

About Darwin Streaming Server

Public Preview

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Darwin Streaming Service

What Is Darwin Streaming Service?

Darwin Streaming Service (DSS) is a technology that lets you view multimedia as it arrives at your computer. With streaming, your users can tune in to broadcasts of live or prerecorded media, or they can view prerecorded media on demand. Users see streamed media as soon as it reaches the computer; they don't have to wait to download files.

Media streams are sent from a server to a client computer in one of several ways:

- Unicast is a one-to-one transmission. Each client computer that tunes in to a stream receives its own stream.
- A multicast stream is sent to a group address. This means several client computers can tune in to the same stream.
- With a reflected multicast, the server receives a multicast stream, then sends it to each client that tunes in to the stream.

A QuickTime movie can be streamed only if it has been hinted. Hinting involves using software that analyzes the media data within a movie and creates hint tracks that tell the streaming server software how to package the data to send over the network. You can hint movies using the Pro version of QuickTime Player. When you hint a movie, QuickTime Player creates one hint track for each media track in the movie. The hint tracks are stored within the movie, and the movie becomes a hinted QuickTime movie.

Viewing Streamed Media: How It Works

A user can view streamed media by

- tuning in directly to a live or prerecorded broadcast using QuickTime Player
- using QuickTime Player to view multimedia on demand
- using a Web browser with the QuickTime Plugin to point to a Web page that has streamed media embedded in the page

When a user tunes in to a live broadcast, the Darwin streaming client (for example, QuickTime Player) sends a request to the Darwin Streaming Server. The server looks for a Session Description Protocol (SDP) file, and if it's found, begins to send the media to the client computer. An SDP file contains information about the format, timing, and authorship of the live broadcast. SDP files are created by broadcast software on the computer that captures the live media, but the SDP file must be copied to the streaming server before the media can be broadcast.

When a user tunes in to a prerecorded broadcast, a similar process happens: the server looks for an SDP file. In this case, an SDP file is created by PlaylistBroadcaster. If the SDP file isn't created on the streaming server, it must be copied to the streaming server before the prerecorded media can be broadcast.

When a user uses QuickTime Player to view multimedia on demand, the client computer sends a request for the server to play the multimedia file. The server looks for the hinted movie file, and if it's found, sends the media to the client computer.

When a user starts to play streamed media through a Web page, the QuickTime plugin sends a request to the server.

Who Should Use Darwin Streaming Service?

If you plan to broadcast multimedia in real time using your computer, you need to install and set up Darwin Streaming Service.

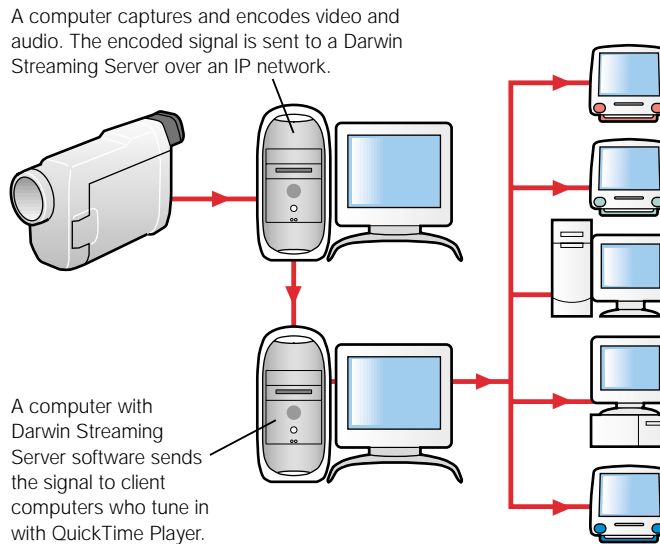
Before You Set Up Darwin Streaming Service

You need the following equipment to stream live audio or video:

- Recording equipment for audio, video, or both.
- A computer that has broadcast software and a video or audio capture card installed. You can also use a computer with a FireWire connection. You use this computer to capture and encode live audio or video and then broadcast it to your streaming server.
- A computer that has Darwin Streaming Server software installed. You use this computer to send the captured media to your viewers. The streaming server must be connected to the capture and encode computer over an IP network.

Sample Setup for Live Video

The illustration below shows a setup for streaming live video and audio. (Most video cameras have a built-in microphone.) You can stream audio only using a microphone, mixer, and other appropriate audio equipment.



Setting Up Darwin Streaming Service for the First Time

To set up and manage Darwin streaming services, you must use the Web-based Streaming Server Admin program. Streaming Server Admin requires the use of a computer capable of running Netscape Navigator, Netscape Communicator or Microsoft Internet Explorer, versions 4.5 or later.

Step 1: Open Streaming Server Admin

To open Streaming Server Admin:

- 1 Open a Web browser.
- 2 Enter the URL for Streaming Server Admin on your server.

For example:

`http://www.myserver.com:1220`

Replace “www.myserver.com” with the name of your server.

- 3 Type your login ID and password in the Login and Password text fields, then click Submit.

The Streaming Server Admin Web page appears and provides a quick snapshot of the server's status. Click the Status, Settings, or Logs button at the top of the page to administer those areas.

To get online help when using Streaming Server Admin, click the question mark.

Step 2: Choose Your Streaming Server Settings

To change the settings for streaming services:

- 1 Click Settings.
- 2 Click either General Settings or Log Settings.
- 3 Make the changes you want and click Submit.

Step 3: Setting Up a Web Page to Show Streamed Media (Optional)

You can embed streamed media in a Web page. If you do this, viewers can use any Web browser to view the media by entering the URL of the Web site.

For example:

`http://www.mywebpage.com/`

You replace “www.mywebpage.com” with the DNS name of your Web site.

To embed live media in a Web page, you must create a reference movie containing a streaming track with an RTSP URL pointing to the media on your streaming server. You store the reference movie on your Web site and include a link to the reference movie on your Web page.

Streaming Server Settings

General Settings

Set Movies directory

Anything in the folder you specify is available for streaming. This includes

- individual files
- folders that contain files
- links to media located elsewhere

The default location of the media folder is `/usr/movies/`.

Server Name/Default Realm

A name given to the server that provides basic authentication.

Streaming via HTTP Port 80

Choose whether you want to serve media streams on HTTP port 80 or not. If you need to serve streams past firewalls, you may need to enable streaming on port 80.

Maximum number of connections

When the maximum number of connections is reached, users who try to connect see a message that the server is busy (error 453).

Maximum throughput

This is the maximum throughput of the network. If the maximum throughput is reached, no one else can connect. Users who try to connect see a message that the server is busy (error 453).

Administrator's password

Enter the server administrator's login password. Confirm by entering the login password again on the next line.

Log Settings

Adjust these settings by changing information in the fields or clicking the preferred button. You can specify that the log be reset after a certain number of days or after it reaches a certain size (in Kb).

Error log

The error log shows error messages. Use this to troubleshoot problems with the server.

Access log

The access history log shows the number of times each media file was accessed since the log was reset. For a complete list of what's stored in the log, see Access log format.

Connected Users

With this panel, you can view the number of clients connected to your streaming server. You can display the information in a number of ways using the screen controls described below.

Number of entries to display

To adjust the number of users displayed:

- Choose a number from the pop-up menu.

Update interval for this page

To adjust how often the page is updated:

- Choose a number from the pop-up menu.

Selecting sort order

To select the sort order:

- Choose either Ascending or Descending from the pop-up menu.

Selecting sort column

To select how connected users are sorted:

- Click the column label by which you want to sort the user information.

Overview of Streaming Live Audio or Video

To stream live audio or video, you need to do the following:

- Set up your broadcast software following the instructions that came with it.
- Connect the audio or video equipment to the computer you're using to capture and encode the signal.
- Use your broadcast software to create a Session Description Protocol (SDP) file on the computer you use to capture and encode the live signal.

See the instructions that came with your broadcast software.

- Copy the SDP file to your Darwin Streaming Server computer.
Be sure to copy the file into the media folder you're using for streaming.
- If you want the streamed media to show on a Web page, set up the Web page.
- Make sure streaming service is started.
- Start the capture software following the instructions that came with it.
- Tell users how to view the streamed media.

Preparing Stored Media for Streaming

To prepare stored media for streaming:

Step 1: Add Hint Tracks to Your Media

Hint tracks contain information the streaming server needs to stream the media properly. Most authoring applications let you export media as a hinted QuickTime movie. You can also hint a movie using the Pro version of QuickTime Player.

Each track in a media file must have its own hint track. For example, a movie with one audio and one video track must have two hint tracks: one for the audio track and one for the video track.

You can use the Pro version of QuickTime Player on most Mac OS and Windows computers. Check the QuickTime Web site for information on system requirements and installation instructions for QuickTime Pro.

When you use QuickTime Player to export a movie as a hinted movie, QuickTime adds the appropriate number of hint tracks automatically.

To export a QuickTime movie as a hinted movie:

- 1 Open the Pro version of QuickTime Player on a Mac OS or Windows computer.
- 2 Open the media file you want to hint.
- 3 Choose Export from the File menu.
- 4 Choose "Movie to Hinted Movie" from the pop-up menu, then type a new filename.
- 5 Click Options in the export dialog box.
- 6 Select Optimize Hints For Server (optional — improves the server's ability to stream to more clients but can double the size of the file).
- 7 Click OK.
- 8 Click Save.

Step 2: Copy the Media File to the Media Folder on Your Darwin Streaming Server

A QuickTime movie does not need to have a video track. It can consist only of audio. For example, a CD track can be encoded as a QuickTime movie.

Streaming Media Files With Multiple Sources

QuickTime movies often consist of content from several media files. For example, a video clip might be combined with music from one or more CD tracks. When you export a QuickTime movie, you should make it a “self-contained” file so that it includes all the sources.

To stream movies that are not self-contained, in addition to hinting, you must

- copy all the files needed by the movie to the same location
- store all the files in the media folder you specified on your Darwin Streaming Server

Using PlaylistBroadcaster to Broadcast Prerecorded Audio or Video

With PlaylistBroadcaster, you can create a virtual “radio station” or video broadcast by setting prerecorded QuickTime media files to play in a specified order (a “playlist”). PlaylistBroadcaster broadcasts the media to the Darwin Streaming Server, which sends the media to viewers in the sequence you set up (random or ordered). Although the media is prerecorded, it appears to viewers as a live broadcast. All viewers see the same media being played when they tune in to the broadcast.

To broadcast media, you need to do the following:

Step 1: Prepare QuickTime Media and a Reference Movie File

PlaylistBroadcaster can broadcast any media that the Darwin Streaming Server is capable of streaming.

To prepare the media, do the following:

- Use the same number and types of tracks for each movie. Be sure all the media files contain compatible media types. For example, all audio tracks should use the same encoding, compression, and bit rate. All video tracks should also use the same encoding, compression, and bit rate.
- Format the media in each file in the same way. For example, use the same frame size for each file that contains a video track.
- Be sure each item is a hinted QuickTime movie.

To prepare a reference movie:

- Usually you specify the first media file in a playlist as the reference movie. However, you can author a separate reference movie.
- If you author a separate reference movie, it must be a hinted QuickTime movie that contains the same number of tracks, type of tracks, encoding, compression, and bit rate used in the actual media files.

Step 2: Create a Playlist

The playlist text file specifies the media files used in the broadcast by pathname. You can use any text editor to create a playlist.

Note: If you change a playlist file, you must stop and restart the broadcast for changes to take effect.

The playlist file:

- must begin with `*PLAY-LIST*`
- can consist of pathnames for individual media files or other playlist files
- must include the complete or relative pathname of each media file or playlist file
- must include a “+” symbol before the pathname to any other playlist
- can include a weight for individual media files, but not for a playlist
- can be named anything you like
- can be stored anywhere on your server

Setting the Sequence and Weight of Your Media Files

You can broadcast the media in the playlist sequentially or randomly, either once through the list or repeatedly through the list.

If you broadcast the media randomly, you can specify a “weight” for each media file in the list. The weight, which is a number from 1 to 10, determines how often an item plays. Media files that are weighted as 10 play more often than media files weighted with lower numbers. (You place the weight after the movie name, as shown in the example below.) The default weight for a media file is 10. In addition to using weights, you can prevent a media file from playing again until a specified number of other media files play.

Example playlist file:

This playlist file contains individual media files with weights and two other playlists:

```
*PLAY-LIST*
# Lines beginning with “#” are comments
#
# individual media files with weights
/music/jazz/take5.mov 2
/music/rock/freebird.mov 9
/music/reggae/onedrop.mov 5
#
# path to another playlist
+/music/classical/playlist.txt
#
# relative path to another playlist
+funk/funkplist.txt
#
#individual media file with space
"/music/jazz/ice cream love.mov" 9
```

If a pathname includes spaces, enclose the pathname in quotation marks. Hinted media files and playlists can be stored anywhere on your server, not just in the media folder. Hinted media files stored outside of the media folder can be broadcast as part of a playlist but are not directly accessible by QuickTime clients.

Step 3: Create a Broadcast Description File

The broadcast description file is a text file that specifies how the media should be broadcast, the playlist file, the IP address of the Darwin Streaming Server, and other information about the broadcast.

Example file:

```
playlist_file/server/local/media/lists/playlist1
play_mode weighted_random
sdp_reference_movie /music/jazz/take5.mov
destination_ip_address 12.123.123.123
destination_base_port 5004
recent_movies_list_size 10
sdp_file /server/QTSS/movies/playlist1.sdp
logging enabled
log_file /server/local/playlist1.log
```

To create a broadcast description file, you can use any text editor, such as TextEdit on Mac OS X Server. You can give the file any name you like and you can save the file to any location on your server. Make sure you save the file in text-only format. TextEdit saves files in RTF (Rich Text Format) unless you specify another format.

The file must contain these keywords followed by the appropriate value:

Keyword	Value
playlist_file	playlist filename and path; can be complete or relative path For example: /server/local/media/lists/playlist1
play_mode	can specify one of three modes: <ul style="list-style-type: none">sequential The media is broadcast in the order it appears in the playlist file. When the last media file is done playing, the broadcast stops.sequential_looped The media is broadcast in the order it appears in the playlist file. When the last media file is done playing, the playlist repeats in the same order.

Keyword	Value
	<ul style="list-style-type: none"> • <code>weighted_random</code> <p>The media is broadcast in random order using the specified weights to determine how often an item plays. The media continues to play in random order until you stop the broadcast.</p>
<code>sdp_reference_movie</code>	<p>sdp reference movie file path and name The complete or relative pathname of the reference movie, which can be one of the media files you are broadcasting. PlaylistBroadcaster uses the reference movie to create an SDP file.</p> <p>For example:</p> <p><code>/music/jazz/take5.mov</code></p>
<code>destination_ip_address</code>	<p>IP address of the local streaming server you use to broadcast the media.</p> <p>The default value is the IP address of the computer that has PlaylistBroadcaster and Darwin Streaming Service installed. You can also specify the IP address of another computer running Darwin Streaming Server (unicast) or a multicast address. For example:</p> <p><code>12.123.123.123</code></p>

Keyword	Value
<code>destination_base_port</code>	<p>The base port number for the broadcast must be an even number. If you do not specify a port number, the default port (5004) is used.</p> <p>Each track of the media you broadcast requires two ports. If the media contains more than one track (for example, video and sound), PlaylistBroadcaster uses the destination base port as the starting port number, then assigns (in ascending order) port numbers to other tracks automatically.</p> <p>Important Each track of every broadcast you play simultaneously (up to 30) must use a different port number. If you stream more than one broadcast of multitrack media from your Darwin Streaming Server, be sure to assign destination base ports so that tracks do not play on the same port.</p> <p>For example, if you use the default destination base port for a broadcast in which the media has three tracks (video, audio, and text), then the broadcast will use ports 5004 through 5009 (two for each track). If you want to broadcast another stream, then you should set the destination base port of the second stream to at least 5010.</p>
<code>recent_movies_list_size</code>	<p>the minimum number of files that must play before a file may be repeated</p> <p>You can specify this only if the play mode is <code>weighted_random</code>. By default this value is zero (0), so that all the media files play randomly based only on the weight you have assigned to each one.</p> <p>Be sure to set this value to a number less than the number of media files in the playlist. If you set it to a number equal to or greater than the number of media files, the broadcast will play each media file once then stop.</p>

Keyword	Value
sdp_file	<p>SDP file path and name; can be complete or relative path</p> <p>For example:</p> <pre>/server/QTSS/movies/ playlist1.sdp</pre> <p>You must specify a Session Description Protocol (SDP) file. The SDP file must be in the media folder you set up for Darwin Streaming Server. If the SDP file you specify doesn't exist in this location, PlaylistBroadcaster creates one.</p> <p>Important If you stop a broadcast and change the broadcast description file, be sure to delete the SDP file from the media folder before you restart the broadcast. Otherwise PlaylistBroadcaster won't create a new SDP file, and your changes won't take effect.</p>
logging	<p>enabled or disabled</p> <p>If you enable logging, PlaylistBroadcaster records information about the broadcast in the log file, including error messages.</p>
log_file	<p>log file path and name</p> <p>For example:</p> <pre>/server/local/playlist1.log</pre> <p>If you enable logging but do not specify a log file, then PlaylistBroadcaster creates a log file with the name of the broadcast description file followed by ".log" in the same directory as the broadcast description file.</p>

Step 4: Start Broadcast Service

To start and stop PlaylistBroadcaster, you need to open a terminal window on the computer where the Darwin Streaming Server is running. You can start and stop broadcasting for each playlist you create.

You can also use Telnet to connect to that computer to start, stop, and otherwise control broadcasts.

Before you start a broadcast

If the playlist you are broadcasting includes a large number of media files, run a “preflight” check before you start the broadcast.

To run a preflight check:

- 1 Open a terminal window.
- 2 Type this command:

```
PlaylistBroadcaster <broadcast_filepath> -preflight
```

You replace <broadcast_filepath> with the complete or relative pathname of the broadcast description file for this broadcast.

Preflight checks each media file in the playlist to make sure it can be broadcast.

After the preflight check is complete, you see information about the broadcast description file and a list of any problems that are found.

Starting a broadcast

To start broadcasting media from a playlist:

- 1 Open a terminal window.
- 2 Type this command:

```
PlaylistBroadcaster <broadcast_filepath>
```

You replace <broadcast_filepath> with the complete or relative pathname of the broadcast description file for this broadcast.

If an SDP file doesn’t already exist, then an SDP file is created when broadcasting starts.

If you are restarting a broadcast after you made changes to the broadcast description file, be sure to remove the SDP file from the Darwin Streaming Server media folder before restarting the broadcast. Removing the file forces PlaylistBroadcaster to create a new SDP file.

Stopping a broadcast

If you are broadcasting only one playlist, open a terminal window and type the following command:

```
PlaylistBroadcaster -stop 1
```

If you are broadcasting more than one playlist, you need to list the broadcasts to find the broadcast index for the playlist you want to stop broadcasting. Then open a terminal window and type the following command:

```
PlaylistBroadcaster -stop <broadcast index>
```

You replace <broadcast index> with the index of the broadcast you want to stop (see “Listing Broadcasts” on page 18 for more information).

Step 5: Tell Users How to Connect to the Broadcast

To connect to the broadcast, users need software that can play QuickTime media, such as QuickTime Player.

For best results, users should have the latest version of the QuickTime software installed on their computers.

If you set up a Web page to show streamed media, users can connect to a broadcast using a Web browser that has the QuickTime Plugin installed. You need to provide users with the URL for the Web page.

If users tune in to the broadcast using QuickTime Player, you need to provide them with the URL for the Session Description Protocol file that connects to the playlist broadcast.

Listing Broadcasts

When a broadcast is started, it's assigned an index and a process ID number. If you want to see what broadcasts are running, open a terminal window on the computer where Darwin Streaming Server is running and type:

```
PlaylistBroadcaster -list
```

You will see a list of the active playlists. Here's an example:

```
[1] JazzBroadcast.txt; pid: 12318
```

```
[2] RockBroadcast.txt; pid: 12389
```

```
[3] ClassicBroadcast.txt; pid: 12730
```

The number at the beginning of each item is the broadcast's index. You need this number to stop a broadcast. The number at the end is the process ID of the broadcast.

Session Description Protocol files

A Session Description Protocol (SDP) file contains information about the format, timing, and authorship of the streamed media. The SDP file is usually created by broadcast software. For live streaming, SDP files are created on the capture and encoding computer by the broadcast software. For broadcasts of prerecorded media, an SDP file is created on your Darwin Streaming Server by PlaylistBroadcaster. To stream either live or prerecorded media, you place the SDP file in the media folder you've designated in Streaming Server Admin.

In most cases you should not modify the SDP file manually. However, if you change anything about the media you're streaming, you must delete the SDP file, let the broadcast software create a new SDP file, then copy this new SDP file to the media folder on your Darwin Streaming Server.

Important When you use PlaylistBroadcaster, if an SDP file already exists, the broadcast software will not create a new SDP file, even if you've made changes to the media you want to stream. You must delete the outdated SDP file for a new one to be created.

Solving Problems With PlaylistBroadcaster

If you enable logging, you can use the log file to troubleshoot problems that occur during the broadcast.

If the media in the playlist is not being broadcast:

Use ProcessViewer to be sure the PlaylistBroadcaster is running. If it is and the media is not being broadcast, stop the broadcast, delete the Session Description Protocol (SDP) file for the broadcast from the Darwin Streaming Server media folder, then restart the broadcast. A new SDP file is generated when you restart the broadcast. Make sure the broadcast description file is complete and doesn't contain errors. If you change the broadcast description file, stop the broadcast, delete the SDP file for the broadcast, then restart.

If the media in the playlist is not being broadcast randomly:

Make sure the weighted_random play mode is specified in the broadcast description file.

If the media plays once and then stops:

Make sure the broadcast description file specifies that the play_mode parameter is sequential_looped or weighted_random.

If you broadcast the playlist as weighted_random and set a value other than zero for the recent_movies_list_size, make sure the number is less than the number of media files in the playlist.

If some media in the playlist is not played:

Check the weight you have assigned to each media file in the playlist. If you change the playlist, you must stop and start the broadcast for the changes to take effect.

Check the setting for the recent_movies_list_size in the broadcast description file. If you change the broadcast description file, be sure to stop the broadcast, delete the SDP file for the broadcast from the Darwin Streaming Server movie folder, then start the broadcast again.

If the media isn't streaming correctly:

Be sure the content, format, and encoding of the media is the same for all files in the playlist. Also, be sure users have the latest version of the QuickTime software installed on their computers.

If the streaming is slow:

Be sure each media file is a hinted movie optimized for the server.

Inside Darwin Streaming Service

Compatible File Formats

You can stream these media files using Darwin Streaming Server, as long as the media is hinted:

Category	Formats
Video	QuickTime AVI
Audio	AIFF/AIFC SoundDesigner II System 7 Sound uLaw (AU) WAV
MIDI	Karaoke MIDI Standard MIDI

Media files can be compressed using these methods:

Category	Compression-Decompression Method (CODEC)
Preferred video	Sorenson Video H.263 Motion JPEG A H.261
Supported video	Animation Cinepak Graphics Motion JPEG B MPEG1 MPEG2 Photo JPEG Video None

Category	Compression-Decompression Method (CODEC)
Preferred audio	QDesign Music codec QUALCOMM Pure Voice DVI 4:1 ALaw 2:1 uLaw 2:1 16-bit raw
Supported audio	IMA 4:1 MACE 3:1 MACE 6:1

Controlling Access to Streamed Media

Darwin Streaming Server comes with two authentication modules you can use to control access to streamed media files.

- **QTSSAccessModule**

This module lets you set up access to Darwin streaming service, but not to any other service on the Mac OS X Server.

Setting Up QTSSAccessModule

To use QTSSAccessModule, you must:

- create an access file
- create a user file
- add users to the file

You can also create a group file, but it's optional.

Creating an access file

An access file is a text file that contains information about users and groups who are authorized to view media in the folder in which the access file is stored. The folder you use to store streamed media can contain other folders. Each folder can have its own access file. When a user tries to view a media file, Darwin Streaming Server checks for an access file to see whether the user is authorized to view the media. The server first looks for an access file in the directory where the media file is located. If an access file is not found, it looks up the directory hierarchy. The first access file that's found is used to determine whether a user is authorized to view the media file. The access file for Darwin Streaming Server works similarly to the Apache Web server access file.

You create an access file with any text editor. The filename must be named “.qtaccess” and the file must follow this format:

```
AuthName <realm>
AuthUserFile <user filename>
AuthGroupFile <group filename>
require user <username1> <username2>
require group <groupname1> <groupname2>
```

Anything not in angled brackets is a keyword. Anything in angled brackets is information you supply.

- *realm*: is the name of the server you want users to see. It's optional. If you don't specify an AuthName value, it defaults to "Streaming Server". You can have a different AuthName value for each protected folder.
- *user filename*: is the path and filename of the user file. The default is /etc/streaming/qtusers.
- *group filename* is the path and filename of the user file. The default is /etc/streaming/qtgroups. A group file is optional. If you have a lot of users you may find it easier to set up one or more groups, then enter the group names, rather than list each user.
- *username* is a user who is authorized to log in and view the media file. The user's name must be in the user file you specified. You can also specify *valid_user*, which designates any valid user.
- *groupname* is a group whose members are authorized to log in and view the media file. The group and its members must be listed in the group file you specified.

Creating a user file

To let users access your media files, you must add them to a user file.

To create a user file, open Terminal and type the following:

```
qtpasswd -c <user filename> <username>
```

You'll be asked to enter a password for the user. Then re-enter the same password a second time when prompted.

A file is created with the user you specified.

Note: The `-c` option means create a file. You use this option only once; otherwise you will overwrite a previously created user file.

Adding users to the user file

To add a user to the user file, open Terminal and type:

```
qtpasswd <user filename> <username>
```

You'll be asked to enter a password for the user. Then re-enter the same password a second time when prompted.

You can allow access to any user by typing:

```
qtpasswd <user filename> valid_user
```

Adding or deleting groups

You can create a group file with any text editor as long as it follows this format:

```
<groupname>: <username1> <username2> <username3>
```

To add or delete a group, edit the text file you set up.

Deleting users

To delete a user from a user or group file:

Use a text editor to open the user or group file. Delete the user name and encrypted password from the user file; delete the user name from the group file.

Changing a password

To change a user password, open Terminal and type the following:

```
qtpasswd <user filename> <username>
```

You'll be asked to enter a password for the user. The password you enter replaces the password that's in the file.

Getting Media Through Firewalls or Networks With Address Translation

Darwin Streaming Server sends data using User Datagram Protocol (UDP) packets. Firewalls designed to protect information on a network often block UDP packets. Client computers located behind a firewall that blocks UDP packets are unable to receive streamed media. However, Darwin Streaming Server also allows streaming over HTTP connections, which allows streamed media to be viewed through even very tightly configured firewalls.

If users are having problems viewing media through a firewall, they should upgrade their QuickTime software to the latest version. If users still have problems, their firewall administrator should provide them with the appropriate settings for the Streaming Proxy and Streaming Transport panels of the QuickTime Settings control panel.

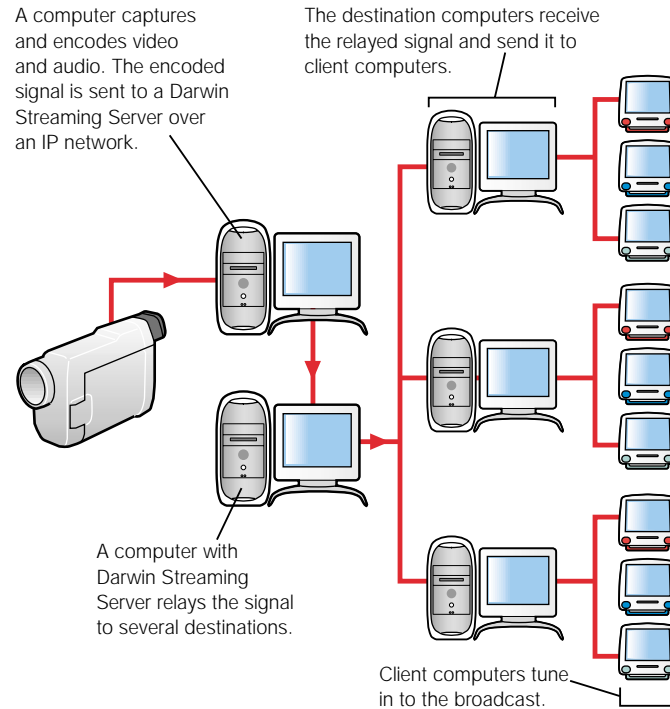
Network administrators can also set their firewall software to permit RTP and RTSP throughput.

Depending on how a network administrator has set up address translation, some client computers located on networks that use address translation are unable to receive UDP packets, but they can receive media that's streamed over HTTP connections. Users who want to view streamed media should upgrade their QuickTime software to the latest version. Their network administrator may need to provide users with the appropriate settings for the Streaming Proxy and Streaming Transport panels of the QuickTime Settings control panel.

Setting Up a Relay

A relay listens to an incoming broadcast (either unicast or multicast), and forwards, or relays, that broadcast to one or more destination addresses. The destination addresses may be unicast or multicast. You can set up your server to relay multiple broadcasts at the same time.

Sample setup for relaying a live broadcast:



Setting Up a Relay Configuration File

You set up a relay by creating a relay configuration file and copying it to the `/etc` directory. The easiest way to create a relay configuration file is to edit the sample file provided with your streaming server software. The path and filename for the sample file is: `/etc/streaming/streamingrelay.conf`

A relay source and one or more relay destinations are part of a unit. Information about a relay destination must immediately follow information about a relay source. You may have more than one unit in a configuration file.

The following example has one source and two destinations.

Important Although the `relay_source` and `relay_destination` lines are each split over two lines in the example, each must be on one line in your configuration file.

Example relay configuration file:

```
relay_source "in_addr=224.98.98.45 src_addr=17.98.45.45 in_ports=5000
             5002 5004 ttl=15"
relay_destination "dest_addr=17.254.98.45 out_addr=17.98.45.45
                  dest_ports=1980 1982 1984"
relay_destination "dest_addr=226.91.45.78 out_addr=17.98.45.45
                  dest_ports=10010 10012 10014 ttl=15"
```

These are the keywords and values that can appear in the relay configuration file.

Keyword	Value
relay_source	followed by these keywords and an appropriate value for each keyword: in_addr, src_addr, in_ports, ttl
in_addr	input IP address. If the source broadcast is a multicast, this is the multicast IP address. If the source broadcast is a unicast, this must be one of the IP addresses on the source computer.
src_addr	IP address of source (optional)
in_ports	port number of the RTP streams in the source broadcast. These must be even numbers. The number of input ports should match the number of output ports; make sure port numbers are unique and don't overlap
ttl	time-to-live value (if it's a multicast source) A time-to-live value is used with multicasts to specify the number of times a media stream can be passed from one router to another before the stream is no longer transmitted. The value can be any number between 0 and 255. A value of 1 reaches client computers on the local area network. The larger the number, the farther the multicast packets will travel.
relay_destination	followed by these keywords and an appropriate value for each keyword: dest_addr, out_addr, dest_ports, ttl
dest_addr	destination IP address (unicast or multicast) of the relay
out_addr	IP address of the interface on which to send out multicast packets (optional). If not set explicitly, the output interface is chosen automatically.

Keyword	Value
dest_ports	port numbers of the RTP streams in the destination relay. These must be even numbers. The number of output ports should match the number of input ports; make sure port numbers are unique and don't overlap
include	followed by a path and filename for a relay configuration file

Turning a Relay On or Off

To turn off a relay, delete or remove the file from the /etc directory. Then stop and restart Darwin streaming service.

To turn on a relay, create or copy a relay configuration file to the /etc directory. Then stop and restart Darwin streaming service.

Multicasting

Multicasting is a term used for streaming data to multiple destinations at the same time. It's an efficient way to send high bandwidth data, such as multimedia, when you have a large number of users who want the same data.

Data is usually sent over the Internet through unicasting. For example, with a unicast, each user who wants to view a movie gets his or her own copy transmitted from the server. If one thousand users request to view the same movie, then one thousand copies of the stream are transmitted over the Internet. With multicasting, only one copy of the movie is transmitted, but any user who wants to view it can tune in to the transmission.

Because the Internet is set up to do unicasting and not multicasting, several protocols and technologies have been created to allow multicasts to be transmitted over the Internet:

- *Multicast IP addresses:* A range of IP addresses has been set aside as multicast addresses. The range is 224.0.0.0 to 239.255.255.255.
- *Multicast Backbone (MBONE):* The MBONE is a virtual network that supports IP multicasting. It uses the same physical media as the Internet, but it's designed to "repackage" multicast data packets so they appear to be unicast data packets.
- *Tunneling:* This is a scheme of hiding multicast packets so that unicast routers will transmit the packets.
- *Multicast routers:* These are devices that can recognize multicast packets and transmit the data properly.

Solving Problems With Streaming Services

If the server doesn't start up or quits unexpectedly:

- Check the error log.
- Make sure the DarwinStreamingServer file is in the /usr/sbin/ folder.

If media files do not stream properly:

- Check the error log.
- Make sure the movie file is supported by the Darwin Streaming Server. Check the list of compatible file formats.
- Try streaming a sample movie to see if the server can stream it. You can download a sample prehinted movie from the Apple Software Updates Web site:
- asu.info.apple.com/swupdates.nsf/artnum/n11357
- If the server streams the sample movie, the problem you're having may be with the way your movie file is prepared. Recreate the movie.
- If the sample movie doesn't stream, the problem you're having may be with the server computer or the network.
- Try hinting the movie again with the Optimize Hints For Server option selected.
- Check streaming server activity and, if necessary, reduce the number of connections or throughput.
- If the problem occurs on a Mac OS client computer, open the TCP/IP control panel on the client computer and make sure MacIP is not selected.
- If the problem occurs on a client computer, make sure the user has the appropriate settings in the Streaming Proxy and Streaming Transport panels of the QuickTime Settings control panel. The administrator for the client computer's network should be able to provide the correct settings.
- If you are reflecting more than one live stream, make sure each stream uses a separate UDP port. Otherwise, client computers will show a message with error 500. You set up ports in the relay configuration file.

If streaming service is slow:

- If you are streaming QuickTime movies, make the movies self-contained using your authoring application, and make sure hinting is optimized for streaming services.
- Reduce the maximum number of connections or the throughput.
- Turn off other services.
- Place media files on other hard disks to improve server performance.

Because Darwin Streaming Server can use only one media folder, you need to create links from the folder you have selected in Streaming Server Admin to the media files on other hard disks.

If users can't see the live streamed media:

Make sure you are capturing a signal from the audio or video equipment into the computer you're using for capture and encoding.

Make sure the SDP file is located in the media folder you set up on your streaming server.

Using Darwin Streaming Server With Windows NT and Windows 2000 Server

There are some differences in the way you use Darwin Streaming Server with Microsoft Windows NT and Windows 2000 Server. These differences are summarized here.

Installing the Server pPackage

To install Darwin streaming services:

- 1 Unzip the server package.
- 2 Double-click the install script, named "Install.bat".
The install script installs the server software and associated files in the following directory on the server computer:

c:\Program Files\Darwin Streaming Server\

Inside this directory, you'll find these files:

Name	Description
DarwinStreamingServer.exe	Server executable
PlaylistBroadcaster.exe	PlaylistBroadcaster executable
qtpasswd.exe	Command-line utility for generating password files for access control.
streamingserver.cfg	Default server configuration file
streamingrelay.cfg	Default relay configuration file
QTSSModules\	Directory containing QTSS API modules
Movies\	Media directory

Server Configuration File

The Darwin Streaming Server package comes with a default configuration file for Windows NT and Windows 2000 Server. The file system paths in this configuration file are in Windows NT format. Because Windows NT path formats are different from those on UNIX systems, a configuration file from a UNIX Darwin Streaming Server will not work on Windows NT.

The default streaming services configuration file is installed in this directory:

```
c:\Program Files\QuickTime\Darwin Streaming  
Server\streamingserver.cfg
```

The spaces must be present, and the directory delimiters must be backslashes (\).

Note that in the Windows NT configuration file, you must specify directory paths, and if they have spaces, you must enclose them in quotation marks. For example:

```
movie_folder "c:\program files\quicktime\darwin streaming  
server\movies\"
```

Case is not important in NT directory/file names, but the spaces are.

Removing Darwin Streaming Server as a Service

To remove Darwin streaming services:

At the command line, type:

```
DarwinStreamingServer -r
```

Using PlaylistBroadcaster With Windows NT and Windows 2000 Server

Each PlaylistBroadcaster needs its own dedicated command prompt window to run as a process.

The `-list` and `-stop` commands are not supported within Darwin Streaming Server on NT.

Access Control Passwords Are Not Encrypted

Passwords created using the `qtpasswd.exe` utility are not encrypted. Keep the password file in a secure location.

Where to Find More Information About Darwin Streaming Service

For more information about Darwin Streaming Service, see these resources:

- Darwin Streaming Service Web site
www.publicsource.apple.com/projects/streaming/
- QuickTime authoring Web site
www.apple.com/quicktime/authoring
- Firewalls and QuickTime 4
www.apple.com/quicktime/resources/qt4/us/proxy
- IP Multicast Initiative Web site
www.ipmulticast.com
- Feel free to join the email discussion list at
lists.apple.com