

## ANEXO 2

### CONFIGURANDO O WINDOWS MEDIA SERVICE

#### Multicasting

Multicasting is a one-to-many form of transmission that sends data to a group of users. Multicasting saves network bandwidth because the files are transmitted as a single data stream until the last hop, where individual streams are sent to the target stations by the router at the end of the path.

There are some terms Windows Media Technologies uses that apply specifically to multicast sessions. We will explain them before discussing how to use multicast and how to troubleshoot a multicast session.

#### *Understanding Windows Media Technologies Multicast Terminology*

There are three terms that are used when setting up a multicast transmission: station, program, and stream.

Stations are used for distributing content via multicast transmissions (publishing points are used with unicast transmissions). A station is similar to a television station. Stations distribute content called programs, and a program is typically made up of several streams. A program, might, for example, use video clips interspersed with advertisements. More complete information on using multicast and creating a multicast station is available in the Windows Media Administrator Help files.

#### Defining a Station

Stations are defined in an .nsc file. This is a configuration file containing all the information, such as IP addresses, port numbers, and required CODECs, that is necessary for joining a multicast transmission. The Windows Media Server creates an .nsc file from the information entered when the multicast station was configured.

The .nsc file is necessary because users don't necessarily join a multicast transmission when a program begins. They can become a member of a multicast group at any time, which means the Windows Media Player immediately starts receiving the streaming data without any header packets that contain information about the transmission. The Windows Media Player uses the .nsc file to get this information.

Administrators typically make the file available either by e-mailing it to the users who can join the group or by posting it on a Web site. This means that, even though the Windows Media Server creates the file, it doesn't distribute it. Keeping distribution of the .nsc file under the control of the administrator helps stop unauthorized users from listening to a transmission. For example, by posting the file on a Web site, administrators can require authentication before granting access to the information.

The .nsc file may include the name of the .asd file containing the encoder configuration. You need to specify this file when you create a multicast station if you did not use the Windows Media Encoder default values in the templates. If you changed any of the default values, save the .asd file, copy it to the server, and, when configuring the multicast transmission, specify it. This is done in the Specify stream format information dialog box. The Windows Media Administrator stores the information in the .nsc file.

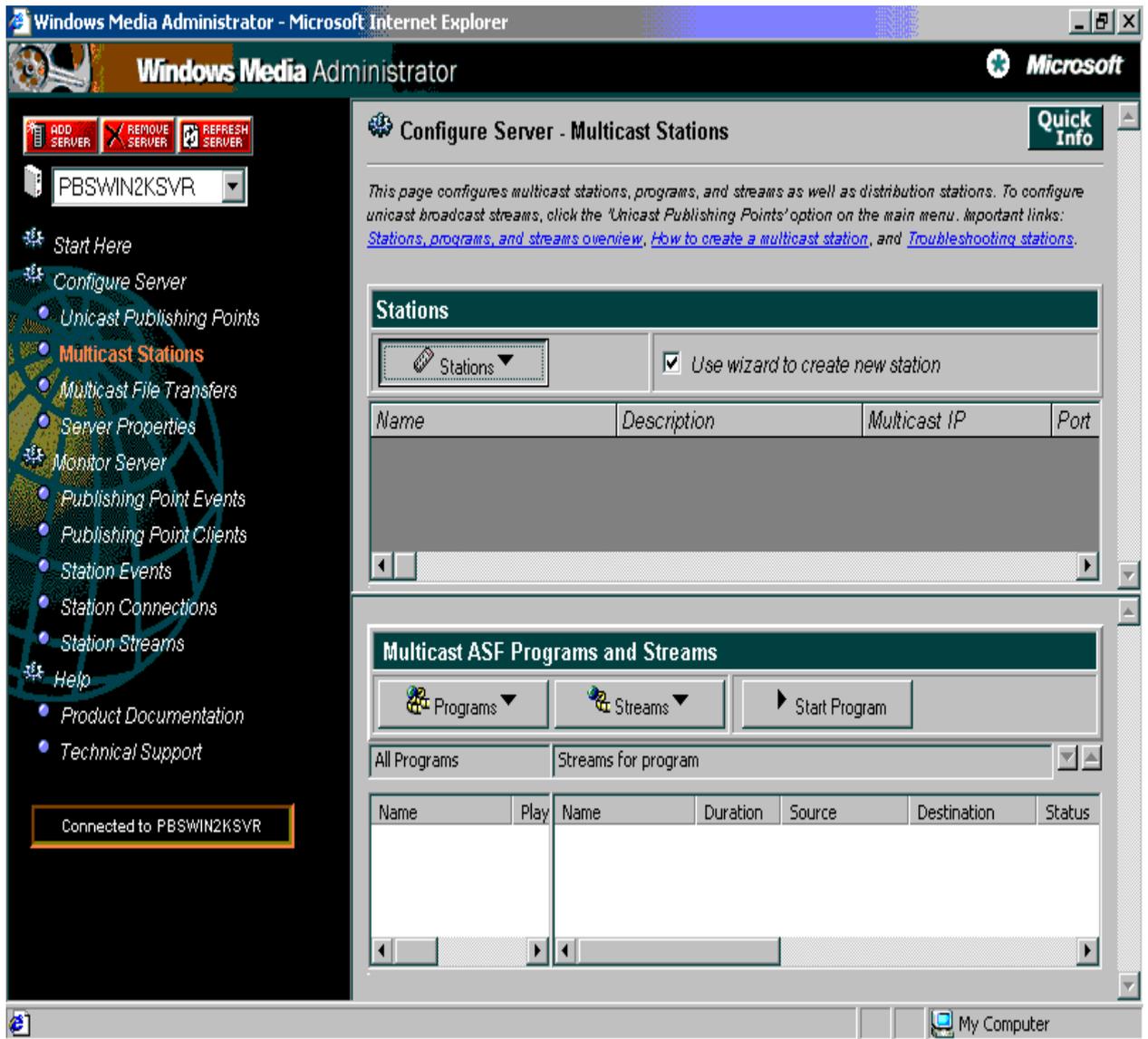
#### Configuring a Multicast Station

This section walks you through the process of defining a station for a multicast session.

To define a station for a multicast session

1. Open the Windows Media Administrator by pointing to Programs on the Start menu, pointing to Administrative Tools, and then clicking Windows Media.

2. To begin, click Multicast Station under the Configure Stations heading in the menu. The Configure Server – Multicast Stations dialog box will appear. Figure 12, below, shows a sample screen:



If your browser does not support inline frames, [click here](#) to view on a separate page.

Figure 12 Configure Server – Multicast Stations

3. Make sure the Use wizard to create new station option is checked. Select Stations, and then New from the drop-down menu. The QuickStart Wizard dialog box, shown below in Figure 13, appears:

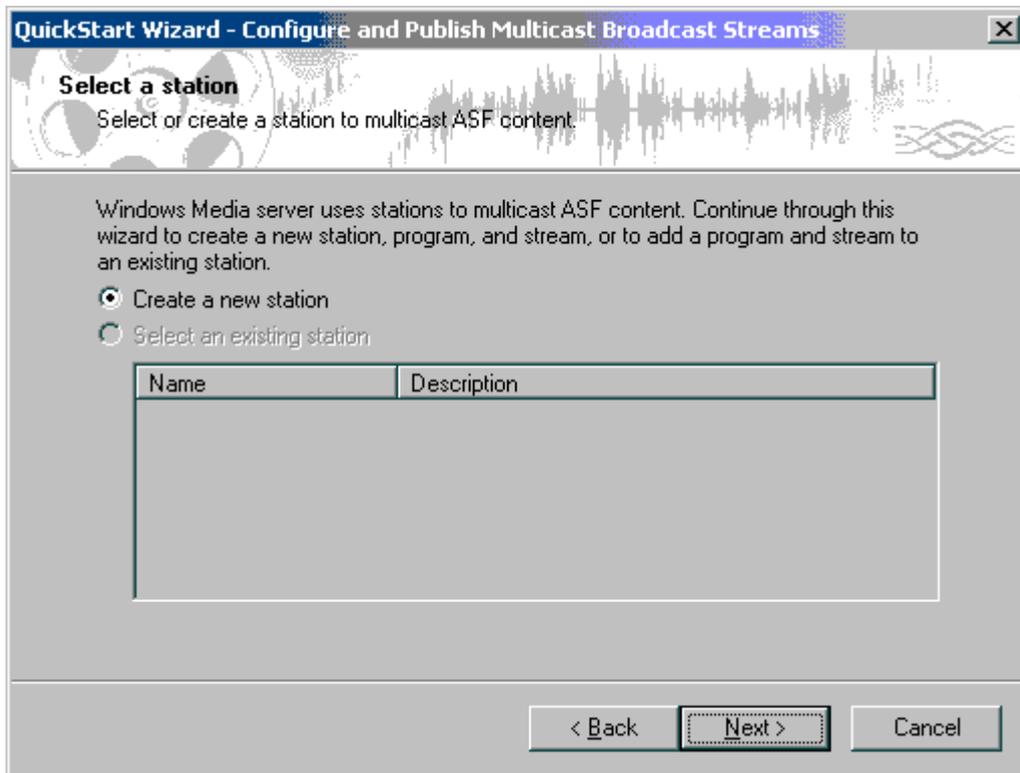


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Figure 13 Wizard for Configuring Multicast Stations

Click Next.

4. The Select a Station dialog box, shown below in Figure 14, appears:



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Figure 14 Selecting or Creating a Multicast Station

In this example, we create a new station, so select the Create a new station option. If any stations already existed, they would be listed and the second option, Select an existing station, could also be chosen. (This is how you can change an existing station's configuration.) Click Next.

5. The Create a new station dialog box, shown below in Figure 15, appears:

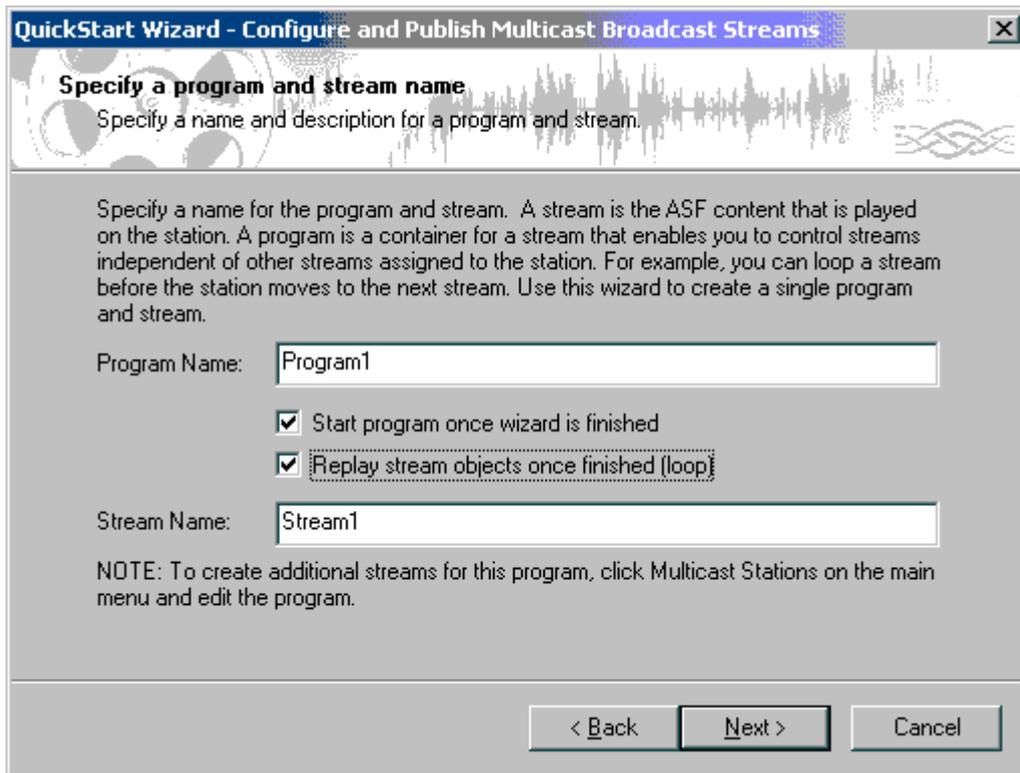
The screenshot shows a dialog box titled "QuickStart Wizard - Configure and Publish Multicast Broadcast Streams". The main heading is "Create a new station" with a sub-instruction: "Specify a name and description for the new station." Below this, there is a text area with the instruction: "Specify a name and description. The name can include spaces and extended characters." There are two input fields: "Name :" containing "Station1" and "Description :" containing "This is a test". Underneath, there are three radio buttons for "Distribution Mode": "Multicast and distribution" (selected), "Multicast only", and "Distribution only". A note follows: "NOTE: When you click next, the wizard will create default values for the station's IP address, port, time to live (TTL), adapter address, unicast rollover URL, and distribution limit. To change these default values, click the Multicast Stations main menu item and edit the station after you finish the wizard." At the bottom, there are three buttons: "< Back", "Next >", and "Cancel".

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Figure 15 Specifying the Station's Name and Description

By selecting the Multicast and distribution option, the server will try to stream across unicast if multicast isn't possible. Click Next.

6. The Specify a program and stream name dialog box, shown in Figure 16, appears below:

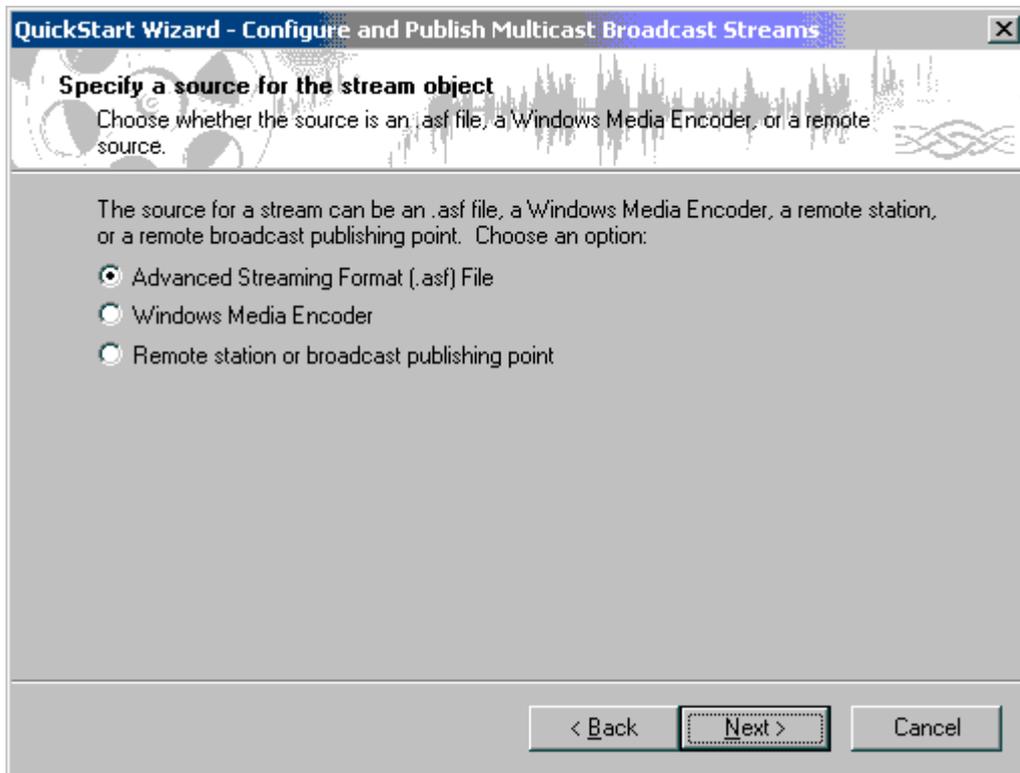


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Figure 16 Specifying a Program and Stream

Click Next.

7. The Specify a source for the stream object dialog box, shown in Figure 17, appears:

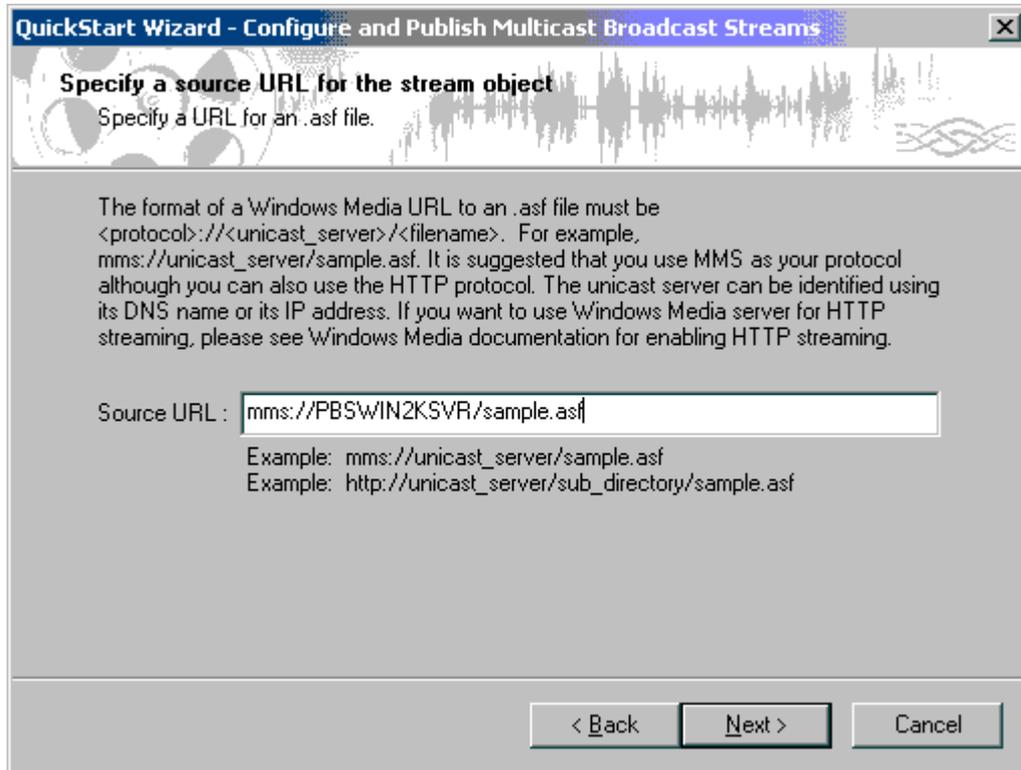


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Figure 17 Specifying a Source

If the stream is a stored file, then select the Advanced Streaming Format (.asf) File option. If it is a live event being encoded in real-time, select the Windows Media Encoder option. If the source is a station or publishing point located on a remote computer, select the Remote station or broadcast publishing point option. Click Next.

8. The Specify a source URL for the stream object dialog box, shown below in Figure 18, appears:

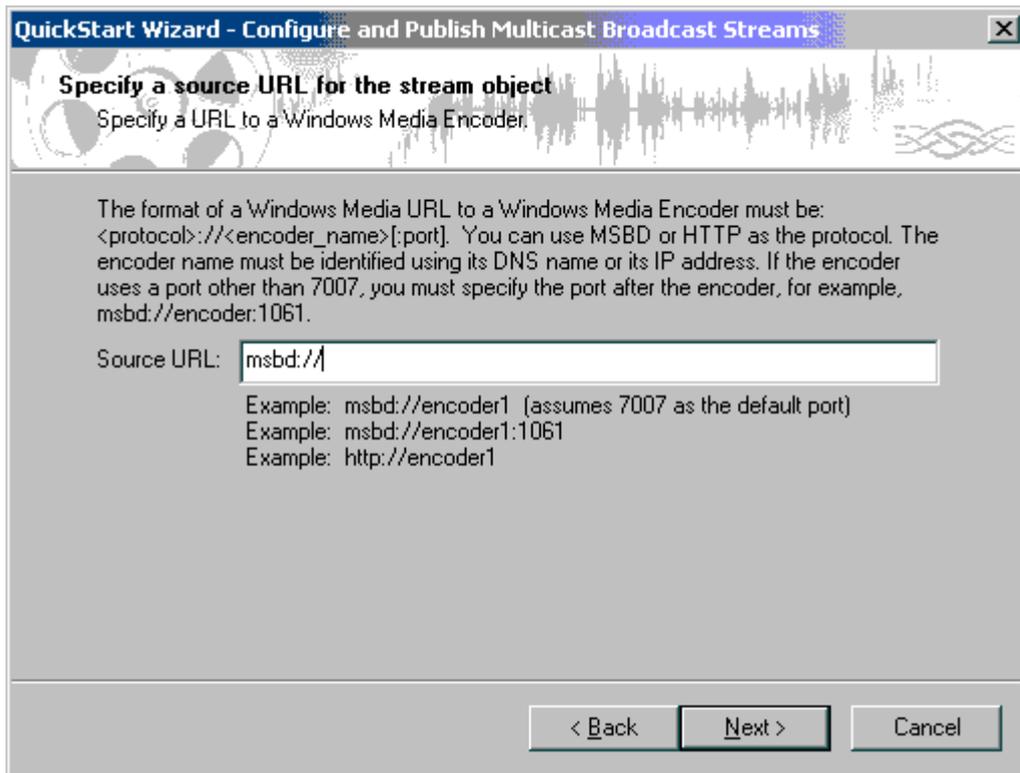


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Figure 18 Specifying an URL to an .asf File

In this example, we specify an URL for the .asf file that is our source. Later in this process, the Windows Media Administrator will generate an .asx file that wraps the URL into a format browsers other than Internet Explorer can understand. (See the "Using ASX Files" section earlier in this paper.)

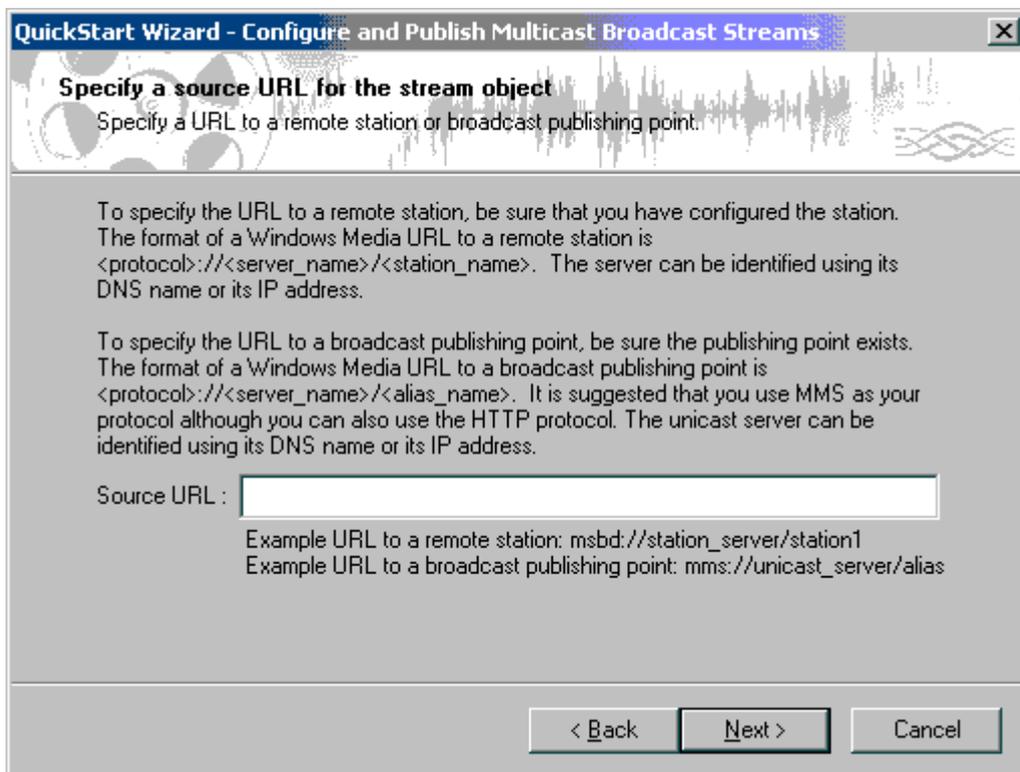
9. If we had selected the Windows Media Encoder option, the screen shown below, in Figure 19, would have been displayed:



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Figure 19 Specifying an URL to a Windows Media Encoder

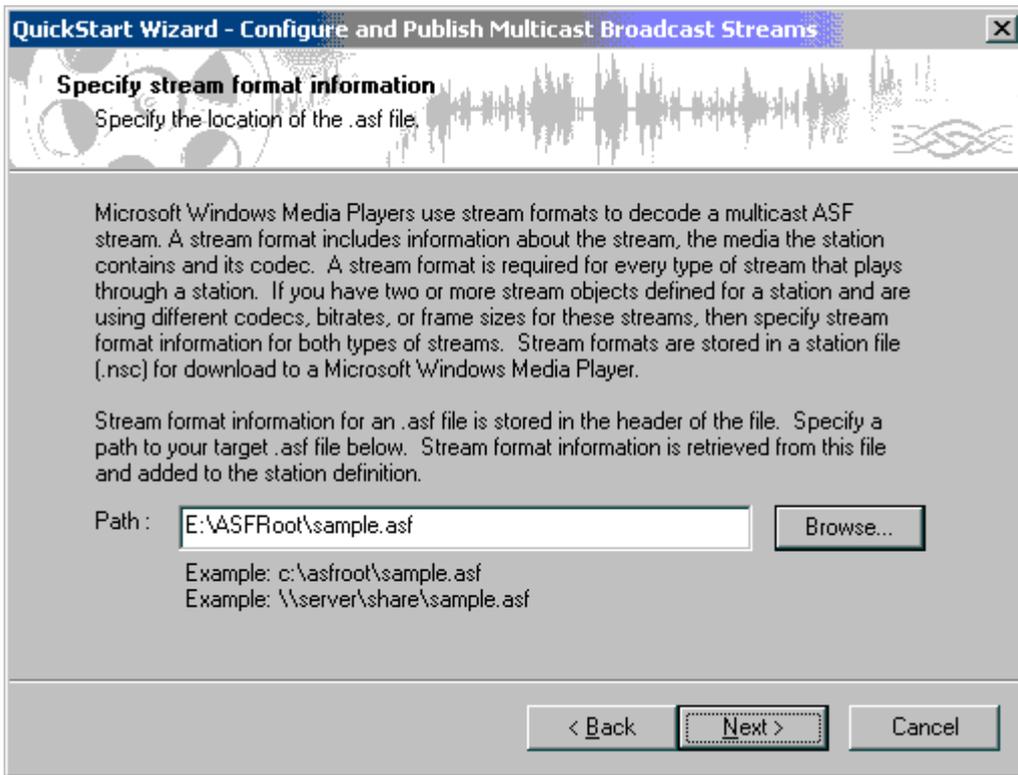
10. If we had selected the Remote station or broadcast publishing point option, the dialog box shown below in Figure 20 would have appeared:



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Figure 20 Specifying an URL to a Remote Station

11. Once you have specified the URL, click Next.
12. The Specify stream format information dialog box, shown below in Figure 21, appears:

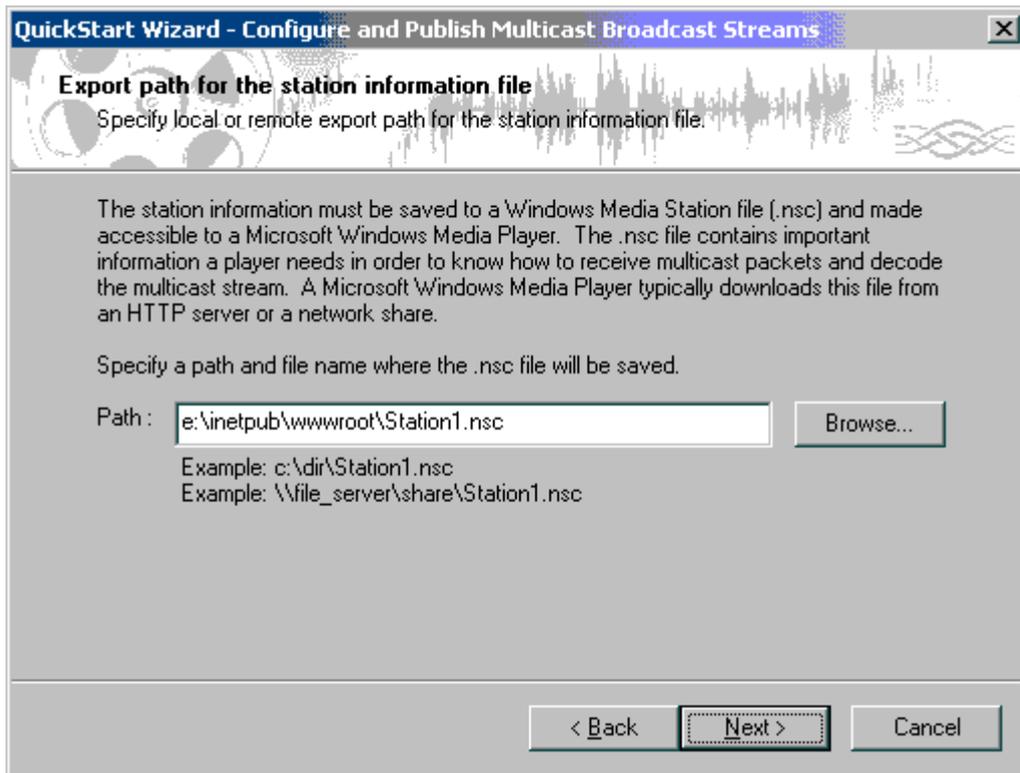


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Figure 21 Specifying a Path to the Source

Specify the location of the .asf file. The Windows Media Administrator needs to look at this file's header to learn information about it that the Windows Media Player will need, such as the type of media the file contains and the CODEC that was used. This information will also be stored in the .nsc file generated by the Windows Media Administrator.

13. The user must specify where the .nsc file will be saved. This is done in the "Export path for the station information file" screen shown in Figure 22, below:

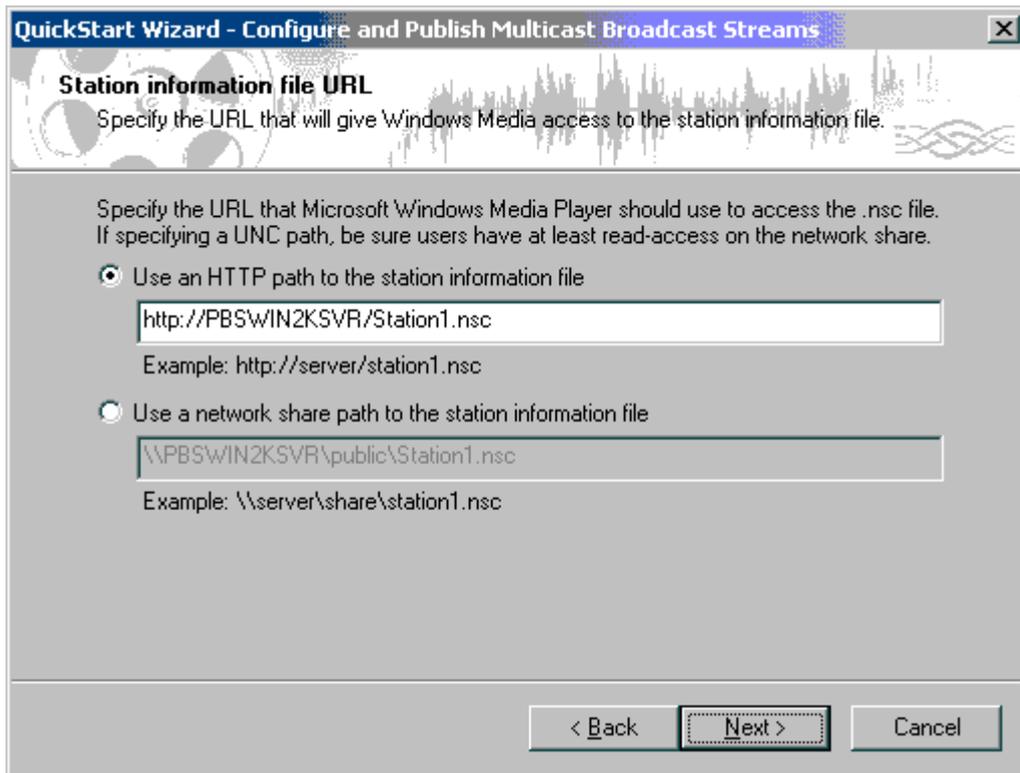


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Figure 22 Specifying a Path for the .nsc File

Specify the location where the .nsc file will be stored. This is usually on a Web server or network share. It must be accessible to your users so that their players can read it. To protect the file from unauthorized access, place it on a share that requires authentication. Click Next.

14. The Station information file URL screen, shown below in Figure 23, appears:

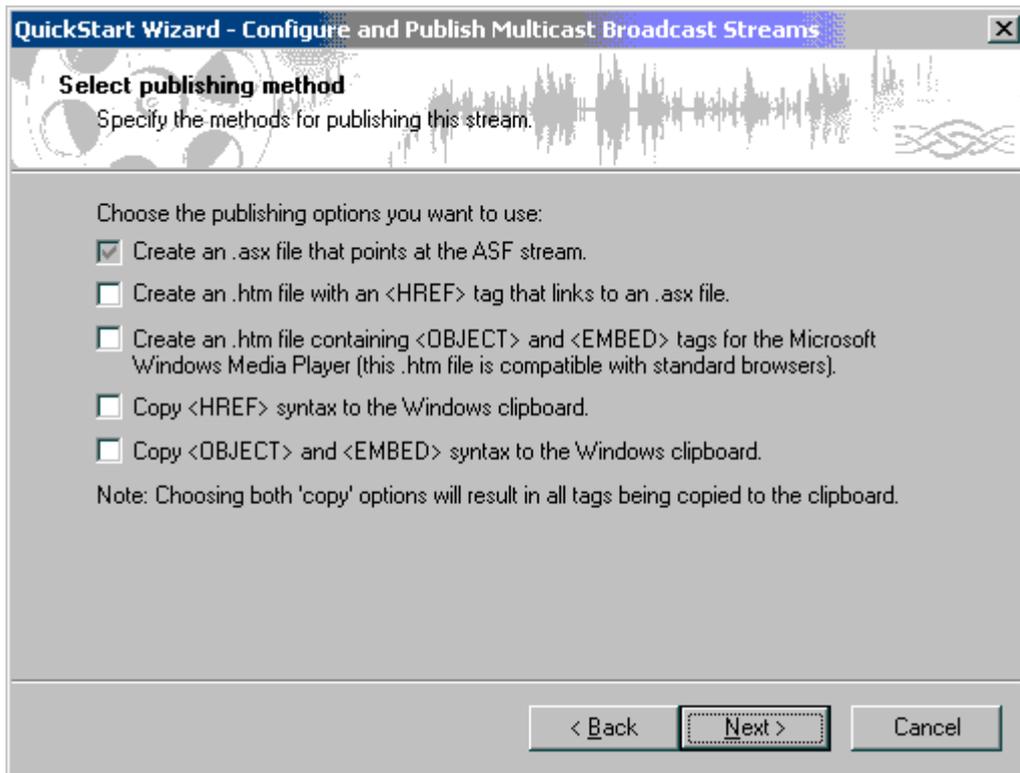


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Figure 23 Specifying an URL for the .nsc file

This is the URL a Windows Media Player uses to access the .nsc file. The URL can point either to a Web server or to a network share. In our example, we've specified a Web server. A Universal Naming Convention (UNC) path uses double slashes or backslashes to precede the name of the computer, while the directories are separated with a single slash or backslash. The examples shown on the screen are UNC paths. Click Next.

15. The Select publishing method dialog box, shown below in Figure 24, appears:

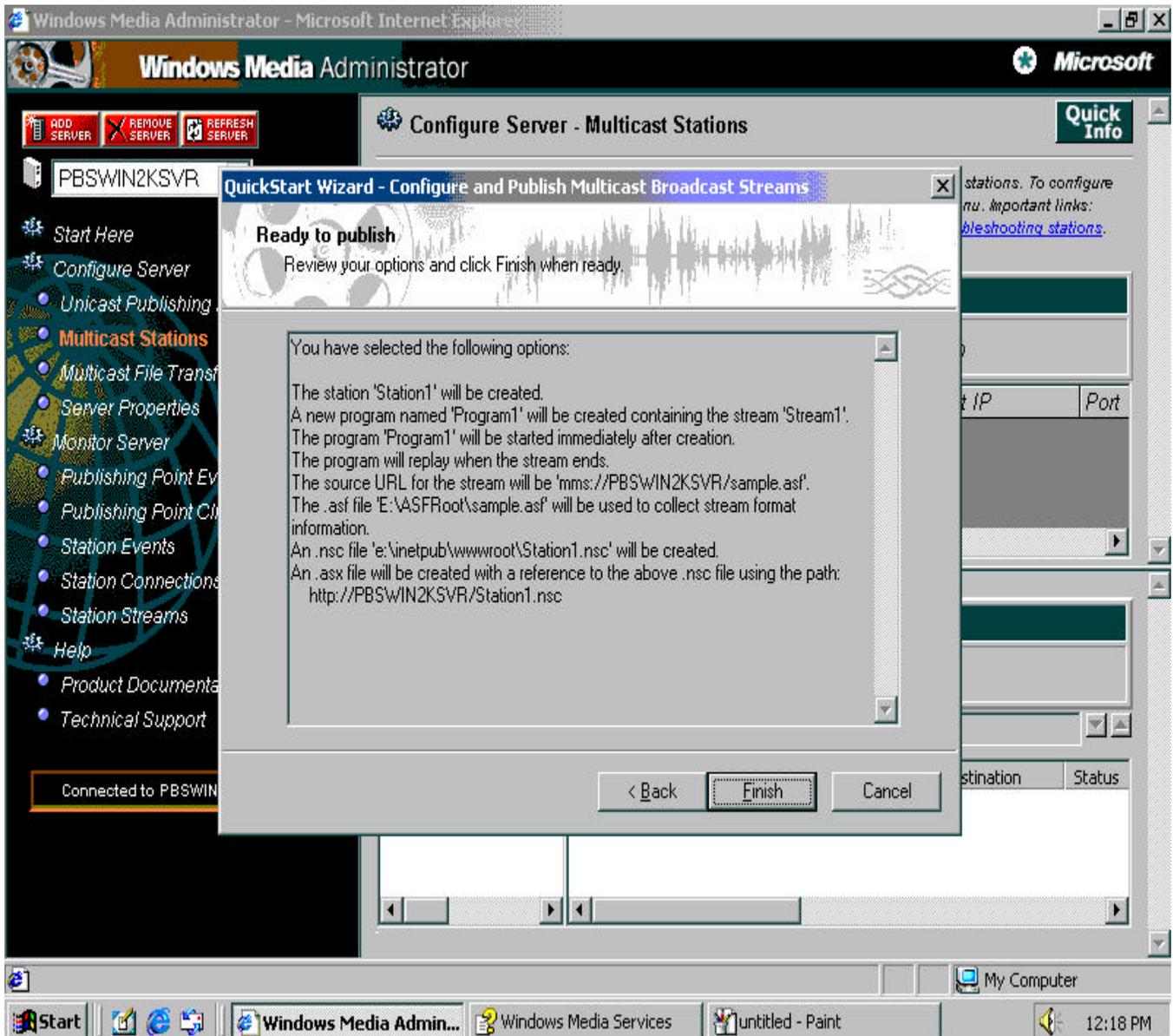


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Figure 24 Selecting a Publishing Method

This screen specifies how the .asf stream will be referenced. Remember that it is generally unwise to point directly to the mms stream. In our example, the Windows Media Administrator will generate an .asx file that references the stream. Click Next.

16. The Ready to publish dialog box, shown below in Figure 25, appears:



If your browser does not support inline frames, [click here](#) to view on a separate page.

Figure 25 Summary of Multicast Options

17. The final screen shows a summary of the station definition.

### Logging User Information

With multicast, there is no direct communication between the server and the users. This makes it difficult to gather information about who is listening and about the quality of the network connection to specific clients. To help with this problem, the Windows Media Player includes logging capabilities for multicast transmissions. These are implemented as an ISAPI DLL called Nsiislog.dll that runs on the IIS Service. To enable logging, (it is disabled by default) follow these steps:

1. Verify that the IIS directory containing nsiislog.dll is shared as a Web directory. Network clients must be able to access this file.
2. In the Windows Media Administrator menu frame, click Multicast Stations. The Multicast Stations page appears.
3. Under Stations, click the station for which you want to create the logging file, then click Stations, and then click Properties. The Edit Station page appears.

4. On the Edit Station page, in Logging URL, type the URL to Nsiislog.dll and then click OK. For example, type `http://server_name/scripts/Nsiislog.dll`, where *server\_name* is the name of the IIS server.

For more information on enabling logging, see the Windows Media Administrator Help files.

In general, the statistics fall into one of three categories: transmission quality, content information, and client information. Examples of transmission quality statistics are:

- How many packets were dropped
- How many packets were resent
- How many bytes were transmitted

Examples of content information include:

- Which audio and/or video CODECs were used
- What the URL of the .asf file is
- What the embedded URL is

An embedded URL is the URL of the Web page that contains an embedded Windows Media Player. By knowing this URL, you can discover who is using your content.

Examples of client information include:

- The Windows Media Player Globally Unique Identifier (GUID)
- How long a client received a particular stream
- The IP address of the client receiving the stream
- The Internet service provider (ISP) the client used

#### Other Uses for Multicast

Multicasting can be used to distribute files other than .asf files. Any time a single stream of data needs to be sent to multiple users, multicast should be considered as a way of conserving bandwidth. (This assumes that the network can support multicast. This is true, for example, if the network consists of a single LAN, or if the network devices, such as routers, support multicast.) A common example is to use Windows Media Technologies multicast to send Microsoft PowerPoint® presentations over a network, but it can be used with other types of files, or directories of files, as well. To configure a multicast file transfer, select the Multicast File Transfers option displayed by the Windows Media Administrator. There is a variety of parameters that can be set, including:

- The maximum bandwidth that should be used to send the data
- The duration of the transmission
- Whether clients can request that the server resend dropped packets

For more information, see the Windows Media Administrator Help files.

## Troubleshooting Multicast Transmissions

Although a complete guide to troubleshooting a multicast session is beyond the scope of this paper, this section includes some suggestions that may make your task simpler. Also, although not discussed in this paper, there are similar statistics available for unicast as for multicast. For more information on logging capabilities, see the Windows Media Administrator Help files.

### Checking the Files

First, make sure that the asx and .nsc files are accessible and that they contain no errors. Without these files, clients cannot join the multicast. Remember that if a default template for the encoder was not used, or if any of the values were changed, the .asd file must be specified. If any changes were made to the encoder after the multicast was configured, you must re-specify this file so that the .nsc file is up-to-date. If anything in the server configuration has changed since the multicast was configured, re-export the .nsc file. To do this, select Multicast Stations on the Windows Media Administrator, and then select Export.

### Checking Statistics

During the transmission, use the Windows Media Player to check statistics. To do this, right-click on the Windows Media Player and click Statistics. An example display is shown below, in Figure 26:

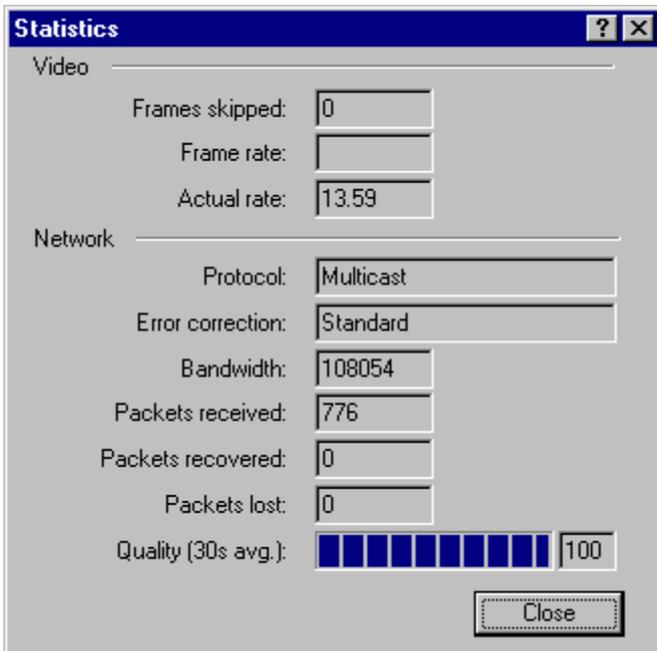


Figure 26 Windows Media Player Statistics

Make sure that Protocol is set to Multicast. Check Packets Recovered and Packets Lost to see if data is being lost. If the Packets Recovered counter is incrementing, the Windows Media Player is reconstructing packets that were dropped. This may be a sign of problems in the network. (These statistics are available for unicast broadcasts, as well.)

If, when configuring the multicast session, you enabled logging, you can use the Nsiislog.dll log to get more information once the session is over. Try to find trends, such as many users on a single segment having a problem.

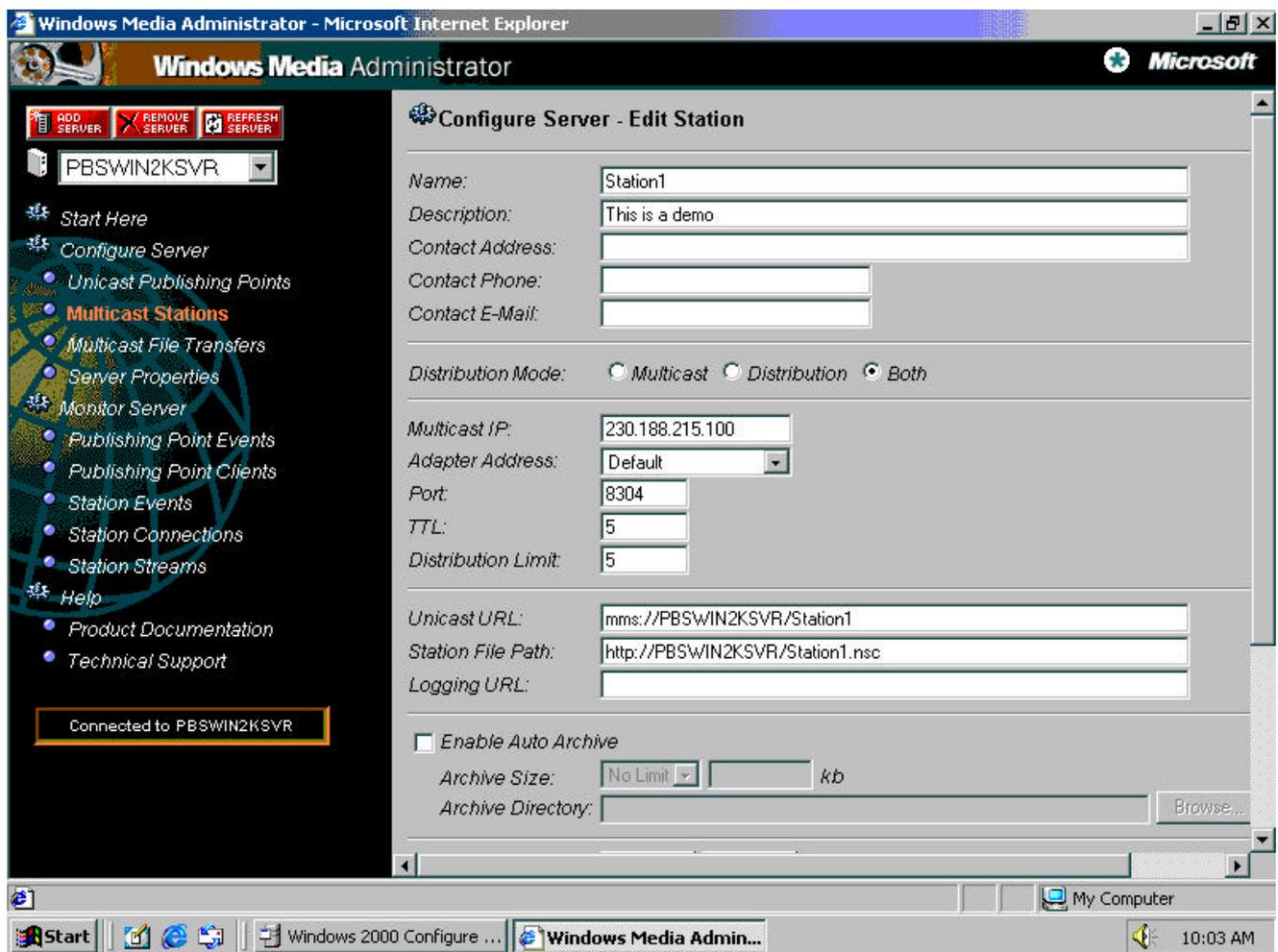
### Keeping Track of IGMP Versions

Be aware that different versions of the Windows operating systems implement different versions of the Internet Group Management Protocol (IGMP), which is used by clients to join a multicast session. The following table summarizes which version of Windows uses which version of IGMP:

Operating System	Version of IGMP
Windows 95	Version 1
Windows NT® 4.0 with SP3 or earlier	Version 1
Windows 98	Version 2
Windows NT 4.0 with SP4 or SP5	Version 2
Windows 2000	Version 2

### Isolating the Problem

Unless you are multicasting over a single LAN, multicasting typically involves multiple subnets and routers. Start on the segment where the server resides and move, hop-by-hop, through the network to try and isolate the problem. Also, make sure that the time-to-live (TTL) value is high enough to take the packet through every hop it must traverse. Basically, the TTL should equal the number of hops. If this number is too low, the packet will be discarded before it reaches the edges of the network. The default value is 5. To set the number of hops, click Configure Server, and then the station you want to edit. The Configure Server – Edit Station dialog box opens, shown below in Figure 27:



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Figure 27 Changing the TTL Parameter

Change the TTL entry to a higher value.

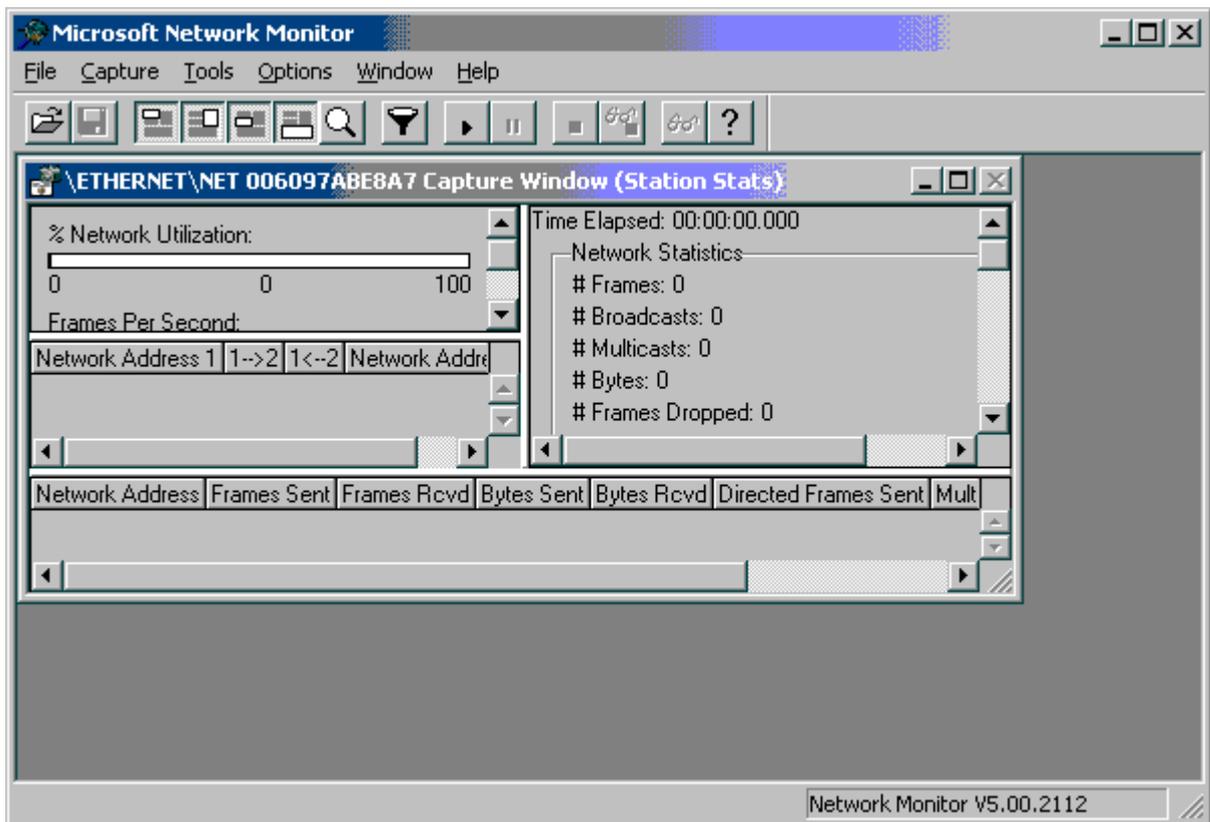
Finally, look for firewalls or any non-multicast enabled devices that might block the transmission to some segment of the network. If a router or switch that the packets must traverse doesn't understand multicast, then the packets are dropped. Also, as mentioned earlier, many firewalls will not pass UDP packets, which is the transport used for multicast transmissions.

There are a number of third-party monitoring tools available for investigating network problems and the Windows 2000 operating system itself contains some utilities. We will briefly discuss two: the *network monitor* and the *tracert* utility.

#### The Network Monitor

The network monitor, available with the System Management Server and, in an abbreviated version with the Windows 2000 Server, allows you to look at packets on the network. To access the network monitor, point to Programs on the Start menu, point to Administrative Tools, and click Network Monitor.

The Network Monitor is illustrated below, in Figure 28:



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Figure 28 The Network Monitor

The Network Monitor works by placing the NIC of the capturing host into *promiscuous* mode so that it passes every frame seen on the wire to the tracing tool. Capture filters can be defined so that only specific frames are saved for analysis. These filters can be configured based on source and destination NIC addresses, source and destination protocol addresses, and pattern matches. Once a capture has been obtained, display filtering can be used to further narrow down a problem. Display filtering allows specific protocols to be selected as well. For more information on using Network Monitor, consult the Help files.

#### The Tracert Utility

The *tracert* utility operates by sending a succession of groups of packets toward a specific destination-- the IP address of the desired destination computer. If you want to trace the route from your machine to whitehouse.gov, for example, type: `tracert whitehouse.gov`. Each router along the path returns information to the machine that initiated the trace, showing the user the IP address of the machine that

received the packets and the round-trip time (in milliseconds) of each packet. When the trace is complete, you will know the number of hops the packets needed to move from origin to destination, as well as the time taken by each hop.

The crucial component of the tracert operation is the TTL (time-to-live) values of the packets. Tracert sends a succession of three-packet groups with increasing TTL values. Along the path, each router decrements the TTL value by 1, then passes it along to the next router. The first group of packets is sent with a TTL of 1. The router at the first hop decrements the value to 0, causing the packet to expire, and sends the expiry information back to the origin machine. The second group then goes out with a TTL of 2, with the second router rather than the first returning the expiry information. This continues until either the maximum TTL value is reached or, ideally, the destination computer receives the packet. The tracert utility has a default maximum TTL value of 30, which means it can report the first 30 hops. You can increase this value by using the -h option (enter tracert alone on the command line for the list of options).

A sample tracert session is shown below in Figure 29:

```
C:\>tracert 198.207.140.69

Tracing route to sbprices.taltrade.com [198.207.140.69]
over a maximum of 30 hops:

  1  126 ms  117 ms  121 ms  laxm480208.jps.net [206.18.119.3]
  2  102 ms  119 ms  120 ms  199.107.163.1
  3  124 ms  104 ms  108 ms  eth1-1.lax-bb3.cerf.net [134.24.35.97]
  4  130 ms  103 ms  119 ms  atm11-0.lax-bb1.cerf.net [134.24.29.17]
  5  144 ms  108 ms  114 ms  atm0-0-0.br1.lax1.alter.net [134.24.32.54]
  6  109 ms  111 ms   92 ms  104.ATM10-0-0.XR2.LAX2.ALTER.NET [146.188.248.206]
  7  121 ms  123 ms  157 ms  100.ATM10-0-0.TR2.LAX2.ALTER.NET [146.188.248.138]
  8  205 ms  174 ms  208 ms  111.ATM5-0-0.TR2.CHI4.ALTER.NET [146.188.136.141]
  9  238 ms  184 ms  194 ms  100.ATM8-0-0.XR2.CHI4.ALTER.NET [146.188.208.105]
 10  190 ms  176 ms  174 ms  190.ATM11-0-0.XR2.CHI6.ALTER.NET [146.188.208.142]
 11  225 ms  192 ms  211 ms  190.ATM1-0-0.GW1.CHI6.ALTER.NET [146.188.208.69]

 12  207 ms  226 ms  214 ms  u12929-gw.customer.alter.net [157.130.99.74]
 13  227 ms  209 ms  212 ms  208.154.78.241
 14  209 ms  269 ms  214 ms  sbprices.taltrade.com [198.207.140.69]

Trace complete.
```

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Figure 29 Sample tracert Session

- Following is a response time rule of thumb: Up to 200 ms is good.
- 200 to 500 ms is marginal.
- Over 500 ms is unacceptable.
- An asterisk instead of a time means there was no response at all.

For more information about tracert, see the Windows 2000 Help files.