</u> information. Before you start the encoder, check the following:

- Do you need to save your configuration?
  If you just finished configuring Windows Media Encoder, or you made changes to the configuration, you must save the configuration. To save a configuration, on the **File** menu, click **Save As**, and give your configuration a name.

- Is the video card configured to use the proper input?
  If you did not configure Windows Media Encoder to stream video content, or you do not have a video capture device installed, ignore this question. When you configure Windows Media Encoder, you establish the video capture card that the encoder uses as its input source. However, many video capture cards have multiple inputs. Use the **Video Source Settings** dialog box to make sure that the correct input is selected. On the **Edit** menu, click **Video**. In the **Video Source Settings** dialog box, verify that the correct video input is selected. For information about using the **Video Source Settings** dialog box, see your video card documentation.

If everything is correct, start Windows Media Encoder by pressing the start button.

Once started, the **Source** time begins to accrue almost immediately. After a few seconds, the **Data Sent, Current Bit Rate,** and **Current Frames per second** settings are displayed.

{button Related Topics,AL(`Starting')}

Understanding script commands

Script commands are commands that can be embedded in an .asf file or <u>ASF</u> stream. There are two types of script commands: URLs and Filenames. A URL is the path to a Web page; a Filename can be the path to another .asf or <u>.asx file</u>. When a command is embedded, it can be streamed over the network. When Microsoft Windows Media Player receives a script command, it transmits that command to an application that can run the command. For example, URLs are transmitted to the default browser, and paths to other .asf files are transmitted to the Windows Media Player client. If an .asf file is 2 minutes long and a Filename script command that references another .asf file is embedded 30 seconds into the file, the .asf file plays up to where the script command is embedded. Then the Windows Media Player client locates and begins streaming the .asf file referenced in the script command. The final 1.5 minutes of the original .asf file is not streamed. Script commands allow you to extend the capabilities of an .asf file or <u>ASF</u> stream. Use script commands to access other areas of the Internet or your local network, or to start other .asf files or streams. Script commands can be written using regular or relative paths.

To use script commands with a template stream format, choose a format that supports scripts.

{button Related Topics,AL(`Scripts')}

Understanding relative paths

A relative path is a shortened version of the complete path to a file. Relative paths are useful for two reasons: they make it easy to transport related content from one location to another without altering the content, and they are shorter than full paths. The length of a path is important when it must be sent across a network connection repeatedly (as in the case of Windows Media script commands). Shorter names mean less bandwidth is consumed in transporting these strings, possibly resulting in video content that looks better and audio content that sounds better, yet use the same overall bandwidth. The path can be shortened because everything is related to a base URL. When creating script commands, you can use relative paths to identify the script commands.

{button Related Topics,AL(`Paths')}

Dropping script commands

If you enable script commands as part of the configuration, you can insert script commands into the ASF stream while Windows Media Encoder is running. The **Script Commands** dialog box is activated when the encoder is started.

When a script command is dropped, the command is placed in the ASF stream, and is executed when it is received by the Windows Media Player client. The results are not immediately visible. For example, if you send a URL as a script command, the URL is received immediately, but the time it takes the client computer to open a browser and for the browser to find the URL varies. The format of the command is the same as the script command format for Windows Media Author and conversion tools. First, state the type of command—either URL or Filename—and then give the command. For example,

URL http://example.Microsoft.com/

sends a URL-type command to the client, which invokes the URL once it is received. For more information about script commands and programming Microsoft Windows Media Player, see *Microsoft Windows Media Player Software Development Kit*.

{button Related Topics,AL(`Drop')}

Adjusting properties in an existing configuration

Once you have created a configuration (.asd) file for Windows Media Encoder , you can make changes to that configuration by editing its property pages. The property pages available differ depending on whether you use a template stream format or a custom configuration.

The properties available when using template stream formats are:

Template. Controls which template stream format is used by the .asd file.

Input. Controls the source of the content; either **Live** or an **AVI/WAV/MP3** file.

Output. Controls where the .asf file or <u>ASF</u> stream is sent, either to a Windows Media server, a local .asf file, or both.

The properties available when using a custom configuration are:

Input. Controls the source of the content; either **Live** or an **AVI/WAV/MP3** file.

Bandwidth. Controls the bandwidth at which the content streams.

Compression. Controls the audio and video codecs used to compress the content. Also provides access to advanced settings for audio loss concealment and for image size, number of frames per second, number of seconds per I-frame, pixel format, delay buffer, and image quality.

Output. Controls where the .asf file or ASF stream is sent, either to a Windows Media server, a local .asf file, or both.

{button Related Topics,AL(`Prop_adj')}

Testing Windows Media Encoder

After configuring and starting Windows Media Encoder, it is a good idea to test it before providing content to users.

To test the encoder, use Microsoft Windows Media Player to receive the ASF stream from both Windows Media Encoder and the Windows Media server.

The stream originating from Windows Media Encoder is not a multicast stream, so do not use more than fifteen clients to test the encoder.

{button Related Topics,AL(`Test')}

Troubleshooting problems with audio/video synchronization

While testing a live <u>ASF</u> stream, if you notice that the audio and video content are not synchronized (that is, the audio is heard a little before or after the video is seen), use the plus or minus keys to adjust the timing. This problem is caused by a minor delay in the commands sent to the audio and video drivers, and is most noticeable while watching, for example, video of a person speaking at a podium.

{button Related Topics,AL(`Synch')}

Understanding ISDN

Integrated Services Digital Network (ISDN) is an international communications standard for sending voice, video, and data over digital telephone lines. An ISDN implementation requires special metal wires, and supports data transfer rates of 64 kilobits per second (Kbps) on each channel. Most ISDN lines offered by telephone companies give you two channels at once, called *B-channels*. You can use one channel for voice and the other for data, or you can use both channels for data to give you data rates of 128 Kbps.

 Basic Rate ISDN (BRI) service consists of two 64-Kbps B-channels and one 64-Kbps D-channel for transmitting control information. Primary Rate ISDN (PRI) service consists of 23 B-channels and one D-channel (in the United States) or 30 B-channels and 2 D-channels (in Europe).

To use ISDN, you must have a terminal adapter to regulate the transfer of data between your computer and the network. Terminal adapters often are called *ISDN modems*, even though they do not perform the signal modulation and demodulation that is required to translate digital data into analog data.

Creating multiple bit rate video

When you custom configure Windows Media Encoder you can choose whether or not the configuration you are creating uses multiple bit rate video. Several template stream formats also use multiple bit rate video.

Multiple bit rate video can be used to provide users with better quality content during times of network congestion. When you use multiple bit rate video, your video content is recorded at multiple bandwidths that you select. These bandwidths range between 19 Kbps and 300 Kbps. Multiple bit rate video also encodes an additional band that is calculated at 20%-33% below the lowest band selected in your configuration. This provides scalability to users who connect at the lower network bandwidth. Using multiple bit rate video gives Windows Media Player the ability to switch to a lower bandwidth video stream when the reception quality of the higher bandwidth deteriorates, or the network connection does not support the higher bandwidth. When encoding multiple bit rate video at Internet bandwidths (28.8 Kbps and 56 Kbps), the minimum processor required is a Pentium II 266 MHz. To encode multiple bit rate video on higher bandwidths, a dual Pentium II 400 MHz is required.

Encoding single stream video creates ASF content that supports only one target bandwidth. This content is best suited for network environments that have constant available bandwidth or for content that is hosted on an HTTP server without Windows Media Services. ASF content created with a single video stream has lower processor requirements and requires less storage space.

{button Related Topics,AL(`Scalable')}

Selecting target network bandwidths for multiple bit rate video configurations

When creating multiple bit rate video content you can select up to five different target network bandwidths. A video stream is encoded into the ASF stream for each bandwidth you select. Once a bandwidth is selected, the default bandwidth is displayed in kilobits per second (Kbps). These bandwidths can be customized to meet your specific needs. You can modify these bandwidths after the configuration is complete from the properties page.

- **28.8 Modem.** Use this bandwidth to support users whose network connection is a 28.8 Kbps modem. This bandwidth can be customized to a minimum of 19 Kbps and a maximum of 24 Kbps.
- **Internet 56 Modem.** Use this bandwidth to support users whose network connection is a 56 Kbps modem. This bandwidth can be customized to a minimum of 25 Kbps and a maximum of 37 Kbps.
- **ISDN.** Use this bandwidth to support users whose network connection is over an ISDN line. This bandwidth can be customized to a minimum of 38 Kbps and a maximum of 56 Kbps.
- **High Speed Internet.** Use this bandwidth to support users who have high speed Internet connections. This bandwidth can be customized to a minimum of 57 Kbps and a maximum of 122 Kbps.
- **Intranet/LAN.** Use this bandwidth to support users whose network connection is over a LAN. This bandwidth can be customized to a minimum of 123 Kbps to a maximum of 300 Kbps.

Note

- Multiple bit rate video also encodes an additional video band that is calculated at 20%-33% below the lowest band selected in your configuration. This provides scalability to users who connect at the lower network bandwidth.

{button Related Topics,AL(`Scalable_band')}

Using HTTP streaming with Windows Media Encoder

If your Windows Media server is protected by a firewall, you still can receive source content from a Windows Media Encoder located outside of the firewall using a feature called *HHTP streaming*.

This option is designed to enable a Windows Media encoder located on the Internet to distribute an <u>ASF</u> stream to a Windows Media server located within a firewall. Standard firewall configurations do not allow distribution of a stream from Windows Media Encoder inside a firewall out to a Windows Media server installation on the Internet.

HTTP streaming is enabled by default for QuickStart configurations. The port reference for HTTP connections is listed in the stream reference box of the encoder. To change the port or to disable HTTP streaming, clear the checkbox for HTTP streaming on the output properties page of your encoder configuration.

If you use the Template or Custom configuration methods you can select HTTP streaming from the Output Settings, Transmissions page of the configuration wizard.

Note

- Check with your network administrator to avoid HTTP port conflicts or to open the port in your firewall.

{button Related Topics,AL(`HTTP_stream')}