RealAudio®
Server Administration
and
Content Creation Guide

Version 3.0

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Printed in the United States of America. Part #: S30-009-961118

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Introduction

RealAudio® Server is today's most popular and practical solution for streaming real-time live and on-demand audio over the Internet and corporate intranets. RealAudio Server is a specialized streaming audio server that works with your Web server, enabling you to enhance your Web site, improve communications, and draw and retain Web site visitors with programming such as news, music, and live events.

Real-time delivery means that you do not have to wait while a file downloads; the sound plays as it is delivered. You have complete control over the sound; you can pause, move forward and back, and start or stop at any time.

RealAudio formats are optimized for low- to medium-speed connections including 14.4 and 28.8 Kbps modems and ISDN. You can also listen to RealAudio files stored on your local computer.

This guide explains how to configure and operate RealAudio Server and how to create and manage content for a RealAudio system. The content includes all of the sounds and multimedia presentations delivered by the RealAudio system, and the support files that make it all work smoothly.

Using this Guide

RealAudio Server Administration and Content Creation Guide is intended for people who are familiar with operating World Wide Web servers and with RealAudio technology. You do not need previous experience operating a RealAudio Server, but you do need to know how to create directories or folders, copy files, change configuration settings, and open text files.

Organization

This manual is organized in three sections as follows:

Section 1: Overview

Explains the components and features of a RealAudio system. Diagrams show the relationships between client and server for audio and multimedia delivery.

Section 2: Administration

Explains how to install and administer RealAudio Server. The chapters are:

Installing RealAudio Server: Explains how to get RealAudio Server installed and running on your computer.

Configuring RealAudio Server: Details how you can customize RealAudio Server to best meet the needs of your customers and gives you ideas for expanding the use of audio on your network.

Maintaining and Tuning RealAudio Server: Everything you need to know to keep RealAudio Server running at peak performance.

Access and Error Log Messages: Access and error log formats.

Command Reference: Command reference for RealAudio Server and its utility programs.

Configuration Settings: Configuration setting reference with syntax and examples.

Section 3: Content Creation

Explains how to create and manage audio and multimedia content for delivery by RealAudio Server and a Web server. The chapters are:

Installing RealAudio Encoder: Explains how to install RealAudio Encoder.

Encoding RealAudio Files: Information about how to prepare files for encoding, which encoding algorithm to use and how to encode a static file using RealAudio Encoder or Sound Forge.

Delivering Live Content: Explains how to deliver live audio, including setting up the RealAudio Server and advertising your event on Timecast: the RealAudio Guide.

Editing Audio Files: Explains how to edit encoded files using the Racut, Rapaste and Rax utility programs.

Managing Content on RealAudio Server: Detailed instructions and examples of how to use bandwidth negotiation.

Configuring Your Web Site: Explains the many ways you can deliver RealAudio from your web site, including HTTP streaming, Netscape Plug-in, ActiveX object, and JavaScript.

Synchronized Multimedia: Discusses how to create a synchronized multimedia presentation using the Cevents compiler.

Conventions

This manual uses the following conventions:

`Command`	Monospace font represents commands to be typed or information displayed on the screen.
`<filename>`	Angle brackets show where to insert information, such as the name and location of a file.
[ ]	Square brackets show optional command arguments.
Bold	Bold font is used for names of files, directories, commands, and options.

New in Release 3.0

RealAudio Server 3.0 is easier to use, supports additional computer platforms, and simplifies and enhances live broadcasting.

DolbyNet audio compression delivers leading sound quality, with stereo sound over 28.8 modems and near-CD quality sound at ISDN and LAN bandwidths.

Robust UDP compensates for lossy Internet environments, providing smooth, continuous audio. Scalability features such as splitter technology, clustering, and multiprocessing, enable live broadcasting to thousands of listeners.

Administrative features such as domain control, bandwidth control, and dynamic ISP hosting enable you to configure RealAudio Server 3.0 optimally for business and resource management.

RealAudio Server 3.0 is available for Windows NT, Macintosh, and popular UNIX operating systems.

New RealAudio 3.0 Encoding Formats

In addition to the RealAudio 2.0 - 14.4 and RealAudio 2.0 - 28.8 encoding algorithms, RealAudio Server 3.0 supports eight new algorithms that provide better sound quality, including stereo, at higher bandwidths. See "Choosing an Encoding Algorithm" on page 185.

Robust UDP support resends lost UDP packets to RealAudio Player 3.0 and later. Clients accessing RealAudio Server through a firewall proxy need their proxy updated to support Robust UDP. See **www.realaudio.com/help** for the latest proxy information.

Better Support For Live Broadcasts

- Continuous live broadcasts are now easier to manage. You can choose to archive content automatically or not save it at all. See “Archiving Live Broadcasts” on page 69.

- Live broadcasts now support bandwidth negotiation. See “Broadcasting Live” on page 67.
- Clusters of computers can receive live broadcasts from a single stream. For information, see “Running RealAudio Server” on page 59.
- Splitting a broadcast stream makes it easier to deliver live audio over long distances to large audiences. For information, see “Splitting an Audio Stream Among Computers” on page 71.
- Multicast support enables many clients to share a live broadcast while using minimum bandwidth. Multicast delivery works best within an intranet. For information, see “Reducing Bandwidth Congestion using Multicast Delivery” on page 75.

Easier Administration

- Log files contain more information to help you measure viewer activity or diagnose problems. For information, see “Using the Access and Error Log Files” on page 85 and “Access and Error Log Messages” on page 97.
- Messages warning you about potentially serious problems, such as exceeding a certain number of streams, can be optionally configured to be sent to your e-mail address. See “Threshold Notification E-Mail” on page 112.
- Remote license management makes it easier to allocate your licensed streams among multiple computers. For information, see “Sharing a Stream License Among Computers” on page 60.
- Domain control lets you specify which users can play audio from a RealAudio Server. For information, see “Restricting Access to Private Content” on page 62.
- Internet service provider support enables you to allocate a specified number of streams to a large number of accounts. You do not need to enter a list of account names, just follow simple naming conventions. See “Creating Accounts on RealAudio Server” on page 63
- Bandwidth control lets you ensure quality performance for priority customers. For information, see “Controlling Traffic on Your Network” on page 62.

- A new performance monitor runs on Macintosh computers and can monitor any RealAudio Server. See “Monitoring Performance” on page 87.

Easier Installation

- New setup programs make installing RealAudio Server faster and easier. For information, see “Installing RealAudio Server” on page 31.

Enhanced Platform Support

- Macintosh users can now run RealAudio Server using Mac Open Transport with a new graphical interface.
- For Windows NT users, RealAudio Server now supports Windows NT Server and Workstation version 4.0 and uses multiple threads.

Overview

Before you create and manage content for a RealAudio system, you should understand how the system works. This chapter describes the primary components of the RealAudio system and explains how they work together.

RealAudio Clips

A RealAudio clip is a file or live broadcast containing sound encoded in one of the RealAudio formats. These formats are highly compressed to deliver the best possible sound over a limited-bandwidth connection.

Because there is no one best format for delivering sound, the RealAudio system provides several formats that are optimized differently for different kinds of audio content. You can choose to provide a clip in one or more formats based on the type of content and the available bandwidth. For example, you would use a different format to deliver speech over a 14.4 Kbps modem than you would to deliver music over an ISDN connection.

In addition to the sound contained in the RealAudio clip, the RealAudio system can deliver images and other Web pages that are synchronized with the sound. These presentations are called Synchronized Multimedia.

Synchronized Multimedia

RealAudio Synchronized Multimedia presentations include both sound and images or other Web pages. For example, users can see the lyrics of a song displayed while they listen to the song, or they can view pictures of a machine being assembled while they listen to the instructions for assembling the machine.

By choosing a low-bandwidth format for the RealAudio clip and appropriate Web pages, you can deliver a multimedia presentation to users with slow connections.

Components of a RealAudio System

The RealAudio system is a client-server system. The server provides the content to the client over a network. The basic components of a RealAudio system are:

RealAudio Player - The client program that enables users to listen to RealAudio clips. Special purpose player components are provided for ActiveX, Netscape Plug-in, and Shockwave movies.

RealAudio Encoder - The program that creates RealAudio clips. The input to this program can be a digitized audio file or a live audio signal.

Cevents - The Cevents compiler creates Synchronized Multimedia presentations on other platforms.

RealAudio Server - The server program that delivers RealAudio clips over a network. One RealAudio Server can deliver clips to many Players at the same time.

Web Browser - The client program that enables users to find most RealAudio clips. The Web browser is also used to display the visual part of Synchronized Multimedia presentations. The RealAudio system works with all popular Web browsers.

Web Server - The server program that delivers Web pages. Typically, RealAudio clips are accessed by clicking a link on a Web page. The Web server also delivers the visual part of Synchronized Multimedia presentations. HTTP streaming of RealAudio files enables audio content providers to stream RealAudio sound from a World Wide Web server. While this method is not as robust, it provides a reasonable method for providing short RealAudio content to a limited number of users. The RealAudio system works with all popular Web servers.

RealAudio Files and Metafiles

The RealAudio system uses several file types, each identified by a specific file extension. The files and their file extensions are:

RealAudio clip (.ra) - The sound encoded in the RealAudio format. This file is created with RealAudio Encoder and delivered by RealAudio Server.

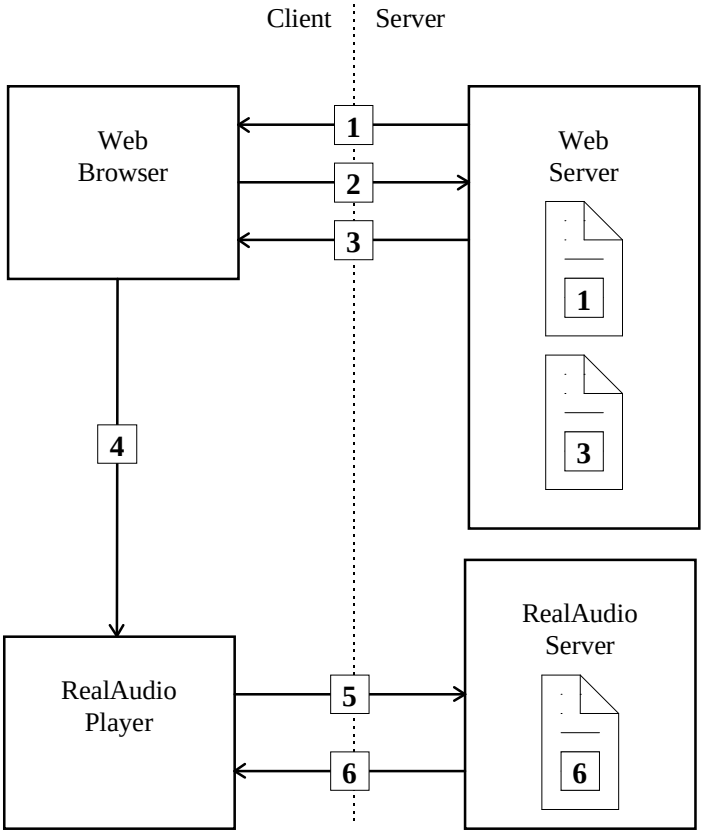
RealAudio metafile (.ram) - The file that connects a Web page to one or more RealAudio clips. The metafile is located on a Web server and is linked by a Web page. The metafile contains the URL of one or more clips located on a RealAudio Server. This file is created using a text editor; RealAudio Cevents creates this file for Synchronized Multimedia presentations.

RealAudio Plug-in metafile (.rpm) - The same as the RealAudio metafile, but used with the RealAudio Plug-in for Netscape Navigator and Internet Explorer 3.0 and later.

RealAudio events file (.rae) - The file that contains the events defined for a Synchronized Multimedia presentation or ActiveX controls. The events file has the same name as the RealAudio clip it contains events for and it is stored in the same directory on the RealAudio Server. This file is created using RealAudio Cevents compiler.

Delivering a RealAudio Clip

The following figure shows the components of the RealAudio system used to deliver a typical RealAudio clip. The numbers in the figure match the numbered steps following the figure.



RealAudio Delivery System

1. The Web browser displays a Web page that contains a link to a RealAudio metafile.

2. The user clicks the link. The Web browser requests the metafile from the Web Server.

3. The Web server delivers the RealAudio metafile to the Web browser. Based on the .ram file extension, the Web server sets the MIME type of the file to **audio/x-pn-realaudio**.

4. The Web browser looks up the MIME type of the RealAudio metafile. Based on the MIME type, the Web browser starts RealAudio Player as a helper application and passes it the metafile.

5. RealAudio Player reads the first URL from the metafile and requests it from RealAudio Server.

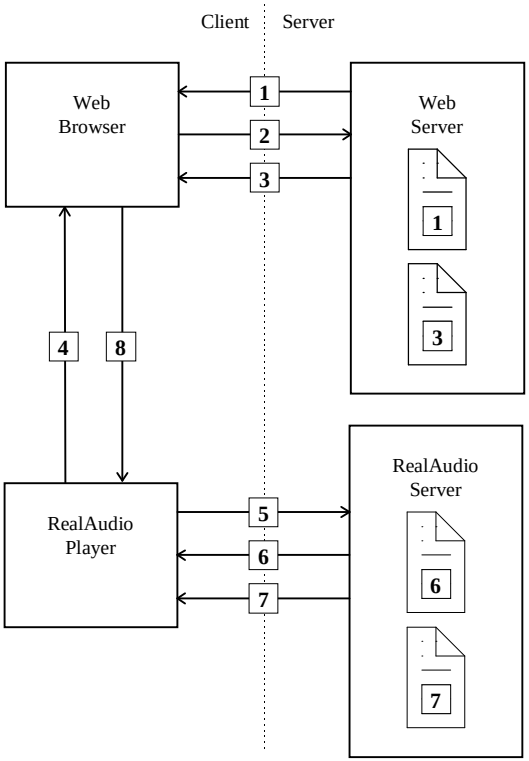
6. RealAudio Server begins streaming the requested RealAudio clip to RealAudio Player.

Note No messages pass between RealAudio Server and the Web server. The Web browser provides the URL of the RealAudio clip to RealAudio Player. RealAudio Player does not require a Web browser to function; users can enter the URL of a .ra or .ram file directly into RealAudio Player, or use the Preset or Scan buttons on RealAudio Player Plus.

Delivering Synchronized Multimedia

Synchronized Multimedia delivery works like regular audio delivery, with a few extra steps between RealAudio Player and RealAudio Server.

The following figure shows the components of the RealAudio system used to deliver a typical RealAudio Synchronized Multimedia presentation. The numbers in the figure match the numbered steps following the figure.



Media Delivery System

1. The Web browser displays a Web page that contains a link to a RealAudio metafile.

2. The user clicks on the link. The Web browser requests the metafile from the Web Server.

3. The Web server delivers the RealAudio metafile to the Web browser. For files with a .ram file extension, the Web server sets the MIME type of the file to **audio/x-pn-realaudio**. For files with a .rpm file extension (RealAudio Plug-in), the Web server sets the MIME type of the file to **audio/x-pn-realaudio-plugin**.

4. The Web browser looks up the MIME type of the RealAudio metafile. Based on the MIME type, the Web browser starts RealAudio Player as a helper application and passes it the metafile.

5. RealAudio Player reads the first URL from the metafile and requests it from RealAudio Server.

6. RealAudio Server begins streaming the requested RealAudio clip to RealAudio Player.

7. RealAudio Server checks the directory where the clip is located and finds an events (.rae) file with the same name as the RealAudio clip. As the time of each event is reached in the clip, RealAudio Server sends the event data to RealAudio Player.

8. RealAudio Player sends the URL for the event to the default Web browser for viewing.

Title, Author, and Copyright

RealAudio clips include text strings for the title, author, and copyright. This text is displayed by RealAudio Player when the clip is played. Although the player usually labels the text as title, author, and copyright, the player displays whatever text you choose to supply.

You can enter the title, author, and copyright text when you encode a clip. You can override the values encoded with the clip using the metafile.

For information about changing the Title, Author or Copyright text strings in encoded files, refer to “Modifying RealAudio File Descriptions” on page 238.

Updating RealAudio Clips

When you encode a RealAudio clip, the original file is not modified. RealAudio Encoder creates a new file with a .ra file extension. It is important to note that encoding a RealAudio clip is a one-way process; you cannot convert a RealAudio file back into the original source format. If you want to be able to encode in other formats in the future, you need to archive the original source.

It is possible to modify the Title, Author and Copyright information of clips without re-encoding them. For information about changing the Title, Author or Copyright text strings in encoded files, refer to “Modifying RealAudio File Descriptions” on page 238.

Live Encoding and Live Broadcasting

The source of a RealAudio clip can be prerecorded or live input. The encoded RealAudio clip can be stored as a file for later use, or it can be broadcast live over a network.

The ability to encode a live input source and broadcast the RealAudio clip live over a network enables you to broadcast live events such as concerts and press conferences as they happen.

All versions of RealAudio Encoder can encode a live input source. Not all versions of RealAudio Encoder support live broadcasting.

RealAudio Server

Welcome to RealAudio Server, the server component of the RealAudio system. The RealAudio system is the premier Internet streaming multimedia delivery system. By setting up a RealAudio Server and providing audio or multimedia content, you are becoming an active participant in the exciting growth market of live and on-demand broadcasting on the Internet.

System Requirements

To run RealAudio Server, you need:

- A computer running one of the supported operating systems
- Space on the computer's hard disk for the RealAudio Server software and the audio files you plan to offer
- A network connection of sufficient bandwidth to serve your users
- A Web server that supports configurable MIME types
- Sufficient memory and processor capacity

Operating Systems

RealAudio Server works with the following architectures and operating systems:

Architecture	Operating Systems
Apple Macintosh (PowerPC)	System 7.5.1 or greater (7.5.5 recommended) with Macintosh Open Transport 1.1 or higher
DEC Alpha	Digital UNIX v3.2 Microsoft Windows NT 3.51, 4.0
Hewlett Packard PA/RISC	HP-UX 10.x
Intel 486/66 or Pentium	Microsoft Windows NT 3.51, 4.0 FreeBSD 2.x BSD/OS 2.0 LINUX 1.2, 1.3, 2.0
IBM PowerPC	AIX 4.1
Sun SPARC	SunOS 4.1.x Solaris 2.4, 2.5
Silicon Graphics Indy	IRIX version 5.x

Disk Space

The RealAudio Server program files require about 2 MB of disk space.

You also need disk space for the content files you are serving. “Editing RealAudio Files” on page 231 explains how much disk space is required for each RealAudio format.

File Descriptors

On UNIX systems, each RealAudio client being served a static file uses 3 file descriptors on the Server. Each client connection to a live event uses 2 file descriptors. Synchronized multimedia presentations use 1 additional file descriptor for the events file.

Your RealAudio Server may be limited in the number of simultaneous streams it can support if your UNIX system does not have enough available file descriptors. On most UNIX systems, the **limit** or **ulimit** command lists the number of available file descriptors.

Bandwidth

For each client connected to the Internet backbone, RealAudio Server requires at least 10 Kbps for 14.4 format and 20 Kbps for 28.8 format. For example, a T1 line can accommodate over 100 simultaneous 14.4 connections. The bandwidth consumed by other applications, such as your Web server, should be taken into account when estimating the number of simultaneous users that can be accommodated.

Internet Connection	14.4 Streams	28.8 Streams
Frame Relay (56 Kbps)	5	3
ISDN (64 Kbps)	6	4
ISDN (128 Kbps)	12	8
T1 (1.5 Mbps)	150	90
Ethernet LAN (10 Mbps)[1]	560	350
T3 (45 Mbps)	4,500	2,700

[1] Collisions and other overhead limit the useful bandwidth to about 70%

Internet Connection	14.4 Streams	28.8 Streams
100BaseT (100 Mbps)	6,000	3,600
100BaseT/FDDI LAN (100 Mbps)	10,000	6,000

Make sure that your Internet connection can handle the peak throughput of your site. Multiply the number of clients the amount of bandwidth a RealAudio file needs to play, which is 10 Kbps for 14.4 files or 20 Kbps for 28.8 files. If the total is close to the maximum bandwidth you get from your Internet provider, you might need to purchase additional bandwidth.

When broadcasting live, you can reach a number of simultaneous streams far greater than that allowed by your Internet connection by transmitting live streams to other RealAudio Servers acting as splitters. For more information on splitting live audio streams, see “Splitting An Audio Stream Among Computers” on page 71.

Compatible Web Servers

Typically, users access RealAudio files using links embedded in World Wide Web pages. Therefore, you need to have a Web server installed and configured to recognize RealAudio MIME types. The details of this configuration are discussed later in this chapter. Although you need a Web server to make the best use of RealAudio, you do not need to install it on the same machine as your RealAudio Server.

RealAudio Server can be configured to work with any Web server that supports configurable MIME types. RealAudio Server has been tested with the following Web servers:

- CERN HTTPD (v 3.0)
- EMWAC HTTPS 0.96
- HTTPD4Mac
- Mac HTTP
- Microsoft Internet Information Server (IIS)
- NCSA HTTPD (v 1.3, 1.4, 1.5)

- Netscape Netsite and Netscape Enterprise Server
- O'Reilly Website NT
- Webstar and Webstar PS
- Spinner 1.0b12 - 1.0b15 / Roxen 1.0
- Apache 1.1.1

To view a current list of World Wide Web servers tested for compatibility with RealAudio Server, see the Progressive Networks site at:

http://www.realaudio.com/help

Memory and CPU Usage

RealAudio Server 3.0 requires approximately 0.8 to 1.3 MB of available RAM per process plus 20 KB RAM for each simultaneous stream. To support 100 simultaneous connections requires approximately 7 MB of available memory.

RealAudio Server has a modest CPU impact. A 100-stream RealAudio Server operating on a 90 MHz Pentium computer consumes less than 30% of the CPU cycles. With enough network bandwidth, the same computer can deliver at least 500 28.8 streams simultaneously.

Maintaining Firewall Security

Many companies and organizations have connected their local-area and wide-area networks to the Internet to improve their ability to access and communicate information. However, connecting to the Internet can expose a company's network and data to unauthorized entry and access.

To protect private networks from unauthorized access through the Internet, many companies use firewalls. A firewall is a security program that controls traffic between the Internet and a private network. A firewall helps ensure that all communication between an organization's network and the Internet conforms to the organization's security policies.

RealAudio Server and Firewalls

Using RealAudio Server with a firewall requires careful consideration of the risks and benefits. RealAudio Server can be installed on a computer either inside or outside of your network security firewall.

- If you intend to offer the content of your Web site to the Internet, Progressive Networks recommends installing RealAudio Server on one or more dedicated computers located outside your firewall. This lets users of the World Wide Web access your Web sites' real-time multimedia content without exposing your private network.
- If you intend to offer RealAudio content only to users on your protected network, install RealAudio Server on a computer placed inside your firewall. This prevents outside access to your RealAudio content. (Progressive Networks offers separate RealAudio Server and Player license packages specifically for intranet use. For more information, contact Progressive Networks.)

You can install RealAudio Server on a computer behind a firewall and still allow outside users to access your RealAudio files. To do so, you must configure your firewall to let RealAudio files pass through.

1. Enable two-way TCP connections on port 7070.
2. Assign the computer running RealAudio Server a single IP address. Computers with more than one IP address can cause problems with the streaming of RealAudio through firewalls.

RealAudio Player and Firewalls

If your customers are unable to hear your RealAudio files, and they are accessing your RealAudio Server from a local area network which is attached to the Internet, it is possible that their network's firewall is preventing the RealAudio stream from reaching them.

Working with firewall products, RealAudio Player allows Internet users behind commercial firewalls to receive RealAudio files. These firewalls can identify RealAudio files and direct them in a secure manner to requesters located on internal networks.

Note Firewalls need to be updated to support the Robust UDP feature of RealAudio Server 3.0. Contact your firewall manufacturer for current information on their support of Robust UDP.

Commercial firewall manufacturers who support RealAudio include:

Product	Manufacturer
Firewall-1	Checkpoint Software Technologies, LTD.
Gauntlet	Trusted Information Systems
Borderware	Border Network Technologies
GFX System	Global Technology Associates
SecureConnect	Morning Star Technologies
Cypress Labyrinth	Cypress Consulting
NetSeer	enterWorks
Private Internet Exchange	Cisco
iway one	BateTech Software
Interceptor	Technologic
Firewall/Plus	Network-1
ANS Interlock	ANS CO+RE Systems
WinGate	Qbix Software
Linux IP Masquerading	Linux
IBM Secured Network Gateway	IBM

Additional Information about Firewalls

To learn more about firewalls, see the following sites on the World Wide Web.

Information	Location
Up-to-date information on RealAudio and firewalls	http://www.realaudio.com/help
Public firewall mailing list	http://www.greatcircle.com
Public domain firewall toolkit	http://www.tis.com
Firewall Product Developers Consortium	http://www.ncsa.com

Sample Configurations

Here are some representative ways in which RealAudio Server can be used to deliver audio to various audiences. Organizations as diverse as radio stations, corporate training departments, and advertisers can use RealAudio to reach their audiences in new and dynamic ways.

A great way to experience the many ways people are using RealAudio is to visit Progressive Networks' Web site. There you can download RealAudio Player and browse through Timecast, a guide to hundreds of audio sites. Be sure to check out Sites and Sounds as well.

For information about specific configuration settings shown for sample configurations, see "Configuration Settings" on page 130.

Radio Station Broadcasting over the Internet

You can bring your station's programming and advertising to a whole new audience through the Internet. Contact an Internet Service Provider about hosting your site, or start your own. Once you have your site established, you can sell ad space there, as well as play audio commercials. Your advertisers can have links from your site to theirs, making it easier for customers to reach them. If you broadcast a live event on your station, such as an interview with a touring band, you can send it out to the networked world. Later, you can make the interview available on demand when the band releases a new CD.

When your radio station is on the World Wide Web, be sure to contact Progressive Networks and become part of Timecast.

Features of Interest	Additional Information	Configuration Settings
Live broadcasting	"Delivering Live Content" on page 219	**EncoderPassword** **EncoderTimeout** **LiveFileBandwidth Negotiation** **LiveFilePassword** **LiveFileSize** **LiveFileTarget** **LiveFileTime**
Splitting audio streams	"Splitting an Audio Stream Among Computers" on page 71	**SplitterBufferDelay** **SourceControlList** **SplitterControlList**
Clustering computers	"Clustering Computers into a Single RealAudio Server" on page 59	**ClusterHost** **ClusterPassword** **ClusterPort**

Internet Service Provider

You can use RealAudio to turn up the interest in your service. Offering Web sites with audio can attract whole new categories of customers, such as radio stations and music stores, in addition to making your service more enticing to existing categories of customers. Host special audio events, such as concerts or interviews, exclusively for members of your service. Individuals who use your service for Internet access can add audio to their personal home pages. RealAudio Server lets you control what customers have audio, how many connections they have, and the total amount of bandwidth used by RealAudio.

Features of Interest	Additional Information	Configuration Settings
Live broadcasting	"Delivering Live Content" on page 219	**EncoderPassword** **EncoderTimeout** **LiveFileBandwidth Negotiation** **LiveFilePassword** **LiveFileSize** **LiveFileTarget** **LiveFileTime**
Creating Accounts On Your RealAudio Server	"Creating Accounts on RealAudio Server" on page 63	**BasePath** **UserList**
Clustering computers	"Clustering Computers into a Single RealAudio Server" on page 59	**ClusterHost** **ClusterPassword** **ClusterPort**
Bandwidth control	"Controlling Traffic on Your Network" on page 62"	**AudioConnections** **MaxBandwidth**
Domain control	"Restricting Access to Private Content" on page 62	**ConnectControlList**
Remote licensing	"Sharing a Stream License Among Computers" on page 60	**LicenseClients** **RemoteLicenseHost** **RemoteLicensePort**

Internet Content Provider

Internet content providers, organizations that offer goods, services, and information over the Internet, can use RealAudio to draw more visitors to their sites. You can set the mood of your site with background music, let customers sample before they purchase, give a guided tour of your site or products, and broadcast interviews with customers doing interesting things with your products.

Features of Interest	Additional Information	Configuration Settings
Live broadcasting	"Delivering Live Content" on page 219	**EncoderPassword** **EncoderTimeout** **LiveFileBandwidth Negotiation** **LiveFilePassword** **LiveFileSize** **LiveFileTarget** **LiveFileTime**
Clustering computers	"Clustering Computers into a Single RealAudio Server" on page 59	**ClusterHost** **ClusterPassword** **ClusterPort**
Remote licensing	"Sharing a Stream License Among Computers" on page 60	**LicenseClients** **RemoteLicenseHost** **RemoteLicensePort**

Corporate Web Site

If your corporation has a Web site, then you are probably trying to reach two different audiences. One audience is potential customers interested in your goods and services. Set the mood of your site with background music. Give a guided tour of your products, explain your customer service offerings, or narrate the vision you have for your company and industry.

The other audience you want to reach with your Web site is people interested in your company. These could be shareholders, advertisers interested in buying space on your Web site, or reporters from trade journals and the general media. You can use live and recorded audio to present your message to this audience in a concise and compelling way.

Features of Interest	**Additional Information**	**Configuration Settings**
Live broadcasting	"Delivering Live Content" on page 219	**EncoderPassword** **EncoderTimeout** **LiveFileBandwidth Negotiation** **LiveFilePassword** **LiveFileSize** **LiveFileTarget** **LiveFileTime**
Synchronized Multimedia	"Synchronized Multimedia" on page 267	

Intranet

If your organization operates an intranet, chances are you use it to improve communication around the organization. You can use audio to provide training, conduct briefings, and distribute memos. Since you are operating your own network, you will probably want to control who has access to your computers and how much bandwidth is used by audio.

Purchasing the RealAudio system for your intranet works differently than purchasing it for Internet use. You purchase an intranet version of RealAudio Server that supports an unlimited number of audio streams and license RealAudio Player for everyone in your organization that has access to audio. For more information about using RealAudio on an intranet, contact Progressive Networks.

Features of Interest	Additional Information	Configuration Settings
Domain control	"Restricting Access to Private Content" on page 62	**ConnectControlList**
Hosting	"Creating Accounts on RealAudio Server" on page 63	**UserList**
Splitting	"Splitting an Audio Stream Among Computers" on page 71	**SplitterBufferDelay** **SourceControlList** **SplitterControlList**
Firewall compatibility	"Maintaining Firewall Security" on page 21	
Bandwidth control	"Controlling Traffic on Your Network" on page 62	**AudioConnections** **MaxBandwidth**
Remote licensing	"Sharing a Stream License Among Computers" on page 60	**LicenseClients** **RemoteLicenseHost** **RemoteLicensePort**

Features of Interest	Additional Information	Configuration Settings
Live broadcasting	"Delivering Live Content" on page 219	**EncoderPassword** **EncoderTimeout** **LiveFileBandwidth Negotiation** **LiveFilePassword** **LiveFileSize** **LiveFileTarget** **LiveFileTime**
Synchronized Multimedia	"Synchronized Multimedia" on page 267	
Multicast Delivery	"Reducing Bandwidth Congestion using Multicast Delivery" on page 75	**MulticastAddressRange** **MulticastControlList** **MulticastDeliveryOnly** **MulticastPort** **MulticastTTL**

Installing RealAudio Server

New setup programs make installing RealAudio Server quicker and easier. This chapter explains the entire installation and upgrading process for all platforms; headings indicate information that applies to only one platform.

Upgrading from a Previous Version

If you are upgrading from a previous version of RealAudio Server, you should install the new version next to, and not on top of, the old version. Once you have installed and tested the new RealAudio Server, you can then replace your old version.

Installing the New Version

To install without replacing an existing RealAudio Server:

1. Install the new version in a different directory or folder than your existing RealAudio Server. This prevents you from affecting your existing RealAudio Server.

2. Note the PnaPort entry in your existing RealAudio server configuration file. If the PnaPort entry is set to 7070 or is not present, RealAudio Server is using the default port 7070. You need to use a different port number for testing RealAudio 3.0 Server. To use a different port number, add or edit the following line to your **server.cfg** file after installing:

   ```
   PnaPort     7072
   ```

   Be sure to specify a port that is not used by another configuration parameter such as **ResolverPort**. If you have problems starting RealAudio Server on this port because another application is using it, try using a different port number.

3. To send a test URL to the new RealAudio Server, you must add :7071 to the pnm URL. This makes the test URL become:

   pnm://<my.server>:7071/sound1.ra

Note On Windows NT you cannot run two versions of RealAudio Server as a Service. Instead, run the test copy of RealAudio Server from a command window until you are ready to remove the existing RealAudio Server.

Configuring the New Version

After you have tested your installation of RealAudio Server, you can then have it duplicate serving of your existing content.

1. Copy the **BasePath** entry from the **server.cfg** file of your existing RealAudio server to the **server.cfg** file for the new version. It is best to use an absolute base path for the **BasePath** entry.

2. Send a test URL to the new Server. Remember to add :7071 to the pnm URL. This makes the test URL become:

   pnm://<my.server>:7071/sound1.ra

Moving the New Version into Production

When you are satisfied the Real Audio Server 3.0 is supplying your existing content, you can stop your old server, and move the new server into production.

To move the new version into production:

1. Stop both instances of RealAudio Server.

2. Rename the directory containing the old installation.

3. Rename the directory containing RealAudio Server 3.0, using the original name of the old server software.

4. Merge all appropriate settings from your existing configuration file into your new configuration file. Use “Configuration Settings” on page 130 to verify all settings.

5. Set the **PnaPort** entry back to its original value.

6. Change your Web page links back to their original port number.

Installing RealAudio Server from the Internet

RealAudio Server is available directly from the Progressive Networks site on the World Wide Web. Progressive Networks sends you e-mail with the download URL and a license key.

If you are installing RealAudio Server from CD-ROM, see “Installing RealAudio Server from CD-ROM” on page 39.

Downloading and Installing RealAudio Server for Windows NT

To install RealAudio Server for Windows NT, you need a Web browser.

To install for Windows NT:

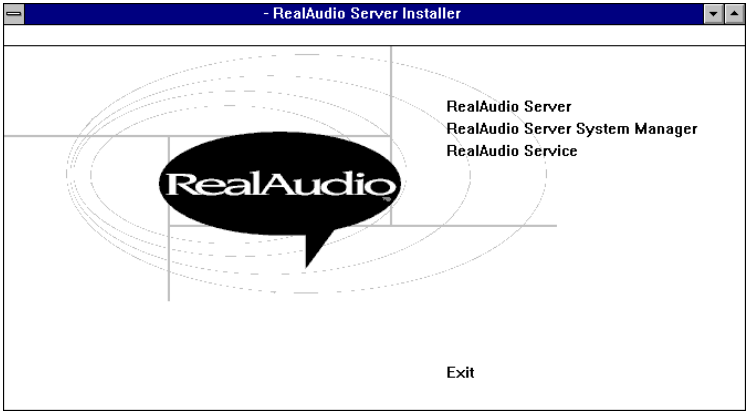
1. Use your browser to view the URL provided by Progressive Networks.

2. Follow the instructions on the page to download the distribution files you want. There are distribution files for RealAudio Server, RealAudio Encoder, and related documentation.

   If you download the distribution file to a machine other than the one on which you plan to run it, you must move the distribution file to the correct machine before you install. Use a utility such as FTP to move the file.

3. Log on as a user with administrative privileges. This lets you successfully install RealAudio Server as a System Service. In Step 8, you can specify a different user ID on which to run RealAudio Server.

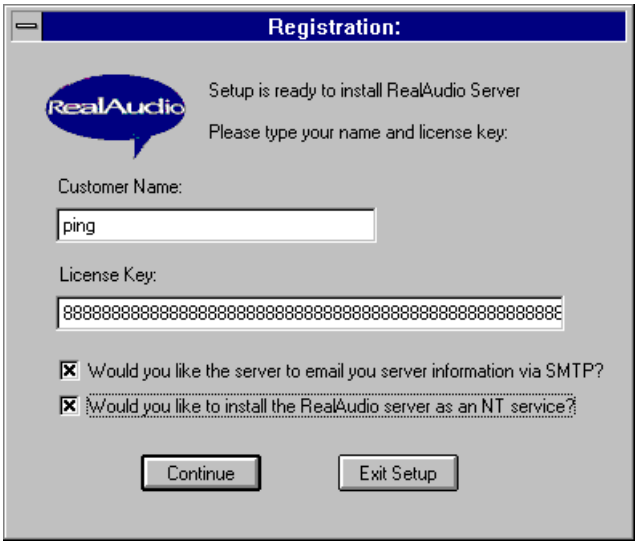
4. To install RealAudio Server and System Manager, run the distribution program. Click **RealAudio Server** on the first screen:



5. Enter your **Customer Name** and **License Key** exactly as they are provided by Progressive Networks or your RealAudio reseller. Use cut and paste if possible to avoid typographical errors.

   Check the boxes to receive e-mail notifications of Server problems and to install the Server as a Windows NT Service.

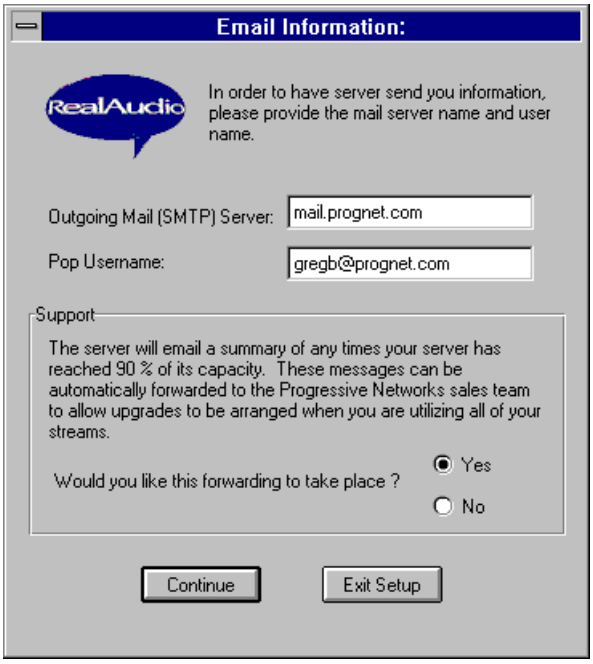
   Note If you have an earlier version of RealAudio Server installed as a Windows NT Service and you want to keep the earlier version, do not check the box to install RealAudio Server as a Service. You can install this version as a Service when you are ready using the **RealAudio Service** item on the previous menu.



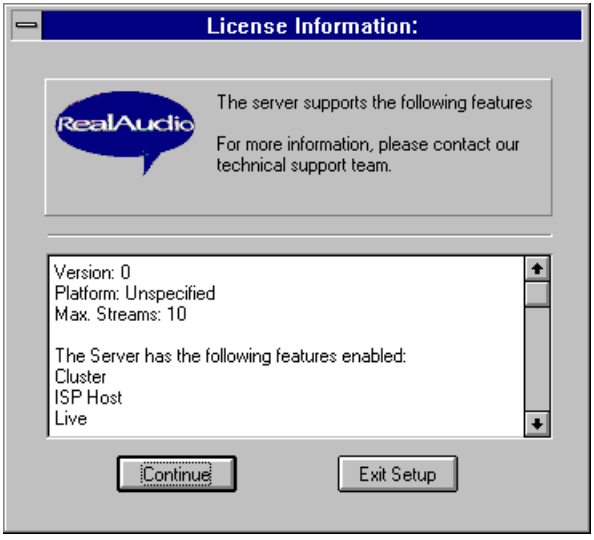
6. Enter the name of your SMTP mail server that RealAudio Server will use to send e-mail notifications. Enter the mail address to receive the notifications; be sure to enter a complete address in the format:

   `username@address`

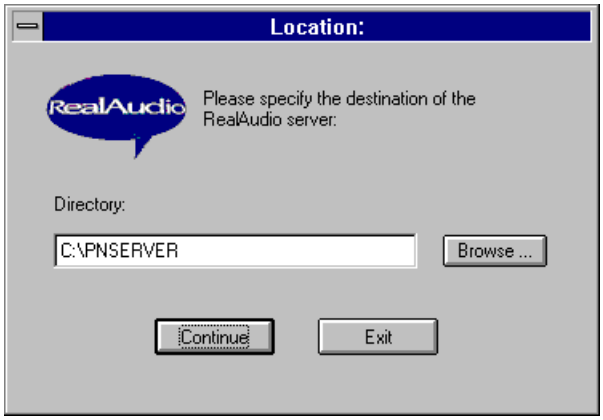
   Click **Yes** to send e-mail to the Progressive Networks sales department when your Server is low on licenses, or click **No** to block sending e-mail to Progressive Networks.



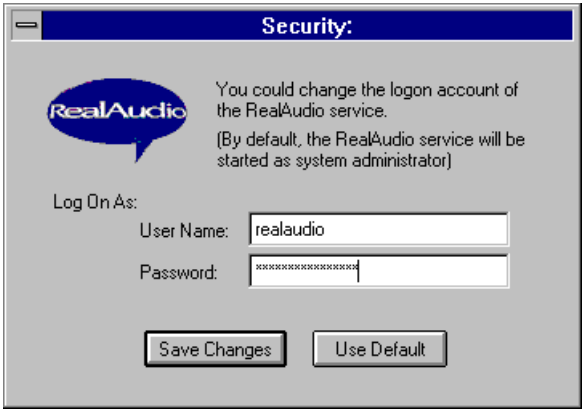
7. Verify that your RealAudio Server has the features enabled that you purchased. Contact Progressive Networks or your RealAudio reseller if there are any problems.



8. Enter the destination for the RealAudio Server files. If you want to keep your existing RealAudio Server, be sure to change the location for the new files.



9. By default, RealAudio Server runs as a Service under the System account, which has administrator privileges. If you want to run RealAudio Server under a different user ID, enter it in the following dialog box and click the **Save Changes** button. Note that you must first create the user ID using Windows NT. To install under the default user ID, click the **Use Default** button.



To install RealAudio Live Encoder, run the file you downloaded.

You have now installed the RealAudio files. Go to “RealAudio Server Files” on page 43.

Downloading and Installing RealAudio Server for UNIX

To install RealAudio Server for UNIX you need a browser and super-user privileges on the computer you are using.

To install for UNIX:

1. Use your browser to view the URL provided by Progressive Networks.

2. Follow the instructions on the page to download the compressed distribution files you want. For UNIX, distribution files are in .tar format. There are distribution files for RealAudio Server, RealAudio Encoder, and the related documentation.

   If you download the distribution file to a machine other than the one on which you plan to run it, you must move the distribution file to the correct machine before you uncompress it. Use a utility such as FTP to move the file.

3. Log on as the super-user.

   Although RealAudio Server can operate without super-user privileges, starting it with such privileges lets RealAudio Server configure itself to use more system resources, if necessary, to support a larger number of connections. Once it has configured itself, RealAudio Server reverts to normal permissions. For more information, see the **User** and **Group** configuration settings in “Configuration Settings” on page 130.

4. Copy the compressed .tar file to a temporary directory and enter the following command for every distribution file you downloaded:

   ```
   uncompress -c <filename> | tar -xvf -
   ```

   Where **filename** is the name of a distribution file.

5. Run the installation script **setup.sh** in the temporary directory.

You have now installed the RealAudio files. Go to “RealAudio Server Files” on page 43.

Downloading and Installing RealAudio Server for Macintosh

To install RealAudio Server for Macintosh, you need a Web browser.

To install for Macintosh:

1. Use your Web browser to view the URL provided by Progressive Networks.

2. Follow the instructions on the page to download the distribution files you want. For Macintosh, the distribution files are in StuffIt format. There are distribution files for RealAudio Server, RealAudio Encoder, and the related documentation.

   If you download the Server distribution file to a machine other than the one on which you plan to run it, you must move the distribution file to the correct machine before you uncompress it. Use a utility such as FTP to move the file.

3. Double-click the **PNServer Installer** icon. Enter your customer name and license key exactly as provided by Progressive Networks. If possible, cut and paste these values. Answer the questions on you screen to complete installation.

You have now installed the RealAudio files. Refer to “RealAudio Server Files” on page 43.

Installing RealAudio Server from CD-ROM

Instructions for installing RealAudio Server from CD-ROM vary depending on whether you are using Windows NT, UNIX, or Macintosh.

See the **Readme.txt** file in the root directory of the CD-ROM for the latest installation information and updates.

Installing RealAudio Server for Windows NT

You can install three separate RealAudio programs for Windows NT: RealAudio Server, RealAudio System Manager, and RealAudio Encoder.

To install RealAudio Server and System Manager:

1. Insert the CD-ROM into the drive.
2. On the CD-ROM change to the appropriate directory
   - **server\alpha-nt** for DEC Alpha CPU systems
   - **server\intel-nt** for Intel CPU systems
3. Double-click **setup.exe** and follow the directions on your screen. See "Downloading and Installing RealAudio Server for Windows NT" on page 33 for more information on installation options.

To install RealAudio Encoder:

1. Insert the CD-ROM into the drive.
2. On the CD-ROM change to the appropriate directory:
   - **encoder\intel-nt** for Intel CPU system.
3. Double-click **setup.exe** and follow the directions on your screen.

Installing RealAudio Server for UNIX

UNIX-based operating systems require you to mount a new file system or device. The commands needed to mount a CD-ROM differ slightly between these systems.

To mount the CD-ROM:

Sun Solaris

1. Insert the CD-ROM and wait for the operating system to mount the CD-ROM.
2. If you are running File Manager a window displaying the disk contents appears. If you are not running File Manager, in a shell enter:

   ```
   cd /cdrom/pn_server
   ```

All Other UNIX-based systems

1. Insert the CD-ROM in the drive.
2. Log in as super-user.
3. From a shell check if there is a directory **/cdrom** to mount the CD on; if one does not already exist, enter:

   ```
   mkdir /cdrom
   ```

4. Enter the appropriate command to mount the CD-ROM:

Operating System	Command
Sun SunOS	`mount -rt hsfs /dev/sr0 /cdrom`
DEC UNIX	`mount -t cdfs -o noversion /dev/rz3c /cdrom`
SGI IRIX	`mount -rt iso9660 /dev/scsi/sc0d7l0 /cdrom`
IBM AIX	`mount -rv cdrfs /dev/cd0 /cdrom`
Hewlett-Packard HP-UX	`mount -rF cdfs /dev/dsk/c0t2d0 /cdrom`

Operating System	Command
FreeBSD	`mount -rt cd9660 /dev/cd0a /cdrom`
BSD/OS	`mount -rt cd9660 /dev/sd1 /cdrom`
Linux	`mount -rt iso9660 /dev/hdc /cdrom`

To install RealAudio software:

1. Change directory to the CD-ROM:

   ```
   cd /cdrom
   ```

   Sun Solaris only: Change directory to the **pn_server** directory:

   ```
   cd /cdrom/pn_server
   ```

2. Change directory to the server directory:

   ```
   cd server
   ```

3. Run the setup program which automatically selects the Server version for your platform:

   ```
   setup.sh
   ```

   To override automatic platform selection, enter:

   ```
   setup.sh --platform=<directory>
   ```

   Where **<directory>** is the name of the directory on the CD-ROM that corresponds to your platform. For example:

   ```
   setup.sh --platform=aix
   ```

Installing RealAudio Server for Macintosh

You can install two separate RealAudio programs for Macintosh: RealAudio Server and RealAudio Encoder.

To install RealAudio Server:

1. Insert the CD-ROM into the drive.
2. Double-click **PNServer Installer** and follow the directions on your screen.

To install RealAudio Encoder:

1. Insert the CD-ROM into the drive.
2. Double-click **PNEncoder Installer** and follow the directions on your screen.

RealAudio Server Files

Once you have installed RealAudio Server, the following subdirectories or folders are created in the directory you created for RealAudio files:

Subdirectory	Contents
bin	Executable files for RealAudio Server (located in installation directory for Macintosh)
logs	Access and error log files
rafiles	Directory for your RealAudio content files
samples	Sample .ram and html files

Testing RealAudio Server

After you install RealAudio Server you should test it by starting the Server and play a sample audio file.

Starting RealAudio Server on Windows NT

To start RealAudio Server manually from the command line:

1. Change to the directory where you installed RealAudio Server.
2. Start RealAudio Server by entering:

   ```
   bin\pnserver server.cfg
   ```

RealAudio Server does not return any messages to indicate that it has started, and there is no prompt on the screen for as long as it is running.

If RealAudio Server does not start, review the error messages in the RealAudio Server Log as described in “Access and Error Log Messages” on page 97.

Starting RealAudio Server on UNIX

To start RealAudio Server manually:

1. Change to the directory where you installed RealAudio Server.
2. Start RealAudio Server by entering:

   ```
   bin/pnserver server.cfg
   ```

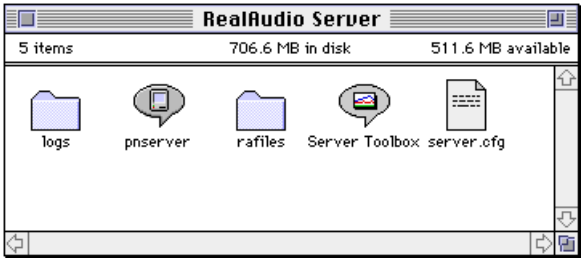
RealAudio Server returns the command prompt and runs in the background. It does not return any messages to indicate that it has started.

If RealAudio Server does not start, review the error messages in the RealAudio Server Log as described in “Access and Error Log Messages” on page 97.

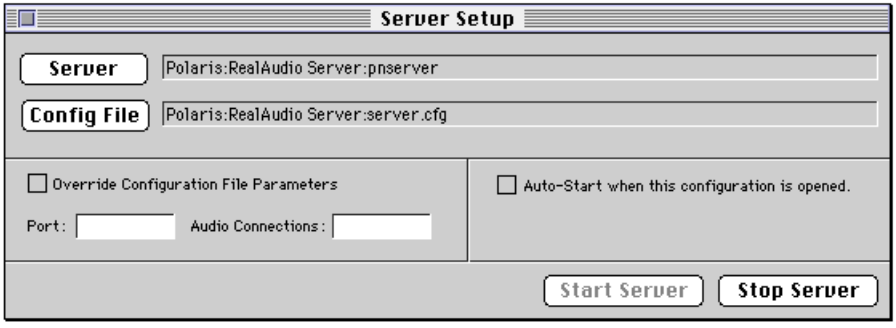
Starting RealAudio Server on Macintosh

To start RealAudio Server manually:

1. Double click the Server Toolbox icon in the RealAudio Server installation folder.



2. On the **File** menu, select **New**, and select **Server Setup**.



3. Click the **Server** button. Choose the **pnserver** application in the RealAudio Server installation folder.

4. Click the **Config File** button. Choose the **server.cfg** file in the RealAudio Server installation folder.

5. Enter the **Port** number to use for testing.

6. Click the **Start Server** button.

If RealAudio Server does not start, review the error messages in the RealAudio Server Log as described in “Access and Error Log Messages” on page 97.

Playing a Sample Clip

Once RealAudio Server starts, you can test it by playing the clips provided in the directory or folder **rafiles**.

1. Start RealAudio Player on any Macintosh, Windows or UNIX computer that can access your RealAudio Server through a network.

2. From the RealAudio Player **File** menu, select **Open Location**.

3. In the **URL** text, enter the path of the RealAudio file as:

   `pnm://<my.pnserver>:<port>/sound1.ra`

   where <my.pnserver> is the DNS name or the IP address of the computer with RealAudio Server installed and <port> is the port number to use for testing.

If RealAudio Player plays the audio file, then RealAudio Server is installed correctly.

If the audio file does not play at all, or if the performance or audio quality is poor, see “Troubleshooting RealAudio Server” on page 95 for information to help you diagnose and correct the problem. Also check your log files for clues. To learn about log files, see “Access and Error Log Messages” on page 97.

Stopping RealAudio Server

Once RealAudio Server is running correctly, you need to stop it before changing configuration settings as explained in the next chapter.

- To stop RealAudio Server for Windows NT, press CTRL+C.
- To stop RealAudio Server for UNIX, use the kill command. For more information, see “kill” on page 116.
- To stop RealAudio Server for Macintosh, click the **Stop Server** button on the Server Setup window.

Configuring Web Servers to Work with RealAudio Server

RealAudio Server works with any Web server that supports configurable MIME types. Setting the correct MIME type makes the user's Web browser play the contents of a RealAudio file with RealAudio Player rather than download the contents of the file.

Your Web Server needs to define the following MIME types:

audio/x-pn-realaudio (files with a .ra or .ram file extension)
audio/x-pn-realaudio-plugin (files with a .rpm file extension)

The procedure for associating RealAudio files with these MIME types varies from one Web server to another. The following procedures tell how to add MIME types to some common brands of Web servers. If you are in doubt, or if your Web server is not listed here, please consult your Web server documentation or the online documentation at the Progressive Networks Web site:

http://www.realaudio.com/help

CERN HTTPD (v.3.0) Server

1. Add the following lines to the **httpd.conf** file under the server's root directory:

```
AddType  .ram  audio/x-pn-realaudio         binary
AddType  .rpm  audio/x-pn-realaudio-plugin  binary
```

2. Reinitialize the Web server.

EMWAC HTTPS (Windows NT Only)

1. In Control Panel, start the HTTP server applet.

2. Click **New Mapping**.

3. In the Extension edit box, enter the filename extension:

   RAM

4. In the Mime Type edit box, enter the full MIME type:

   audio/x-pn-realaudio

5. Click **OK**.

6. Repeat Steps 3 and 4, using:

   RPM

   as the filename extension and:

   audio/x-pn-realaudio-plugin

   as the MIME type.

7. Reinitialize the Web server.

Mac HTTP and HTTPD4Mac Servers

1. Enter the following information into your configuration file in the format appropriate for your server:

   ```
   Action:  TEXT
   File Suffix:  .ram
   File Type:  *
   MIME Type:  audio/x-pn-realaudio
   Creator:  *
   ```

2. Repeat with:

   .rpm

   as File Suffix and:

   audio/x-pn-realaudio-plugin

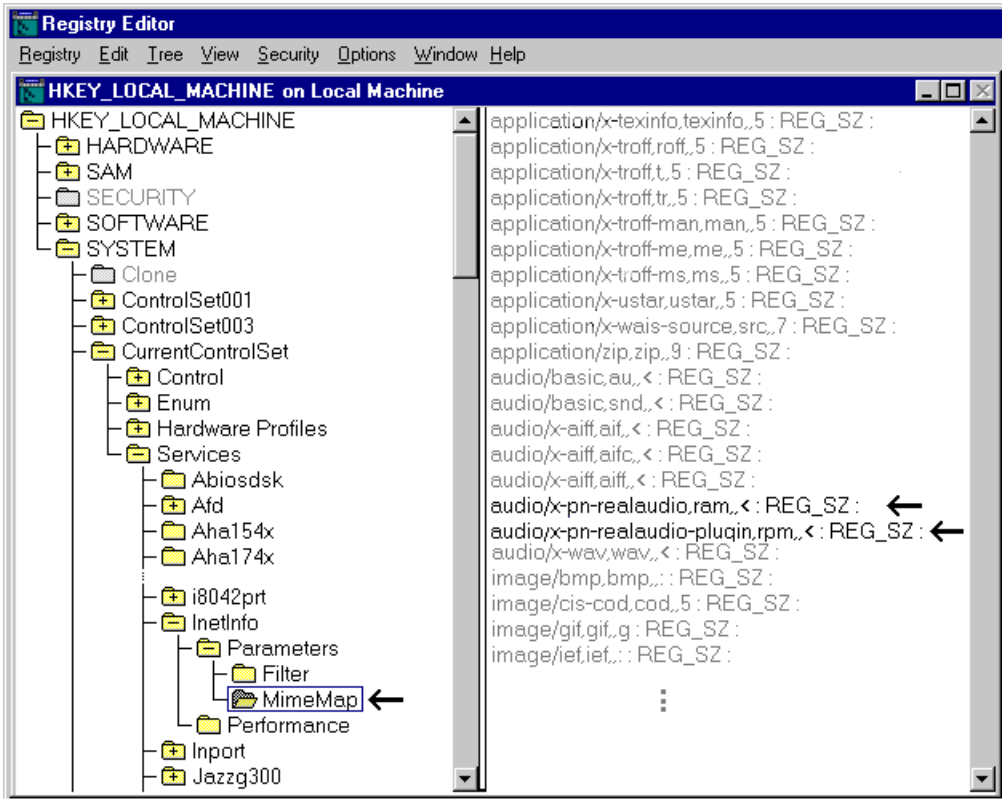
   as MIME Type.

Microsoft Internet Information Server (Windows NT Only)

MIME type configuration is done in the Windows NT registry. To edit the registry:

1. Log on as Administrator.
2. Start Regedt32.
3. Click the entry:

   HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\InetInfo\Parameters\MimeMap



4. Click **Add Value** on the **Edit** menu.

5. In the **Add Value** box, enter:

   audio/x-pn-realaudio-plugin,rpm,,<

6. In the **Data Type** box select:

   REG_SZ

   And click the **OK** button.

7. Leave the **String** box blank and click the **OK** button.

8. Repeat Steps 4 through 7. For Step 5, enter:

   audio/x-pn-realaudio,ram,,<

NCSA HTTPD (v. 1.3 and 1.4) Server

1. In the file **srm.conf** in the **SERVER_ROOT/conf** subdirectory, add the following lines:

```
AddType audio/x-pn-realaudio            ram
AddType audio/x-pn-realaudio-plugin     rpm
```

2. Reinitialize the Web server.

Netscape Netsite Server

1. Add the following to the **MIME.types** file:

```
type=audio/x-pn-realaudio           exts=ram
type=audio/x-pn-realaudio-plugin    exts=rpm
```

2. Add the following line to the Server's main configuration file (called **magnus.conf** in the examples given in the Netsite documentation):

```
Init fn=load-types mime-types=mime.types
```

3. Reinitialize the Web server.

O'Reilly Website NT Server

Use the admin tool on the mapping page to change the content type by entering the following commands:

```
.ram audio/x-pn-realaudio
.rpm audio/x-pn-realaudio-plugin
```

Webstar and Webstar PS

1. Start the Admin program for the Webstar server.
2. On the Configure menu, click **Suffix Mapping**.
3. Enter the MIME type information into its associated fields exactly as shown in the following example (these fields are case sensitive):

   ```
   Action:  TEXT
   File Suffix:  .ram
   File Type:  *
   MIME Type:  audio/x-pn-realaudio
   Creator:  *
   ```

4. Click the **Add** button to update the MIME types directory.
5. Repeat Steps 3 and 4, using:

   .rpm

   as File Suffix and:

   audio/x-pn-realaudio-plugin

   as MIME Type.

Spinner 1.0b12 - 1.0b15 / Roxen 1.0

1. Point your browser to the following URL:

   http://<server_name>:18830/Configurations/Gnats/Contenttypes/Extensions?40

   Where:
   server_name is the name of computer running your Web server
   18830 is the default administration server port; change this port number to your administration server port if necessary

2. Enter the RealAudio MIME types into the dialog box.

Apache 1.1.1

Apache comes preconfigured, but the MIME type for RealAudio files needs to be changed from **`audio/x-realaudio`** to **`audio/x-pn-realaudio`**. MIME types are normally stored in **/usr/local/etc/httpd/conf**.

Configuring RealAudio Server

After you have RealAudio Server installed on your computer, you can configure it to best meet the needs of your network and your users. You control the configuration of your RealAudio Server in two ways:

- Buying optional licensed features from Progressive Networks
- Changing configuration settings for your copy of RealAudio Server

This chapter describes:

- Standard and optional features of RealAudio Server
- Changing configuration settings
- Using multiple computers as your RealAudio Server
- Organizing files to serve customers the optimal audio for their network connection

Standard and Optional Features of RealAudio Server

RealAudio Server 3.0 includes a wide range of features designed to meet the needs of people delivering on-demand content over networks and the Internet. Some features are standard with every copy of RealAudio Server; others are options that you can purchase from Progressive Networks. What features you have is controlled by the license you purchase from Progressive Networks.

The following features are in every copy of RealAudio Server:

- Live broadcasting
- Clustering (licenses for 100 or more audio streams)
- Synchronized multimedia

Other features available from Progressive Networks include:

- Splitting—Sending audio streams between RealAudio Servers, making it easier to distribute live audio to large audiences and to optimize bandwidth usage.
- Intranet—Restricts broadcast of RealAudio to just users of your company or organizations' network.
- Remote license management—Sharing license information between several computers to balance the load on your network and simplify compliance with your license agreement.
- RealAudio Hosting—Allocating audio streams to accounts on your server.

To see what features you currently have:

1. Start System Manager and connect to the RealAudio Server you want to check.

   See "Changing Configuration Options with System Manager" on page 54 for instructions on using System Manager.

2. On the Server menu, click **Information**.

If you have questions about the features you have purchased, or would like to purchase any additional features, please contact your RealAudio reseller or Progressive Networks.

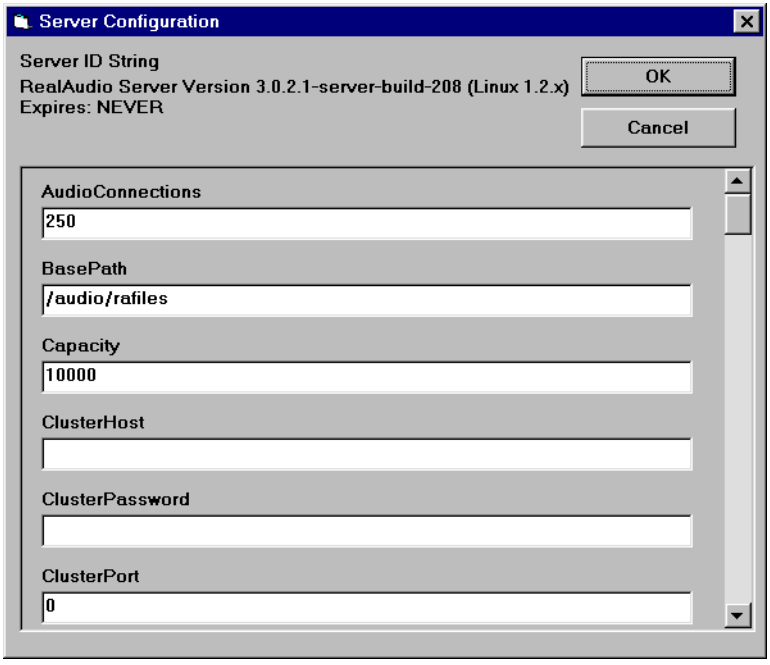
Changing Configuration Options with System Manager

The server configuration file, server.cfg, is a plain-text file that stores pairs of configuration options and their settings, such as:

```
ClusterHost          Matisse
ClusterPassword      fauvist
EncoderTimeout       30
```

You can edit the configuration file with any text editor. Note that entries in the file are case-sensitive. (When RealAudio Server is not running, editing the configuration file manually is the only way to change settings.)

When your RealAudio Server is running, you can change its configuration with System Manager. System Manager is a graphical administration tool run on Windows 95 or Windows NT. It can reconfigure a RealAudio Server running on any platform.



System Manager lets you easily change configuration options to meet the changing needs of your customers.

Installing System Manager

If you did not install System Manager when you installed RealAudio Server, you need to do so now. See “Installing RealAudio Server” on page 31.

If you purchased RealAudio Server on CD-ROM follow the directions in “Installing RealAudio Server from CD-ROM” on page 39.

Connecting System Manager to RealAudio Server

You can run multiple sessions of System Manager simultaneously. If you have more than one RealAudio Server running, you can start a session for each one and leave them all running continuously for as long as RealAudio Server is running. You can also run multiple sessions for any particular RealAudio Server.

1. **Windows 95 and NT 4.0**: Click the **Start** button, point to **Programs**, point to **RealAudio**, and click **RealAudio System Manager**.

   Windows NT 3.51: Double-click the RealAudio program group and double-click the **RealAudio System Manager** icon.

2. On the File menu, click **Open**.

3. Click the name of the RealAudio Server that you want to monitor.

4. Click **OK**.

If the RealAudio Server you want to monitor is not in the list, you need to add it to System Manager’s selection menu.

1. In the **Open Connection** dialog box, click **Add**.

2. Enter the required information and click **OK**:

Text box	Enter
Connection Name	A name for the connection.
Machine Name	The name of the machine running the Server you want to reconfigure.
Machine Port	The port number for System Manager to use to reach RealAudio Server. This is the port specified in the **PnaPort** setting for RealAudio Server (the default is 7070).
Password	The password that you entered as the value for the **MonitorPassword** setting in the RealAudio Server configuration file.

System Manager automatically saves the connection information for all of the RealAudio Servers you enter.

Changing Configuration Options

Before you change configuration options, you must first connect to a RealAudio Server from System Manager. See “Connecting System Manager to RealAudio Server” on page 56.

Changes to some of the configuration values have an immediate effect; others take effect only after you restart RealAudio Server. For specific information about individual options, including when changes to a particular option take effect, see “Configuration Settings” on page 130.

To change configuration options:

1. On the Server menu, click **Configuration**.

2. Edit the entry or entries you want to change and click **OK**.

   All configuration options are shown, even if some of them do not have a value.

If the RealAudio Server you are configuring is running as a cluster host, the sub-servers of the cluster are listed in the main window of System Manager. The sub-servers' configuration can be edited from System Manager.

1. Click the name of the sub-server you want to configure.
2. On the Server menu, click **Configuration**.
3. Enter the password for the sub-server.
4. Edit the entry or entries you want to change and click **OK**.

Changing Configuration Options Manually on UNIX-based Servers

In addition to the Windows-based System Manager, RealAudio Server includes a UNIX command-line version of System Manager. With this version, you can write scripts for automating some administrative tasks. For detailed information on using the command-line System Manager, see "rasm" on page 124.

1. Using a text editor such as vi, open the file **server.cfg** located in the **pnserver** directory.
2. Edit the entry or entries you want to change.

   For specific information about individual options, see "Configuration Settings" on page 130.
3. Save the file as text.
4. To force reloading of the new configuration settings, use the command:

   ```
   kill -HUP `cat pnserver.pid`
   ```

For information on using the **kill** command, see "kill" on page 116.

Running RealAudio Server on Multiple Computers

You can join several computers together to run RealAudio Server. This helps you balance the load of incoming requests and your available bandwidth so that customers always receive good performance. Ways to use multiple computers with RealAudio Server include:

- Clustering computers together to act as a single RealAudio Server
- Sharing licensed stream allotments among computers

Clustering Computers into a Single RealAudio Server

You can group individual RealAudio Servers together into a cluster to provide support for large stream requirements. With clustering, you can exceed the performance capability of a single computer, in terms of simultaneous RealAudio Player connections. A cluster consists of a control server and a number of sub-servers. The control server allocates incoming connection requests from RealAudio Players to the least busy sub-server. A clustered RealAudio Server can distribute both static and live audio streams.

Clustering is a standard feature of RealAudio Server. Individual licenses are required for each RealAudio Server in a cluster. You can cluster different platforms (a Windows NT computer controlling a cluster of Linux computers); however, all computers in a cluster must be running the same version of RealAudio Server and have the same audio files stored on their hard disks.

Control Server Configuration

You start the control server by using a cluster password. Add the following parameter to the configuration file of the control server.

```
ClusterPassword      <clusterpassword>
```

For example:

```
ClusterPassword      zpassword
```

Sub-server Configuration

The sub-servers connect to the control server of the cluster through the standard audio port defined by **PnaPort** in the configuration file. Sub-servers are accepted into the cluster only if they supply the correct password, name and port number for the control Server. Add the following entries to the sub-server's configuration file.

```
ClusterHost          <clusterhost>
ClusterPort          <clusterport>
ClusterPassword      <Control Server password>
```

For example:

```
ClusterHost          Maze
ClusterPort          7070
ClusterPassword      zpassword
```

If a sub-server fails to connect to the control server, it stops operating. For information on configuration settings, see "Configuration Settings" on page 130.

Sharing a Stream License Among Computers

You can share one RealAudio Server's allotted number of streams among several other RealAudio Servers. This simplifies license management when you own several RealAudio Servers.

The ability to share allotted streams is an optional feature controlled by the license you purchase from Progressive Networks. If you would like to add this capability to your network, contact your RealAudio reseller or Progressive Networks.

To share a stream license you need:

- One RealAudio Server licensed and configured to share allotted streams. This RealAudio Server is called the remote license server.
- Other RealAudio Servers configured to accept stream allotment. These RealAudio Servers are called the license clients.

Remote License Server Configuration

You need to specify the names of the license clients and the number of streams allotted to each. You specify this information with the LicenseClients configuration setting:

`LicenseClients [{<host>:<port>,<streams>},…]`

where:

`host` is the name of a license client

`port` is the PnaPort value of the license client

`streams` is the number of streams to allocate to the license client

License Client Configuration

For a license client to receive stream allotment from a remote license server, you need to specify the name of the remote license server and the port number it uses to communicate with the license client. You also need to specify the number of streams that can be allocated to the client. Add the following entries to the configuration file of each license client:

```
RemoteLicenseHost    <host>
RemoteLicensePort    <port>
AudioConnections     <count>
```

where:

`host` is the name of the remote license server

`port` is the number of the port the remote license server uses to connect to the license client, specified with the **LicenseClients** configuration setting on the remote license server.

`count` is the total number of licenses available to this client. This value should be the sum of the **`streams`** value on the LicenseClients parameter of the remote license server and the number of locally licensed streams.

Note The **RemoteLicenseHost** and **RemoteLicensePort** settings must specify a different RealAudio Server from the one on which this configuration file is used.

Controlling Traffic on Your Network

If you are the administrator of a network, part of your job is balancing the needs of all the users who rely on being connected. Adding audio to your network means more data traveling over cables and through routers. RealAudio Server lets you control how much of your network resources are dedicated to audio by letting you specify who can access RealAudio files and how much bandwidth RealAudio Server can use.

Restricting Access to Private Content

You can control who can access RealAudio Server and how many people can be connected simultaneously. Together, these two features help you put a ceiling on how much RealAudio traffic flows through your network at any given time.

If you purchased an intranet license for RealAudio Server, you must specify a **ConnectControlList** to enable the users on your intranet to access your RealAudio Server.

Use the **ConnectControlList** configuration setting to specify who can access RealAudio Server:

`ConnectControlList [{<address>, <net mask>}, …]`

where:

`address` is the domain address or network address of the computer allowed to access RealAudio Server

`net mask` specifies how much of the address to use as wildcards

For example, to restrict access to a network with IP addresses starting 100.71.12:

`ConnectControlList [{100.71.12.0, 255.255.255.0}]`

To restrict access to a single computer with IP address 100.71.12.122:

`ConnectControlList [{100.71.12.122, 255.255.255.255}]`

To allow any player to connect, do not include a ConnectControlList setting in your configuration file. To prevent any player from connecting, specify:

```
ConnectControlList [{0.0.0.0, 255.255.255.255}]
```

Controlling Bandwidth Used by RealAudio

You can control how much bandwidth one RealAudio Server uses in serving audio to network users with the **MaxBandwidth** configuration setting:

```
MaxBandwidth <number>
```

where **number** is the number of kilobits per second RealAudio Server can use. For example, to restrict the server to using half of a T1 connection's capacity, use

```
MaxBandwidth 750
```

The default value is 0, which forces RealAudio Server to use the values specified in your RealAudio Server license and in the **AudioConnections** setting as the maximum bandwidth.

To limit the number of simultaneous connections served by RealAudio Server, use the **AudioConnections** configuration setting.

Creating Accounts on RealAudio Server

With RealAudio Server you can divide the stream capacity of your server between multiple accounts. For example, this can let an Internet Service Provider (ISP) buy RealAudio Server and then allocate audio streams to individuals, companies, or organizations who use the ISP to place their Web sites on the Internet.

The ability to allocate is an optional feature controlled by the license you purchase from Progressive Networks. If you would like to add this capability to your network, contact your RealAudio reseller or Progressive Networks.

You can create individual accounts and specify the number of streams allocated to each, or you can use a naming convention to allocate the same number of streams to a large number of accounts.

UserList entries can not be added or deleted from the System Manager. The **UserList** entry only supports changes to existing entries from the System Manager. For example, you can change the maximum or minimum number of connections a particular account is authorized. To make more substantial changes to the **UserList** you can edit **server.cfg** using a text editor.

Creating Individual Accounts

To divide your audio stream capacity between specified individual accounts, you need to specify which users, the location of the user's files, and the minimum and maximum number of streams they are guaranteed. Add the following entry to your configuration file:

```
UserList [ {<user>, <path>, <min>, <max>}, …]
```

where:

`user` is the name of the user. This defines the key that the URL passes to RealAudio Server to allow selection of a particular account entry. Name does not have to be a user directory and can be a string up to 1024 characters. In the URL, name is preceded by a tilde (~). For example:

```
pnm://audio.realaudio.com/~fred/test.ra
```

Selects the account entry defined for the user fred and then plays the RealAudio file **test.ra** from the **fred** privateRApath directory.

`path` is the path of the directory of user files. This configuration setting creates a separate path for RealAudio files in each account. This lets the owner of the account alter the files in their own directory without granting them access to any other user's files.

`min` is the minimum number of streams allocated to the account. These streams are no longer available to any general RealAudio Server requests. If **`min`** is 0, no streams are reserved for that account.

`max` is the maximum number of streams allocated to the account. This number can be from 0 to the total number of streams available on RealAudio Server.

For example, to allocate eight streams between two businesses posting Web sites on your service, use:

```
UserList [ {ElectroMotors, /usr/electro/ra, 2, 5},
{CityWeld, /usr/cityweld/ra, 1, 3}]
```

If more than the available streams are allocated to individual account entries, RealAudio Server logs an error and provides access to the minimum streams for those entries in **UserList** before the limit is exceeded. All account entries after the limit is exceeded are not allocated streams.

Creating Accounts Using a Naming Convention

If you need to create a large number of accounts, and allocate the same number of streams to each, you can use a naming convention instead of listing each account individually. This function is typically used by Internet Service Providers who make RealAudio Server available to a large number of customers.

The ability to create accounts using a naming convention is an optional feature controlled by the license you purchase from Progressive Networks. If you would like to add this capability to your Server, contact your RealAudio reseller or Progressive Networks.

You can define a naming convention for most accounts, and still create individual accounts with different numbers of streams.

You can use one or both of the following naming conventions to allocate large numbers of accounts.

Naming Convention One

All accounts using this naming convention have a URL with the following format:

```
pnm://server.com/~account/directory/file.ra
```

All URL requests that begin with the same value for **account** are counted against that account's stream allocation.

The files for this account must be located in the **/account/** directory relative to the **path** specified in the following UserList entry.

The following special UserList entry specifies the number of streams allocated to each account that uses this naming convention:

```
{ ~*, <path>, <min>, <max> }
```

Naming Convention Two

All accounts using this naming convention have a URL with the following format:

```
pnm://server.com/dir1/dir2/dir3/dir4/file.ra
```

All URL requests that begin with the same value for the specified number of directory levels are counted against that account's stream allocation. If the directory level is set to 3, then **/dir1/dir2/dir3/** becomes the unique account identifier.

The files for this account must be located in the /**dir1**/**dir2**/**dir3** directory relative to the **path** specified in the following UserList entry.

The following special UserList entry specifies the number of streams allocated to each account that uses this naming convention:

```
{ *n, <path>, <min>, <max> }
```

Where **n** is the number of directory levels that make up the unique account.

Note If you use the *n naming convention, you must use it for all files on that RealAudio Server. URLs relative to the Server BasePath do not work.

Delivering Highest Quality Supported by Client Using Bandwidth Negotiation

You can configure RealAudio Server to deliver files encoded with different algorithms based on the capability of the client. Users get the best quality their connection can handle without having to explicitly choose among multiple links. You can choose to provide as many versions of each file as you want. The bandwidth negotiation process is transparent to end users.

Bandwidth negotiation requires only one link on your Web site to a particular clip. Without bandwidth negotiation, to provide content in multiple formats, your Web site must provide a separate hypertext link and metafile for each format.

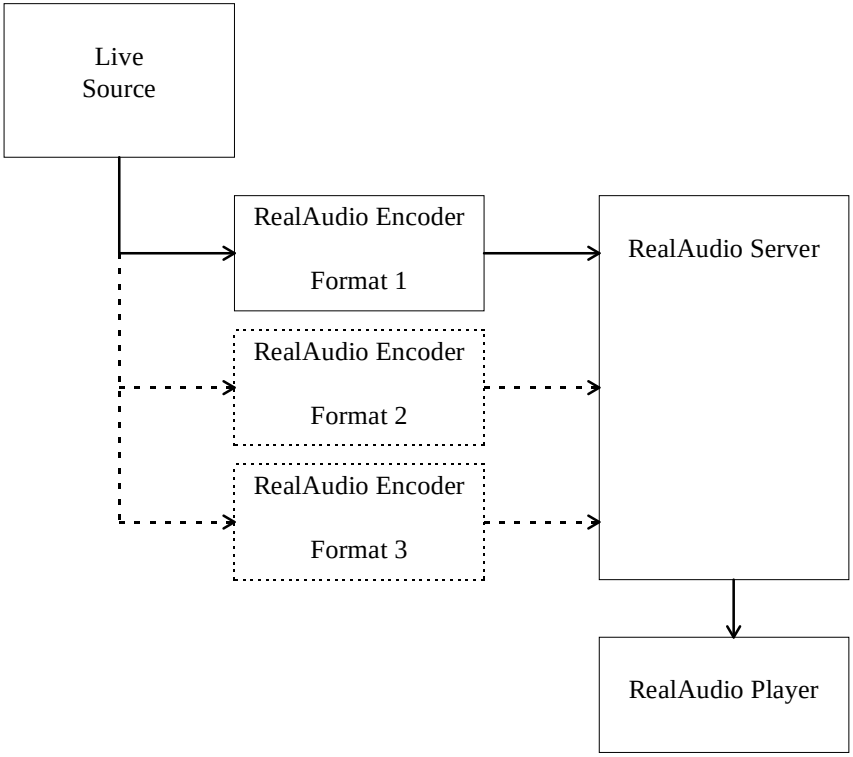
Refer to “Bandwidth Negotiation” on page 241 for more information.

Broadcasting Live

With RealAudio, you can send live events directly to user’s computers, letting people enjoy music, speeches, and public events from their computers. Whether you are promoting a concert, holding a company meeting, or covering a campaign speech, you can use RealAudio to attract whole new audiences.

Broadcasting live requires using RealAudio Server with RealAudio Encoder, the program that compresses and encodes audio for transmission over the Internet. If you choose, you can save the event to disk while you are broadcasting.

For each RealAudio format that you want to broadcast live, you need a RealAudio Encoder. For example, to offer a live broadcast in both RealAudio 2.0 - 28.8 and RealAudio 3.0 - 28.8 Stereo, you need to run two copies of RealAudio Encoder sending their output to RealAudio Server. The bandwidth



negotiation feature of RealAudio Server automatically delivers the highest bandwidth signal supported by the Player.

For information on RealAudio Encoder, see “Encoding RealAudio Clips” on page 181.

Connecting to RealAudio Encoder

RealAudio Encoder translates the broadcast audio into one or more formats that RealAudio Server can distribute over the Internet. As administrator of the RealAudio Server, you must provide a way for RealAudio Encoder to connect to RealAudio Server. You do this using the **PnaPort** and **EncoderPassword** configuration settings.

The **EncoderPassword** setting specifies the password RealAudio Encoder must use to connect to RealAudio Server. Passwords are necessary to keep

unauthorized users from connecting to the audio stream of your live broadcast. For example, if you have the setting:

```
EncoderPassword FrogNet
```

the person starting RealAudio Encoder must use the password **`FrogNet`** to start RealAudio Encoder.

RealAudio Server can perform bandwidth negotiation during live events. Connect one RealAudio Encoder for each encoding algorithm you want to support. Specify the same file name as the output from each RealAudio Encoder. RealAudio Server recognizes the format of each stream and directs it to RealAudio Players requesting that format.

The **EncoderTimeout** configuration parameter specifies how long RealAudio Server will stay connected to a RealAudio Encoder that is not sending data. If the connection to the Encoder is lost, the Server must disconnect before the Encoder can reconnect.

Archiving Live Broadcasts

You can choose to archive a live broadcast for playback later. RealAudio Server can be configured to automatically archive live broadcasts or you can use the **rafile** utility program to archive broadcasts on any RealAudio Server over a network. You can choose to create just one file; a new file based on elapsed time, such as every 30 minutes; or a new file based on size, such as every 5 MB.

If you specify the **LiveFileTarget** and **LiveFilePassword** settings in the server's configuration file, RealAudio Server automatically archives any live audio stream that arrives at the Server. Be sure you have enough available disk space to store the files generated from a live broadcast. The archive files are stored in the directory specified by the **LiveFileTarget** parameter, or in the working directory that was used to start RealAudio Server if a target directory is not specified.

Because the **rafile** utility program accepts a network address for the audio source, you do not need to run it on the same computer as either RealAudio Server or RealAudio Encoder. Archive files written by **rafile** are stored in the specified directory, or in the working directory used to start the **rafile** program if no directory is specified.

You can specify that archived files are written using the conventions used for bandwidth negotiation. If your live broadcast uses bandwidth negotiation for one or more formats be sure to specify **LiveFileBandwidthNegotiation True**. The archive files are written to a directory named with the file name of the broadcast and individual files are named based on their bandwidth.

Note Running **rafile** automatically with two bandwidth negotiation live streams but with **LiveFileBandwidthNegotiation** set to False, the files will overwrite each other.

If RealAudio Server or **rafile** archives a live broadcast with the same destination path and file name used for a previous broadcast, the .ra file from the previous broadcast is overwritten. Reusing the same output file name can simplify Web page maintenance, because the links for a recurring event remain the same. If you want to maintain an archive of live broadcasts, either copy the .ra file elsewhere before it is overwritten or use unique file names for each live broadcast.

Example 1:

A radio station broadcasts over the Internet and wants to archive the entire broadcast day in multiple files each 60 minutes long to the **/usr/Archive** directory. The broadcast is named Live.ra and is available in RealAudio 2.0 - 28.8 format only. The configuration parameters are:

```
LiveFileBandwidthNegotiation False
LiveFilePassword raBroadcast1
LiveFileTarget          /usr/Archive
LiveFileTime            1h
```

RealAudio Server automatically archives the live broadcast to a series files in the /usr/Archive directory named Live0.ra, Live1.ra, Live2.ra, and so on. Each file contains one hour of audio data encoded in the RealAudio 2.0 28.8 format.

Example 2:

A concert promoter broadcasts a live concert over the Internet and wants to archive the entire concert. The concert is broadcast in three formats using bandwidth negotiation: RealAudio 2.0 - 14.4, RealAudio 3.0 - 28.8 Stereo, and RealAudio 3.0 - ISDN Mono.

Instead of archiving on the Server computer, the computer, a separate archive computer is used. The archive computer runs the **rafile** utility program from a command line.

The configuration parameters on the Server computer are:

```
LiveFileBandwidthNegotiation True
LiveFilePassword raBroadcastZ
```

The command on the archive computer is:

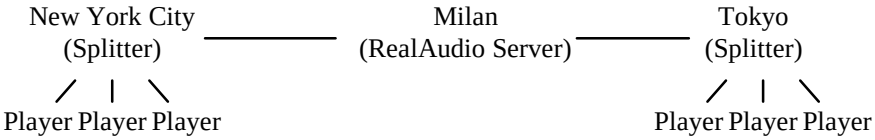
```
rafile -b -p raBroadcastZ
pnm://server.domain.com/Concert.ra Bconcert.ra
```

The **rafile** utility program connects to the Server using the URL pnm://server.domain.com/Concert.ra. It creates a directory named **Bconcert.ra** in the directory on the archive machine from which the **rafile** command was issued. The directory **Bconcert.ra** contains three files, one for each format in the broadcast: **14_4.18**, **28_8.36**, **dnet.50**. These files can be copied to a RealAudio Server for later rebroadcast of the concert.

For information on bandwidth negotiation, see “Delivering Highest Quality Supported by Client Using Bandwidth Negotiation” on page 67. For additional information on the **rafile** command and its settings, see “rafile” on page 120.

Splitting an Audio Stream Among Computers

In addition to offering recorded audio files or live broadcasts sent directly from RealAudio Encoder, RealAudio Server can now offer live audio sent from another RealAudio Server. This gives you greater efficiency and flexibility in delivering live broadcasts to users.



For example, say you want to broadcast a concert from Milan over the Internet. You can have RealAudio Servers in New York City and Tokyo receive the broadcast. Then users in those cities connect to the RealAudio Server closest to them, thereby getting better audio quality and performance.

The ability to split audio streams is an optional feature controlled by the license you purchase from Progressive Networks. If you would like to add this capability to your network, contact your RealAudio reseller or Progressive Networks.

To split an audio stream, you need:

- One RealAudio Server supplying the audio stream.
- Another RealAudio Server version 3.0, licensed for splitting.
- A link in the Web site that refers to both servers. This link has the syntax:

pnm://<splitter>:<port1>/pnm://<server>:<port2>/<stream>

where:

pnm is the protocol RealAudio Server uses to play audio

splitter is the name of the RealAudio Server acting as the splitter

port1 is the port number used by the Player to connect to the splitter

`server` is the name of the RealAudio Server supplying the audio stream to the splitter

`port2` is the port number used to connect to the RealAudio Server supplying the audio stream to the splitter

`stream` is the name of the audio stream

For example, a RealAudio Server named **source.com** is receiving a live audio stream named live1.ra from RealAudio Encoder. Another RealAudio Server, named **split.com**, is configured as a splitter and is connected to **source.com**. Players can access the stream through the splitter using the following URL:

```
pnm://split.com/pnm://source.com/live1.ra
```

When a RealAudio Player requests this URL, **split.com** makes a connection to **source.com** and requests the **live1.ra** stream. As **split.com** receives the stream from **source.com**, **split.com** delivers the stream to the Player.

The following configuration parameters are needed for splitting:

```
SplitterBufferDelay
SourceControlList
SplitterControlList
```

Setting the **SplitterBufferDelay** configuration parameter on the splitter is important for preventing dropouts in the audio stream. The recommended value is 20 seconds; a minimum of at least 10 seconds should usually be used.

Controlling Splitter Source

You can limit a splitter to specified source servers or files on specified servers. If you do not control the splitter source, any user of your splitter can request any available source stream from any other RealAudio Server.

The **SourceControlList** configuration parameter specifies the URLs of sources your splitter can accept. You can specify full or partial URLs; a partial URL works like a wildcard.

If you specify any value for **SourceControlList** then only URLs in the list are accepted by the splitter. If you do not specify a **SourceControlList** value, any source is accepted.

See “SourceControlList” on page 164.

Controlling Splitter Access to a Server

You can specify the splitters that are allowed to access a RealAudio Server. If you do not limit the splitters, any splitter can access your server.

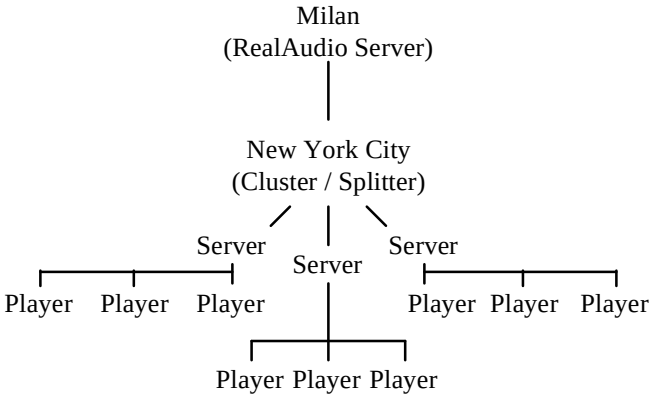
The **SplitterControlList** configuration parameter lists the addresses of splitters that are allowed to access your Server.

If you specify a **SplitterControlList** configuration parameter, only splitters from the specified addresses can access your Server. If you do not specify a **SplitterControlList** value, any splitter is accepted.

See “SplitterControlList” on page 165.

Combining Splitting and Clustering

To meet the high demand for RealAudio Player connections during a live broadcast, try combining splitting with clustering. Clustering lets you operate several computers as one RealAudio Server. With a computer running RealAudio Server and operating as both a cluster control server and a splitter, you can supply a large number of connections to a single live audio stream coming from the broadcast site. Continuing the earlier example, using clustering with splitting lets you serve many RealAudio Players in New York City using a few transatlantic connections.



Reducing Bandwidth Congestion using Multicast Delivery

Multicast delivery enables many clients on a network to share a live broadcast using less bandwidth than sending a separate stream to each individual client. RealAudio multicast delivery uses UDP multicast support. For multicast delivery, RealAudio Server sends the live broadcast to a single multicast address, and each client in the network listens to that address.

Multicast delivery requires:

- Multicast-enabled clients (RealAudio Player 3.0 or later)
- Correctly configured RealAudio Server running on a computer that is correctly configured for multicast support
- Multicast-enabled routers on the client network

Multicast delivery is primarily intended for intranets. For large audiences, use splitters to send data across the Internet, and then use multicast delivery within each target intranet.

To enable multicast delivery:

1. Verify with your network administrator that the routers in your network have enabled multicast UDP support and the computer running RealAudio Server is correctly configured for multicast support.

2. Specify the addresses of the client computers or networks that can receive multicast delivery using the **MulticastControlList** configuration parameter. See “Multicast Control List” on page 155.

3. Specify how far in your network multicast packets can travel using the **MulticastTTL** configuration parameter. The default value 16 keeps multicast packets within a typical internal network at a site. See “MulticastDeliveryOnly” on page 157.

4. Specify the range of multicast addresses available to RealAudio Server using the **MulticastAddressRange** configuration parameter. See "MulticastAddressRange" on page 155.

5. To limit RealAudio Server to multicast delivery only, set MulticastDeliveryOnly to True.

Simulating a Live Broadcast

At times, you might want to play a recorded RealAudio file as if it were being broadcast live. Perhaps you want to test your system before a live event, delay broadcast of a concert, or play an audio commercial on your site. The **slta** (Simulated Live Transfer Agent) utility lets you play a recorded RealAudio file as if it were live.

To use **slta**, you need to specify the password from the Server's **EncoderPassword** configuration parameter and the name of the input and output file.

Using Slta on Windows NT and UNIX

For example, to play the file **ford01.ra** as a live event, use the following command:

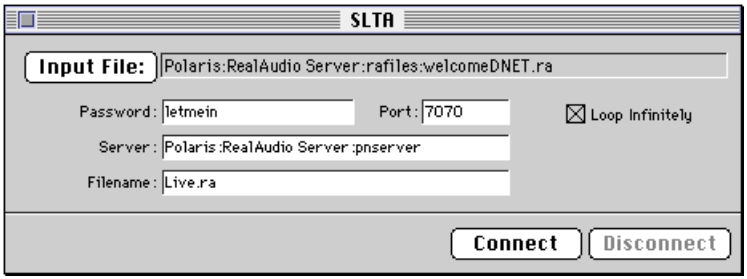
```
slta -p fakeit ford01.ra pnm://server.com/car.ra
```

Instead of entering values on the command line, you can create a configuration file for **slta** that contains the values for the **ServerPassword**, **InputFile**, and **OutputFile** settings. For more information on simulating a live event, see "slta" on page 127 and "Configuration Settings" on page 130.

Using Slta on Macintosh

To start slta on Macintosh from the Server Setup window:

1. On the **File** menu, select **New**, and select **SLTA**.



2. Click the **Input File** button and choose the input file.

3. Enter the slta **Password** specified by the EncoderPassword parameter in the Server's configuration file.

4. Enter the Port on the RealAudio Server computer that accepts slta connections. This value is specified by the ServerPort parameter in the Server's configuration file.

5. Enter the name of the RealAudio **Server** on which you want to serve the selected file.

6. Enter the Filename used to request the file from the Server.

7. If you want the input file to play continuously by looping, check the **Loop Infinitely** check box.

8. Click **Connect** to start the slta.

Maintaining and Tuning RealAudio Server

After you have RealAudio Server installed and configured, you need to perform some periodic maintenance to keep it running smoothly. This chapter tells you how to start and stop RealAudio Server, read log files to help diagnose problems, and fix some common problems.

Starting and Stopping RealAudio Server

To maintain your RealAudio Server, you need to start and stop the program. You can also specify that RealAudio Server start automatically whenever you start your computer.

Starting RealAudio Server Manually on Windows NT

To start RealAudio Server manually from the command line:

1. Change to the directory where you installed RealAudio Server.
2. Start RealAudio Server by entering:

   ```
   bin\pnserver server.cfg
   ```

RealAudio Server does not return any messages to indicate that it has started, and there is no prompt on the screen for as long as it is running.

If RealAudio Server does not start, review the error messages in the RealAudio Server Log as described in “Access and Error Log Messages” on page 97.

Starting RealAudio Server Manually on UNIX

Because RealAudio Server runs on a high-numbered, unprivileged port, you do not need super-user privileges to start it. However, if you do start it while you are logged on as super-user, then RealAudio Server can configure itself to use additional system resources, such as file descriptors, that it needs to support a large number of users connected simultaneously.

After you start RealAudio Server with super-user privileges and it adjusts its resource limits, RealAudio Server assumes the user and group IDs entered into the configuration file.

To start RealAudio Server manually:

1. Change to the directory where you installed RealAudio Server.
2. Start RealAudio Server by entering:

   ```
   bin/pnserver server.cfg
   ```

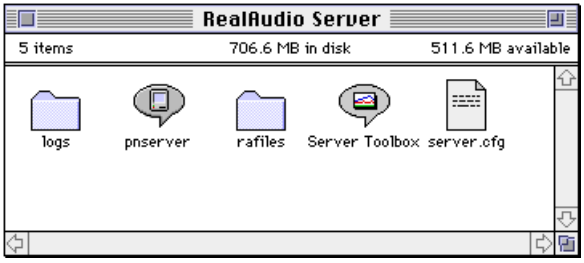
RealAudio Server returns the command prompt and runs in the background. It does not return any messages to indicate that it has started.

If RealAudio Server does not start, review the error messages in the RealAudio Server Log as described in “Access and Error Log Messages” on page 97.

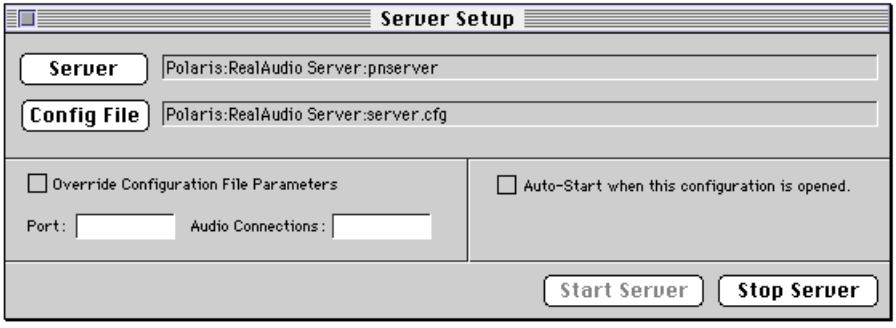
Starting RealAudio Server Manually on Macintosh

To start RealAudio Server manually:

1. Double click the **Server Toolbox** icon in the RealAudio Server installation folder.



2. On the **File** menu, select **New**, and select **Server Setup**.



3. Click the **Server** button. Choose the **pnserver** application in the RealAudio Server installation folder.

4. Click the **Config File** button. Choose the **server.cfg** file in the RealAudio Server installation folder.

5. If you want to override the default port number (7070), enter the **Port** number to use for testing.

6. Click the **Start Server** button.

If RealAudio Server does not start, review the error messages in the RealAudio Server Log as described in “Access and Error Log Messages” on page 97.

Starting RealAudio Server Automatically on Windows NT

Once you have RealAudio Server running satisfactorily, you can configure it to start automatically each time you start your computer.

RealAudio Server is installed as a service under Windows NT. This means that it can be controlled from the Services Control Panel and starts and stops automatically when the system is booted or shut down.

When you run RealAudio Server as a Service, errors are written to the Windows NT error logs rather than the error logs specified in the RealAudio Server configuration file. You can view them just like any other Windows NT errors.

To uninstall RealAudio Server as a service, run the **delsvc** program from the **bin** directory. Make sure that RealAudio Server is stopped prior to removing it.

Starting RealAudio Server Automatically on UNIX

Once you have RealAudio Server running satisfactorily, you can configure it to start automatically each time you start your computer.

Add the command to start RealAudio Server to the boot-time scripts of your UNIX system. The boot-time scripts generally reside in files or directories beneath the **/etc** subdirectory. Be sure to use complete path names in your script.

If you do not have permission to change the boot-time scripts on your computer, you may need to have your system administrator do this for you.

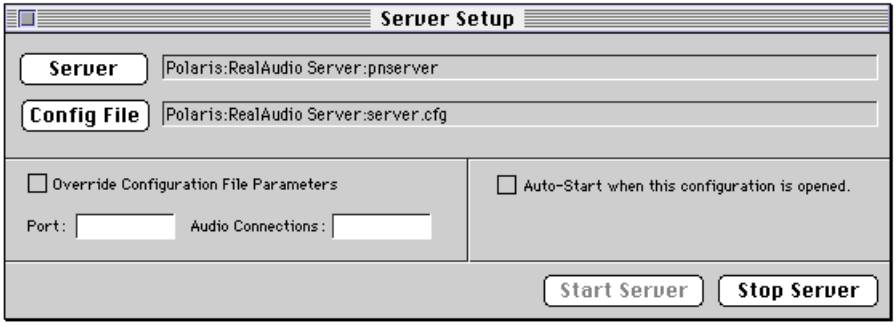
Starting RealAudio Server Automatically on Macintosh

Once you have RealAudio Server running satisfactorily, you can configure it to start automatically each time you start your computer.

To start RealAudio Server automatically on Macintosh:

1. Double click the **Server Toolbox** icon in the RealAudio Server installation folder.

2. On the **File** menu, select **New**, and select **Server Setup**.



3. Select the Server, Config File, and other settings as you did for starting manually.

4. Select the **Auto-Start** check box.

5. On the **File** menu, select **Save As** and save the **ServerSetup** file in the RealAudio Server folder.

6. Copy the **ServerSetup** file to the **Startup Items** folder in the **System Folder**.

Shutting Down Gracefully

To shut down RealAudio Server gracefully, you can prevent new connections without disconnecting current users. After your current users have disconnected, stop the RealAudio Server.

To prevent new users from connecting to UNIX Servers without using System Manager:

1. Change the PnaPort configuration setting to an unused value such as 9999.
2. Issue the SIGHUP signal.

To prevent new users from connecting to any Server using System Manager:

1. Using the System Manager, connect to the Server.
2. Change the PnaPort configuration setting to an unused value such as 9999.

Be sure to change the PnaPort back to its normal value before restarting RealAudio Server.

You can use the System Manager to check how many users are logged on to RealAudio Server. See “Monitoring Performance” on page 87.

Stopping RealAudio Server

To stop RealAudio Server, follow the platform-specific directions below.

Windows NT

1. If you are running RealAudio Server from the command line, press Ctrl+C.
2. If you are running RealAudio Server as a Service, start Services Control Panel.
3. Select **PNServer**.
4. Click **Stop**.

UNIX

1. Log on either as super-user or by using the same user ID as RealAudio Server.

2. If you know the process ID, type:

   ```
   kill <processid>
   ```

   If you don't know the process ID, change to the **pnserver** directory and type:

   ```
   kill 'cat logs/pnserver.pid'
   ```

Macintosh

1. Start RealAudio Server Setup.

2. Click **Stop Server**.

Using the Access and Error Log Files

The **pnerror.log** and **access.log** files reside in the **logs** subdirectory of your RealAudio Server installation. The error log records information and error messages about RealAudio Server operation. The access log records transactions by clients.

Reading Log Files

The error and access log files are stored as plain text. You can read them using a text editor or word processor.

You should read your log files on a regular basis. How frequently you read them depends on the amount of traffic your RealAudio Server handles and if you are encountering any problems.

For information on the structure and content of the log files, see “Access and Error Log Messages” on page 97.

Changing Log Files

Because new information is appended to log files for each error and transaction, log files can grow quickly. To keep your log files at a manageable size, you should change them on a regular basis. You may want to archive log files to maintain a record of your server’s performance.

Windows NT

Changing the log files on Windows NT requires changing the name of the log file set in the configuration file.

1. Connect System Manager to the RealAudio Server with the log file you want to change.
2. On the Server menu, click **Configuration**.
3. Enter the new name for the log file and click **OK**.

ErrorLogPath for the error log

LogPath for the access log

RealAudio Server starts writing to the new file.

For complete information on RealAudio System Manager, see “Changing Configuration Options with System Manager” on page 54.

UNIX

There are several ways to change log files:

- You can use System Manager to change the log files. See the instructions in the previous section for Windows NT.
- You can rename the log file and UNIX continues to write to the renamed file until you enter a SIGHUP signal. RealAudio Server then closes the existing, now renamed log file. When the next message needs to be logged, RealAudio Server opens the log file using the settings in the configuration file.

  For example, to change your access log file named **pnaccess.log**, rename it access1.log. RealAudio Server continues to write to access1.log. Once RealAudio Server receives a SIGHUP, it closes access1.log and opens **pnaccess.log** with the next message to be logged.
- If you do not want to keep your log files, simply delete the desired log file and issue a SIGHUP signal. Once RealAudio Server receives the signal, it opens a new file.

Macintosh

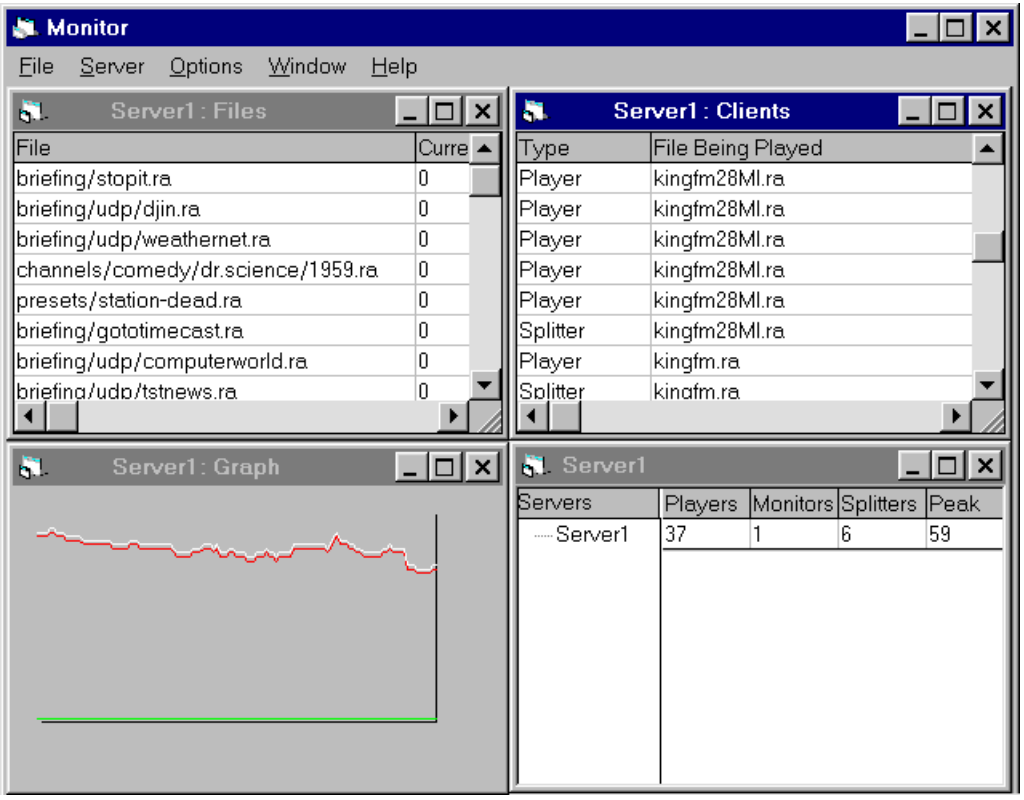
Rename the existing log file. RealAudio Server continues to write to the original log file name.

Monitoring Performance

System Manager on Windows 95 or Windows NT and Monitor on Macintosh let you view the performance of one or more RealAudio Servers graphically. These programs can monitor a Server running on any platform.

Monitoring Performance from Windows

System Manager includes windows that display clients currently connected, files being played, and a graph of all connections for the past two minutes. The System Manager for Windows is shown in the following figure:



This highly versatile tool lets you choose how you want connection information interpreted and displayed. For example, you can leave System Manager open on a corner of your screen with just the Player connections shown as a graph, giving you a visual sense of the connection activity on your RealAudio Server.

1. **Windows 95 and NT 4.0**: Click the **Start** button, point to **Programs**, point to **RealAudio**, and click **RealAudio System Manager**.

   Windows NT 3.51: Double-click the RealAudio program group and double-click the **RealAudio System Manager** icon.

2. On the File menu, click **Open**.

3. Click the name of the Server that you want to monitor and click **OK**.

4. On the Server menu, click **Clients**, **Files**, or **Graph** to display the type of information you want.

Connecting System Manager to any of the members of a cluster displays all streams from all Servers in the cluster. For live broadcasts, Server clusters and forks are listed in the Splitters column.

Clients Window

You can view the following information in the Clients window:

Column	Description
Type	The type of client connected: Player, Monitor (System Manager), Splitter, or Encoder. **Note** For live broadcasts, Server clusters and forks are listed as Splitters.
File Being Played	Name of the file being played from your RealAudio Server.
Domain Name	The domain name or IP address of the client computer. To toggle between IP address and domain name, check **Do DNS Lookups** on the **Clients** tab of the **Options** dialog box.

Column	Description
Elapsed Time	The length of time that the client has been connected to that file since the System Manager has been attached to the Server. This information is also available in the access log.

Use the Clients window in System Manager to determine how many clients connect to your site simultaneously. You can multiply this number by 10 to 20 Kbps to determine how much bandwidth your RealAudio Server is using. See "Bandwidth" on page 19.

If you want the Clients window to update continuously, select **Preferences** from the **Options** menu, select the **Client View** tab and check the **Update Continuously** box.

Files Window

The Files window tells what files are being accessed and the number of times each file is being played. This helps you determine which files are most and least popular, which could help you decide what new files to add or remove to improve the popularity of your site.

Column	Description
File	Name of the file currently being played.
Current	Number of clients currently connected to that file.
Total	Total number of connections made to this file since the System Manager was started.

If you want the Files window to update continuously, select **Preferences** from the **Options** menu, select the **File View** tab and check the **Update Continuously** box.

Graph Window

The Graph window gives a graphical interpretation of selected connections made to your Server in the past two minutes. To control what information appears on the graph, select **Preferences** from the **Options** menu, select the **Graph View** tab and check the boxes for the statistics you want to display.

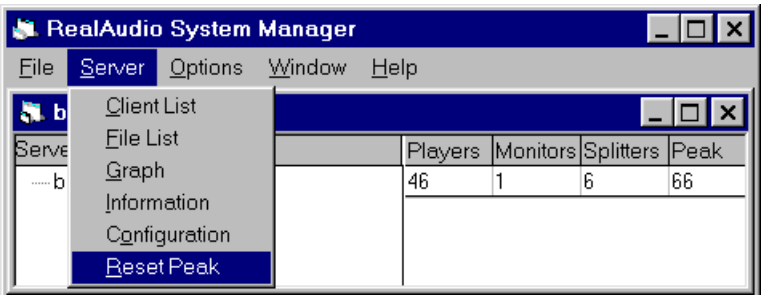
by changing options on the Graph tab of the Preference Window.

Resetting the Peak Usage

The **Peak** value in the System Manager display is maintained until you restart the Server or manually reset the value.

To reset the Peak value:

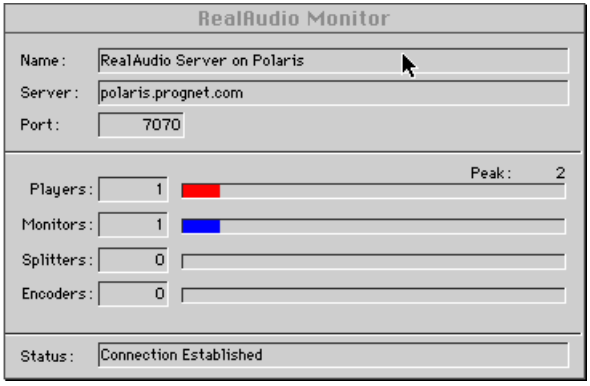
Click **ResetPeak** on the **Server** menu.



Monitoring Performance from Macintosh

The Monitor application on Macintosh can monitor the performance of any RealAudio Server. Unlike the Windows-based System Manager, the Monitor cannot change the Server configuration.

The following figure shows the Monitor application for Macintosh:

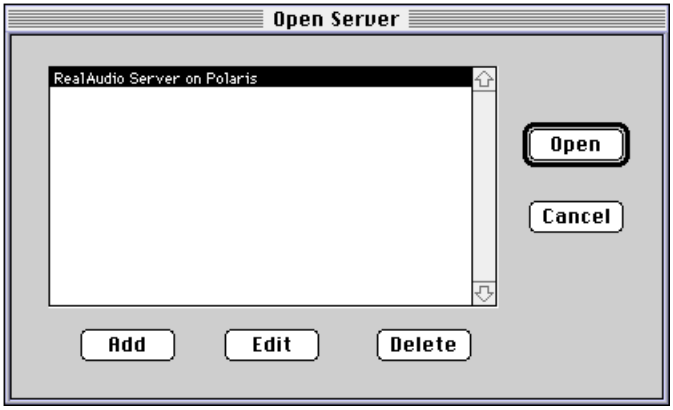


To start Monitor:

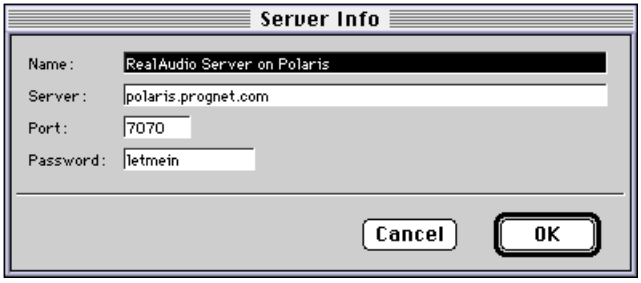
1. Open the Server Toolbox by double-clicking its icon in the RealAudio Server folder.

2. On the **File** menu, select **New**, and then select **Monitor**.

3. In the **Open Server** dialog box, select the RealAudio Server you want to monitor and click the **Open** button.

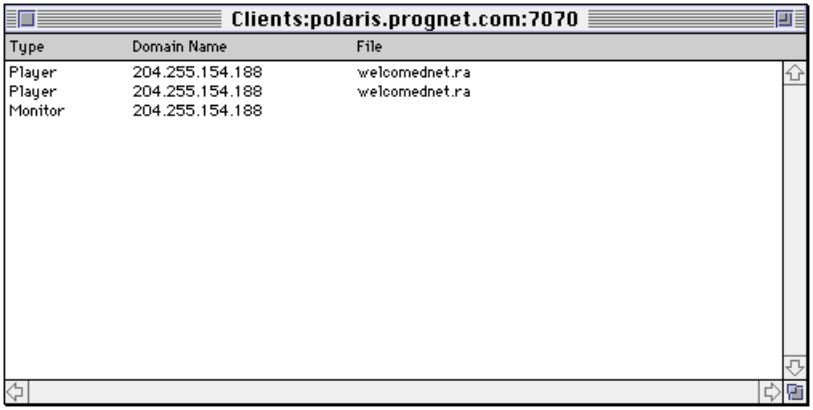


4. If the RealAudio Server you want to monitor is not shown, click the **Add** button. In the **Server Info** dialog box, enter a name for the connection, the DNS name or IP address of the RealAudio Server, the Port number, and the password specified by the EncoderPassword parameter in the Server's configuration file.



Monitor Client List

To view a list of clients currently connected to the Server, select **Client List** from the **Monitor** menu.



Network Performance Considerations

A number of factors can interfere with the quality of the audio being delivered over the Internet. Audio packets can be lost during delivery if they pass through slow routers or if the network is especially busy. Recurrent problems may indicate that you need to modify your connection to your Internet service provider.

To monitor audio quality, read the connection statistics in the access log to learn more about packets that are early, later, missing, or out-of-order. Also, you should periodically use RealAudio Player to listen to the clips on your RealAudio Server. Open the Statistics window on RealAudio Player and monitor the percentage of packet loss that is occurring. If the audio quality you hear is poor, it is likely that your users are also experiencing poor audio quality.

If you determine that there is a high level of packet loss, consult your Internet provider. You may need a faster Internet connection or there may be other problems with your Internet service.

Troubleshooting RealAudio Server

If you are experiencing problems with RealAudio Server, you need to use RealAudio Player to test links on your site to isolate the source of the problem. Before you try to connect to your site, launch System Manager to see if your RealAudio Server has an available connection for you to use. If your RealAudio Server has a license that includes RealAudio Hosting Service, you can use hosting to reserving a stream for your own testing.

The access and error logs record errors and information generated by RealAudio Server. For instructions about how to open and interpret the log file, see "Using the Access and Error Log Files" on page 85.

The following questions can help diagnose the problem:

Is RealAudio Server running on the host machine?

Use **ps** (on UNIX), or the Services Control Panel (on Windows NT) to check if RealAudio Server is running. If the Server is not running, start the server.

Is the IP address of the host machine correctly configured in the network routers?

If the Player cannot access the Server over the network, then you cannot expect audio to play. Configuring IP address and routers is a complex issue. Contact a networking specialist for help.

Is the machine you are using to test the audio connected to the network used by the Server host computer?

You must have a network connection between Player and Server for audio to play. Contact a networking specialist for help.

Is there a firewall between the Player and the Server?

You need to configure your system's firewalls to permit RealAudio to play through them; for details see "Maintaining Firewall Security" on page 21.

Can you connect to the RealAudio Server with the RealAudio System Manager?

The System Manager application can help you diagnose the problem by validating communications between the Player and RealAudio Server and by letting you view the running state of the connection during attempts to play audio.

Is the RealAudio file downloading to the Player instead of playing in real time?

RealAudio files cannot be referenced directly by your Web document. Remember that the Web page is being served by a Web server, but the RealAudio file is being served by RealAudio Server. The Web page must point the user's Web browser to the RealAudio file by way of a metafile, which is a text file you create and save with a .ram extension. The metafile contains the URL of the .ra file located on your RealAudio Server. The Web page contains a link to the metafile. For information on metafiles, refer to "RealAudio Metafiles" on page 249.

Is there unreadable text displaying on the screen instead of audio?

You have not configured your Web server to recognize RealAudio MIME types. For information on RealAudio Server and MIME types, see "Configuring Web Servers to Work with RealAudio" on page 47.

If you still have problems after considering these possibilities, please contact Progressive Networks at:

http://www.realaudio.com/help

Access and Error Log Messages

RealAudio Server writes important status information to the access and server log files. This chapter describes the structure and contents of these log files. For information about reading and maintaining log files, see “Using the Access and Error Log Files” on page 85.

RealAudio Server Access Log

The access log helps you monitor and manage your RealAudio Server. You can view how many clients have connected to your server, the name of the client machines, the clips they listened to, the times of day they connected, and errors that were generated by RealAudio Server. This information can give you an idea of who your audience is and what clips are popular.

The RealAudio Server Log records transactions in the file format common to most Web servers. Each transaction is recorded on one line in fields delimited by spaces. To view the RealAudio Server log, open the file specified by the name used in your LogFilePath using a word processor or text editor.

Two configuration parameters control what is written to the access log: **LoggingStyle** and **StatsMask**. Each field description lists any parameter settings required for that field to be included in the access log.

The access log format is:

```
<IP_address> <- -> <timestamp> "<GET filename>
<protocol>" <return_code> <bytes_sent>
[<client_ID_string>] <stat1> <stat2> <file_size>
<file_time> <sent_time> <resends> <failed_resends>
```

Where:

<IP_address> IP address of Client.

For example:

123.45.678.90

<- -> Two hyphens for compatibility with Web server log formats.

<timestamp> Time that Client accessed the file in the format:

[<day>/<month>/<year>:<hh>:<mm>:<ss> <TZ>]

For example:

[31/Oct/1996:13:44:32 -0800]

<GET filename> File requested by Client. Filename includes the path relative to the Server's **BasePath** value.

For example:

GET /bands/fourfrosh/classics.ra

<protocol> Protocol and version used by Client in the format:

PNA<type>/<number>

where:
<type> is **T** for TCP connections or blank for UDP connections. Type appears only if the **LoggingStyle** configuration parameter is set to 1.
<number> is the RealAudio protocol number.

For example:

PNA/8
PNAT/8

<return_code> Return code using HTTP standard error codes. Always 200, meaning successful transfer.

<bytes_sent> Number of bytes transferred to Client during playback. This field can be lower than the total size of the RealAudio file, indicating partial playback of the file. If this field is consistently low for some or all audio files, this can mean that RealAudio Players are able to connect to your server, but are unable to play files. Check your system error logs for messages relating to network system errors.

[<client_ID_string>] Client ID string. This field is not part of the common Web server access log format. The ID string is text sent by the client that describes the version and type of RealAudio Player being used. RealAudio Player versions 2 and 3 use the following underscore delimited format:

```
<platform>_<version>_<player>_<type>_<dist>_
<language>_<CPU>
```

Where:

<platform> is the operating system that RealAudio Player is running on—Win16, WinNT, Mac, and so on.

<version> is the operating system version number.

<player> is the version number of RealAudio Player.

<type> is the type of RealAudio Player.

<dist> is the distribution code of RealAudio Player.

<language> is the code of RealAudio Player. EN is US English.

<CPU> is the type of processor running the platform. If the processor does not have a hardware Floating Point Unit, the string "no-FPU" is appended to the end of the CPU field without a delimiter.

For example:

```
Win95_4.0_3.0.0.19_play32_PN01_EN_586
```

Note 1 RealAudio Player version 1 uses a different ID string in the following format:

```
<platform><player>
```

The field descriptions are the same as the newer format. For example:

```
Win1.0.0
```

Note 2 If the client is a splitter, the Client ID field contains the following string:

```
splitter
```

<stat1> Connection statistics sent by the Client when it completes playing a clip. These optional fields are sent only when the **StatsMask** configuration

parameter is set to 1 or 3. The Player user can also set a preference value to block sending connection statistics. When the Client blocks connection statistics, when the Client is a splitter, or when **StatsMask** is set to 0, the **<stat1>** and **<stat2>** fields are replaced by **[UNKNOWN]**.

The connection statistics field starts with the string "Stat1" and has the following format:

```
[Stat1: <total> <order> <missing> <early> <late>
<format>]
```

Where:

<total> is the total number of packets received by the Client.

<order> is the number packets received by the Client out of order. These packets are reordered as they are being played by the Client.

<missing> is the number of missing packets that the Client did not receive. This is the most common problem reported on the PN Server Log. A low percentage of missing packets does not have a serious effect on quality; a high percent seriously degrades audio quality. For more information, see "Network Performance Considerations" on page 94.

<early> is the number of packets received too early by the Client. If the Client receives any packets too early, then older packets are discarded. This problem is very rare, and it may indicate that the client's machine is running too slow, or has a bad Internet connection. However, if this problem shows up very often, you need to investigate further.

<late> is the number of packets received too late by the Client. If the Client receives packets too late, the Player will have already played that portion of the audio. Normally, this is a very rare occurrence; if it happens often, your Server's Internet connection may not be fast enough.

<format> is the name of the decoder used to play the clip. Values are:

dnet	RealAudio 3.0 formats
28.8	RealAudio 2.0 28.8 format
lpcJ	RealAudio 2.0 14.4 format

For example:

```
[Stat1:   641      0      0      0      0 dnet]
```

<stat2> Extended connection statistics sent by the Player when it completes playing a clip. These statistics are supported only by RealAudio Player 3.0.

These optional fields are sent only when the **StatsMask** configuration parameter is set to 2 or 3. The Player user can also set a preference value to block sending connection statistics. When the Client blocks connection statistics, when the Client is a splitter, or when **StatsMask** is set to 0, the **<stat1>** and **<stat2>** fields are replaced by **[UNKNOWN]**.

The extended connection statistics field starts with the string "Stat2" and has the following format:

```
[Stat2: <bandwidth> <available> <highest>
<lowest> <average> <requested> <received>
<late> <rebuffering> <type> <startup> <format>]
```

Where:

<bandwidth> is the bandwidth in bits per second of the clip.

<available> is the average bandwidth in bits per second available to the user while the clip was playing.

<highest> is the highest time in milliseconds between the Client requesting a resent packet and receiving the packet.

<lowest> is the lowest time in milliseconds between the Client requesting a resent packet and receiving the packet.

<average> is the average time in milliseconds between the Client requesting a resent packet and receiving the packet for all resent packets.

<requested> is the number of resent packets requested by the Client.

<received> is the total number of resent packets received by the Client.

<late> is the number of resent packets received by the Client too late.

<rebuffering> is the rebuffering percentage for the clip.

<type> is the transport type for the connection. Values are:

0	UDP
1	TCP
2	IP Multicast

<startup> is the time in milliseconds from the Client sending the first packet to the Server to the Client receiving the first packet from the Server.

<format> is the name of the decoder used to play the clip. Values are:

dnet	RealAudio 3.0 formats
28.8	RealAudio 2.0 - 28.8 format
lpcJ	RealAudio 2.0 - 14.4 format

For example:

```
[Stat2: 15234 15552 0 0 0 0 0 0 0 0 220 28.8]
```

<file_size> Total amount in bytes of audio data in the RealAudio file. This number is less than the size of the RealAudio file because it does not include the file header and other non-audio information stored in the file. This field appears only if the **LoggingStyle** configuration parameter is set to 1.

Note This field is always 0 for live broadcasts.

<file_time> Total length, in seconds, of audio stored in the RealAudio file. This field appears only if the **LoggingStyle** configuration parameter is set to 1.

Note This field is always 0 for live broadcasts.

<sent_time> Total length, in seconds, of the audio sent to RealAudio player. This field appears only if the **LoggingStyle** configuration parameter is set to 1.

<resends> Number of packets successfully resent because of transmission errors. This field appears only if the **LoggingStyle** configuration parameter is set to 1.

<failed_resends> Number of packets not successfully resent in time to correct transmission errors. This field appears only if the **LoggingStyle** configuration parameter is set to 1.

The following example shows three access log entries:

```
172.16.2.139 - - [04/Nov/1996:14:45:57 -0700] "GET
newclips/realcool.ra PNA/8" 200 590976
[Win95_4.0_3.0.0.19_play32_PN01_EN_586] [Stat1:
2592          0          0          0          0
28.8][Stat2:     15234      15552          0
0          0          0          0          0
0          0        220 28.8] 590976 310 310 0 0

172.16.2.139 - - [04/Nov/1996:14:53:49 -0700] "GET
classic/xyz144.ra PNAT/8" 200 4
[Win95_4.0_3.0.0.19_play32_PN01_EN_586] [UNKNOWN]
5580 5 0 0 0

172.16.2.139 - - [04/Nov/1996:16:01:10 -0700] "GET
speeches/carter.ra PNA/5" 200 55680 [Win1.0.0]
[Stat1:       229         0         0         0
0] 630020 630 55 0 0
```

RealAudio Server Error Log

The error log helps you monitor and manage your RealAudio Server. It contains both information and error messages about server operation. By looking for patterns of errors, you can troubleshoot and correct possible problems on your site.

To view the RealAudio Server log, open the file specified by the name used in your ErrorLogFilePath using a word processor or text editor.

Error messages are recorded in the error log in the following format

```
[Date] [Time] [Servername](ProcessID) : [Error Message]
```

A sample error message looks like this:

```
***15-Nov-96 14:13:30.488 myserver(1556): 6220: No such user: joe
```

Note You can also have RealAudio Server send messages to your e-mail address to notify you when certain thresholds are exceeded. See “Threshold Notification E-Mail” on page 112.

Common Error Messages

The following is a list of the more common error messages you might encounter:

`Could not allocate enough file descriptors to meet capacity. Capacity has been set to <connection number>`

The number of simultaneous connections has exceeded the capacity of your operating system. RealAudio Server has automatically reset the number of audio connections allowed to connect.

`Invalid license key or information`

Either you have not specified any licensing information for the LicenseKey setting in server.cfg or the licensing information you entered was incorrect. Check to make sure the information was entered exactly as you received it.

This license is for another platform

The license information you specified for the LicenseKey setting in server.cfg is for a different operating system. Check to make sure that you installed RealAudio Server on the proper machine.

Server cannot be started before <date>

The RealAudio Server license you purchased does not become valid until the date listed. Because RealAudio Server requires a valid license to operate, your RealAudio Server will not start until the date listed.

Server cannot be started after <date>

The RealAudio Server license you purchased is not valid after the date listed. RealAudio Server requires a valid license to operate.

Your license does not support ISP Hosting.

You configuration file contains RealAudio Hosting Service settings, but you license does not include Hosting Service. The Hosting Service configuration settings are ignored.

You must restart the server for this change to take effect.

You have made a change in server.cfg that will not take effect until you restart RealAudio Server.

Password failure on cluster attempt from <hostname>:<portnumber>

A sub-server attempted to connect to the control server with an invalid password. Check server.cfg on the indicated sub-server to be sure that you have entered the correct ClusterPassword and ClusterPort.

Out of Memory

RealAudio Server is unable to dynamically allocate enough memory to create a new connection or manage existing connections. If you receive an Out of Memory message, you may require additional memory or you may need to add swap space for your RealAudio Server machine to use for dynamic memory allocation.

Error retrieving <file name>

A user tried to access a file and the file could not be found. The user may have supplied the wrong URL and the Server rejected the

request. However, if you see this more than once for the same file, you should check your metafile to ensure that the URL pointing to the file is accurate.

SIGPIPE Received, code:13 (UNIX systems only)

The SIGPIPE signal is sent to RealAudio Server by the operating system when the client abruptly drops the connection. No action is required for this message.

Error retrieving URL <file name> (Codec error)
Error retrieving URL <file name> (Insufficient bandwidth)

The Player requested a file for which it does not have the correct CODEC installed or for which it does not have sufficient bandwidth to play. For example, a RealAudio Player 2.0 requesting RealAudio 3.0 content generates this error message.

Server General

General Server messages you might encounter include:

Cannot open ACCESS for logging

Can not get resource limit: <oserrormessage>

Can not set resource limit: <oserrormessage>

gethostname failed <errorno>

OS limit exceeded; max connections set to <connectionnumber>

Illegal URL <url>

Invalid URL: <url>

Invalid bandwidth request: <bandwidthpath>

Invalid bandwidth request: <bandwidthpath>

SIGHUP received, code: 1

SIGINT or SIGTERM received, code: 2

<processid> exited

Terminating with exit code %d

Event file is corrupt

RTTP1 Monitors not allowed

New live connection dropped due to server limit

New audio connection dropped due to server limit

New monitor connection dropped due to server limit

New subserver connection dropped due to server limit

Server Communication

Server communication messages you might encounter include:

<connectionid>: Illegal hello message: <data>

<connectionid>: Version %d protocol not supported

Licensing

Server licensing messages you might encounter include:

Server expired, no new connection will be accepted

Invalid license key or information

This license is for another platform

Server cannot be started before <date>

Server cannot be started after <date>

Your license does not permit ISP Hosting

Server Configuration

Server configuration messages you might encounter include:

Expected ',' or ']' in list at line <lineno>

Invalid number of elements in struct at line <lineno>

Invalid punctuation token '<character>' in config file

Invalid integer at line <lineno>

Expected type to be a string or an int

Expected type to be a string

Expected type to be an int

Invalid integer

Negative values not allowed

Expected type to be a list

Expected type to be a struct

Invalid configuration

You must restart the server for this change to take effect

Could not verify that BasePath is valid

You must specify a base path. If you want to specify the current working directory, then use '.'

Invalid group id

Invalid group name

Can't change to group id

Invalid user name

Invalid user id

Can't change to user id

Invalid license

This license is not yet valid

This license has expired

Invalid error log path

Invalid log path

You have allowed more user max streams than the server can support

You have reserved more user min streams than the server can support

Can't open the pna port

Invalid platform in the license

Invalid timeout

MaxThreads must be greater than zero

AudioConnections must be greater than MaxThreads

Min streams for user '<username>' exceeds max streams

User '<username>' already in UserList, skipping

User max streams exceed licensed audio connections

User min streams exceed licensed audio connections

Can't open config file server.cfg

MaximumAudioConnections too large,

No such group: <groupname>

Must specify a number for Group config variable

No such user: <username>

Must specify a number for User config variable

Server Clustering

Server clustering messages you might encounter include:

clustering not enabled for this server

Password failure on cluster attempt from <hostname>:<portno>

<connectionid>: subserver init message not sent

Unknown subserver opcode <opcode>

Unknown type in cluster_update

Cluster list is corrupt

Header failure from subserver eof <no> error <errorno> <clusterid>

Cluster password expected

Data failure from subserver

Cannot find global id structure

No global ids available for subserver

Cluster password incorrect

Unknown superserver opcode <opcode>

Can not connect to <hostname>:<port> error <errorno>

Data failure in init eof <no> error <errorno>

Header failure from superserver eof <no> error <errorno>

Data failure from superserver

Unable to allocate global root id

No cluster password

Cannot cluster with <hostname>:<port>

<connectionid>: Unable to redirect

<connectionid>: Client broke connection

Server Technical

Server technical messages you might encounter include:

Bad header: ileave: <no> gran: <no>, channels: <no>, frame: <no>, bpm: <no>

Forked subserver count exceeded

No read streams for select

<connectionid>: bad player

<connectionid>: read: <oserrormessage>

<connectionid>: write: <oserrormessage>

Unsupported event type 0x%x

<connectionid>: unknown error state <erorrstate>

<connectionid>: port <portno>: <oserrormessage>

<connectionid>: monitor rejected

Invalid opcode: <opcodeno>

Accept on port <portno>: <oserrormessage>

SIGCHLD received, pid <processid> status <exitcode>

SIGPIPE received, code: 13

Socket initialization failed with error <errorcode>

WSACleanup failed %d

Bad magic string for event file

Version %d is incorrect for event file

Unknown entity type: %d

get_conn: error: <oserrormessage>

<connectionid>: Client broke connection in start state

<connectionid>: Client broke connection in key state

Threshold Notification E-Mail

RealAudio Server can send notification messages to an e-mail address when connection or bandwidth thresholds are exceeded. You can also specify to send copies of these messages to Progressive Networks.

The messages notify you when the thresholds specified for connections and bandwidth are exceeded. The connections threshold is specified by the **AudioConnections** configuration parameter. The bandwidth threshold is specified by the **MaxBandwidth** configuration parameter. Be sure to set these parameters to get meaningful notifications. Bandwidth notifications are sent only if **MaxBandwidth** is specified.

The notification e-mail lists the number of licensed streams, the threshold exceeded, and the time for which the threshold was exceeded. For example, if the bandwidth threshold is exceeded:

```
In last 99 hours, server usage exceeded 99% for a
total of 9999 seconds
Licensed Streams: 999
>--- BANDWIDTH THRESHOLD exceeded ---<
Maximum Bandwidth: 999
Bandwidth Used: 999
Maximum Audio Connections: 999
Number of Connections Used: 999
```

Threshold notification e-mail is controlled by the following configuration options:

MailMessageLevel
MailMessageLimit
MailMessageSMTPHost
MailMessageUser
MailUsageCC
MailUsagePeriod
MailUsageThreshold

For more information about these configuration settings, see “Configuration Settings” on page 130.

Command Reference

This chapter contains reference information for UNIX commands used with RealAudio Server. For information on using UNIX commands, refer to your UNIX system documentation.

cevents

Name

cevents - RealAudio Synchronized Multimedia compiler

Syntax

```
cevents <inputfile> <outputfile>
```

Description

The **cevents** utility takes the supplied text file containing the multimedia event descriptions and converts it to a compiled events file.

File Format

Inputfile has the following format:

```
u <starttime> <endtime> <URL>
```

where each entry is on a single line with each value separated by spaces and where

`starttime` is the start time of the event in HH:MM:SS.t format
`endtime` is the end time of the event in HH:MM:SS.t format
`URL` is the URL of the page for the event

See Also

“Cevents” on page 268

kill

Name

kill

Syntax

```
kill -HUP <processID>
```

Description

You can reconfigure a running server on a UNIX machine using the command-line interface. First, change the parameters you want by editing the **server.cfg** file. Then use the kill command with the -HUP flags. This forces the Server to reload with the new configuration settings.

`ProcessID` is the process id of RealAudio Server.

If you do not know the process id, run ps to obtain it. The parameters for ps depend upon the version of UNIX you are using:

UNIX platform	Command
BSDI, FreeBSD, LINUX, SunOS	`ps -aux | grep pns`
AIX, HP-UX, DEC UNIX, IRIX, SOLARIS	`ps -ef | grep pns`

pnserver

Name

pnserver - RealAudio Server

Syntax

```
pnserver [-v] [-n] [-p port] [-s streams] [-t threads]
<configfile>
```

Description

The **pnserver** command starts RealAudio Server.

The following options are available:

-v	Displays the version information of RealAudio Server. This includes the platform, build and release tags used to identify a particular release.
-n	(UNIX only) Do not detach from the command terminal. This prevents the server from becoming a daemon process.
-p port	Use the supplied TCP port, port as the connection port for the server. This overrides any configuration file setting.
-s streams	Run the server with a maximum of streams. This overrides any configuration file settings.
-t threads	Start threads number of processes for this server. This overrides any configuration file setting.

configfile	Specifies a file of configuration settings for pnserver. If no file is specified, uses the settings in **server.cfg**. If another file is specified, settings in this file override values in **server.cfg**. For information on configuration settings, see “Configuration Settings” on page 130.

raconv

Name

raconv - RealAudio bandwidth negotiation file converter

Syntax

```
raconv [-v] [-f] <file names> directory
```

Description

The **raconv** utility takes the supplied files and converts them to the Bandwidth Negotiation naming scheme and places them in the specified directory. More then one file name can be supplied.

The following option is available:

-v	Displays the version information of the utility. This includes the platform, build and release tags used to identify a particular release.
-f	Forces raconv to overwrite existing files with the same filenames.

Examples

The file newband.ra is encoded in three formats: RealAudio 2.0 - 28.8, RealAudio 3.0 - ISDN Mono, and RealAudio 3.0 - Dual ISDN Stereo. The files are stored in the following locations:

```
/usr/rawdata/old28_8/newband.ra
/usr/rawdata/isdnmono/newband.ra
/usr/rawdata/dualisdn/newband.ra
```

Issue the following commands:

```
raconv /usr/rawdata/old28_8/newband.ra /usr/rafiles
raconv /usr/rawdata/isdnmono/newband.ra /usr/rafiles
raconv /usr/rawdata/dualisdn/newband.ra /usr/rafiles
```

The **raconv** utility program creates a directory named **/usr/rafiles/newband.ra** that contains the files 28_8.36, dnet.50, and dnet.100.

See Also

"Delivering Highest Quality Supported by Client Using Bandwidth Negotiation" on page 67.

racut, rapaste, rax

The **racut**, **rapaste**, and **rax** utility programs enable you to cut and paste parts of clips in .ra files and to change the title, author, and copyright information for .ra files.

For information on **racut**, see “Cutting RealAudio Files” on page 233.

For information on **rapaste**, see “Combining RealAudio Files” on page 237.

For information on **rax**, see “Rax Tool” on page 239.

rafile

Name

rafile - RealAudio Live File Creation Utility

Syntax

```
rafile [-v] [-b] [-f config] [-t time] [-s size] -p
password -e bandwidth url destination
```

Description

The **rafile** utility program creates files from live broadcasts. Use **rafile** to archive live broadcasts for playback later.

The following options are available:

-v	Displays the version and copyright information for **rafile**.
-b	Creates files using the bandwidth-negotiation style of file naming. For information on bandwidth negotiation, see “Delivering Highest Quality Supported by Client Using Bandwidth Negotiation” on page 67.
-f config	Forces **rafile** to take its configuration information from the file named in config, instead of from the command line. This file uses the same format as the **server.cfg** file, but contains settings that pertain to **rafile** only.
-t time	Specifies the amount of audio to store in one file, by time. Use m for minutes, h for hours, and d for days. This option is mutually exclusive with the -s option.
-s size	Specifies the amount of audio to store in one file, by size of file. Size is measured in megabytes (MB). This option is mutually exclusive with the -t option.

-p password Specifies the password required to connect to RealAudio Server broadcasting the audio.

-e bandwidth Specifies the bandwidth of the file being saved. Valid values are **14_4.18**, **dnet.20**, **dnet.25**, **28_8.36**, **dnet.50**, and **dnet.100**. See "Delivering Highest Quality Supported by Client Using Bandwidth Negotiation" on page 67. The default value is set by the BandwidthEncoding configuration setting.

url The url for the live file being broadcast

destination The directory or filename in which to save the audio. If destination is a directory, **rafile** uses the name of the live stream as the basis for creating filenames. If destination is a filename, **rafile** uses the filename as the basis for creating filenames.

Example

To create a file every 30 minutes and use the filename **concert.ra**, enter:

```
rafile -t 30m pnm://server:7071/live1.ra
concert.ra
```

Successive files are named concert0.ra, concert1.ra, and so on.

To save 10 MB files in the /usr/archive directory, enter:

```
rafile -s 10 pnm://server:7071/live1.ra
/usr/archive
```

Successive files are named live10.ra, live11.ra, live12.ra, and so on.

rasm

Name

rasm - RealAudio command-line System Monitor

Syntax

```
rasm [-v] [-l <update>] [-p <password>] [-c] [-i] [-k]
<hostname[:port]>
```

Description

RealAudio System Manager enables remote monitoring and administration of RealAudio Server from the UNIX command line. To connect System Manager to a server, set hostname to the DNS name or IP address of the Server. If the Server is running on a port other then 7070, specify the port number.

The following options are available:

-v — Displays the version information of the System Manager. This includes the platform, build and release tags used to identify a particular release.

-l update — Sets the update period for output to the screen to update seconds.

-p password — Provides the password required by System Manager to connect to the Server. If this option is not used the System Manager prompts for the password. This feature is not secure. The password is easily accessible to knowledgeable searchers. The password is required each time you want to start monitoring a Server. Entering **`-p <password>`** at the starting command line lets you run automatic monitoring scripts.

-c — Connects to the server to verify it is still accepting connections and then exits. Prints a message if the connection fails and the exit status is non zero.

-i Starts interactive mode and permits entry of the commands listed in the command section.

-k Do DNS lookups on incoming IP addresses to translate them to full domain names. This command can slow down responses on System Manager. If you are experiencing delays in System Manager information or in response to commands, make sure that this feature is turned off.

-u Posts messages every time the connection status changes. In this case, the System Manager provides the following information.

<time> <event> <name> <filename>

where **<time>** is the time the client connected, **<event>** shows whether the client was able to connect, **<name>** is the domain name or IP address for that client, and **<filename>** is the name of the file being played.

Commands

Command	Function
c	Displays the current configuration after it has been retrieved using the t command.
e	Reset peak usage value
h or ?	Prints a list of commands.
k	Begins collating hostname information for connected clients by doing reverse DNS lookups on the IP numbers provided by the Server.
l	Provides the current list of connected clients.
n	Modify configuration variables.

Command	Function
o	Prints # of Players, System Managers, unknowns, and total connections to STDOUT every five minutes, or the number of seconds specified by the -l option on the command line. This command can be toggled to start and stop.
r	Forces the Server to reload configuration.
s	Prints a single line of summarized status information.
t	Requests configuration information from RealAudio Server.
u	Continuous display. Updates whenever a client status changes.
w	Provides information on clustered Servers.
x	Exit the program.

Notes

System Manager can monitor a Server running on any platform. Information provided by System Manager includes number and status of Player connections, System Manager connections, Unknown connections (connections currently being negotiated with the Server), and Total connections. This information can then be used to monitor activity on RealAudio Server on a regular basis.

System Manager runs in two modes: interactive and non-interactive. When the System Manager is in the non-interactive mode, information is automatically appended to STDOUT every 5 minutes, unless that time span is modified by the **`-l`** command. The System Manager accepts commands from the command line; however, it does not prompt you.

The interactive mode is started with the **`-i`** command, which enables the System Manager to print prompts and accept commands from the command line.

System Manager displays information in the following format:

```
<client>  <name>
```

Where:

<client> is the type of client connected (Monitor or Player)

<name> is the domain name or IP address of that client

For example, a typical display might look like:

```
monitor 204.71.154.93
Player  204.71.153.24
```

If you prefer to receive System Manager information in a report, use the **-l** option and append the output to a file. To do this, use the following command:

```
rasm -l<seconds> <hostname>[:port] >>
monitor.txt
```

Where:

<seconds> is the number of seconds between reports

<hostname> is the name of the computer you are collecting data from

monitor.txt is the name of the report that the information is appended to

Example

To monitor a Server in interactive mode, with updates every 20 seconds and fully qualified host names for clients, use the following command:

```
rasm -l 20  -k -i    yourServer:7070
```

slta

Name

slta - RealAudio simulated live transfer agent

Syntax

```
slta [-v] [-f config] [-p password] inputfile URL
```

Description

The **slta** utility delivers a stored RealAudio file as if it is a live event. This can be used to provide a test or delayed broadcast of a live event.

The following options are available:

-v	Prints out the version information of **slta**. This includes the platform, build and release tags used to identify a particular release.
-f config	Forces **slta** to take its configuration information from the file named in config, instead of from the command line. This file uses the same format as the **server.cfg** file, but contains settings that pertain to **slta** only.
-p password	Specifies the password **slta** uses to connect to RealAudio Server; this value is specified by the Server's **EncoderPassword** configuration parameter.
inputfile	The RealAudio file to be converted to a live RealAudio file.
URL	Specifies the address of the output, exactly as it is used by RealAudio Player to access the stream in the format **pnm://host/file.ra[:port]**. If you do not include a port number, **slta** uses port 7070.

Example

To play the file **ford01.ra** as a live file, enter:

```
slta -p fakeit ford01.ra pnm://server.com/car.ra
```

Configuration Settings Reference

This chapter lists the various configuration settings used by RealAudio Server and its associated utilities. You can change these settings by either using System Manager or by editing the RealAudio Server configuration file. For information on changing configuration settings, see “Configuring RealAudio Server” on page 53.

The entries in this chapter are arranged in alphabetical order. The following table lists the configuration settings used by the components of RealAudio Server.

Program	Settings
pnserver	AudioConnections BasePath ClusterHost ClusterPassword ClusterPort ConnectControlList CustomerName DefaultErrorFile EncoderPassword EncoderTimeout ErrorLogPath Group LicenseKey LicenseClients LiveFileBandwidthNegotiation LiveFilePassword LocalHost LogPath LoggingStyle MailMessageLevel MailMessageLimit MailMessageSMTPHost

Program	Settings
	MailMessageUser MailUsageCC MailUsagePeriod MailUsageThreshold MaxBandwidth MaxThreads MinPlayerProtocol MonitorConnections MonitorPassword MulticastAddressList MulticastControlList MulticastPort MulticastTTL PnaPort PidPath RemoteLicenseHost RemoteLicensePort ResolverPort SourceControlList SplitterBufferDelay SplitterControlList StatsMask Timeout User UserDir UserList
slta	InputFile OutputFile ServerHost ServerPassword ServerPort
rafile	BandwidthEncoding LiveFileBandwidthNegotiation LiveFileSize LiveFileTarget LiveFileTime URL

AudioConnections

Maximum number of simultaneous audio connections.

Used by	**pnserver**
Default value	Licensed number of streams
Range of values	0, 1 - 32767
Restart Server after change	No, unless in a cluster

The maximum number of simultaneous audio connections your RealAudio Server can support is determined by the license you purchase unless you are using a remote license server. The AudioConnections parameter lets you set a different limit than specified by your license.

To specify a greater number of connections than the license on this computer allows, you need to get more streams from a remote license server. See “Sharing a Stream License Among Computers” on page 60.

Note For a Server that is part of a cluster, a server restart is required for the new AudioConnections value to take effect. Information is passed to the control server only at startup.

To specify a value, enter the following line in the **server.cfg** file:

```
AudioConnections      <count>
```

The maximum number of connections cannot usefully exceed the maximum number that the bandwidth of your network connection supports. If **AudioConnections** is not specified, RealAudio Server uses the number of streams specified by your license. If a **LicenseKey** is not specified, RealAudio Server allows 2 connections.

The special value 0 means the maximum number of streams allowed by the license key on this computer.

Examples:

```
AudioConnections    20
```

Allows no more than 20 simultaneous connections.

```
AudioConnections    0
```

Allows the maximum number of simultaneous connections specified by this computer's license key.

BandwidthEncoding

Specifies the default bandwidth for archive files of live broadcasts.

Used by	**rafile**
Default value	None
Range of values	**14_4.18**, **dnet.20**, **dnet.25**, **28_8.36**, **dnet.50**, **dnet.100**
Restart Server after change	No

By default, **rafile** uses this setting unless overridden with the **-e** option.

```
BandwidthEncoding <value>
```

For more information, see "rafile" on page 120.

Example

```
BandwidthEncoding dnet.20
```

BasePath

Path to root directory of your RealAudio files.

Used by	**pnserver**
Default value	**rafiles**
Range of values	Valid directory names
Restart Server after change	No

Most RealAudio content delivered by your RealAudio Server resides in, or beneath, the directory specified by the base path. Use the following format to enter the absolute path name of the base path directory into the **server.cfg** file:

```
BasePath        <path>
```

BasePath should point to the **rafiles** subdirectory of your RealAudio Server installation directory, as this directory contains several sample documents. For further information on organizing RealAudio content see “Bandwidth Negotiation" on page 241.

Example

```
BasePath        /pnserver/rafiles
```

ClusterHost

Name of computer controlling the cluster of RealAudio Servers.

Used by	**pnserver**
Default value	(none)
Range of values	Valid computer names
Restart Server after change	Yes

This entry is required by the sub-server in clustered server operation.

```
ClusterHost          <Host name>
```

Do not use the name of the local computer as **ClusterHost**.

Example

```
ClusterHost          maze
```

ClusterPassword

Password used to validate members of a clustered server.

Used by	**pnserver**
Default value	(none)
Range of values	Valid alpha-numeric strings
Restart Server after change	Yes

```
ClusterPassword          <string>
```

This is used by both the cluster host and the sub-servers when running as a clustered RealAudio Server. On the control Server this sets the password the control server expects to receive from the sub Servers. On the sub-servers this sets the password that the sub-servers send to the control server.

Example

```
ClusterPassword          zpassword
```

ClusterPort

Number of PNA port used by cluster host, as specified in the **PnaPort** setting found in the cluster host's **server.cfg** file.

Used by	**pnserver**
Default value	(none)
Range of values	Valid port numbers

Restart Server after change	Yes

This entry is required by the sub-server in a cluster.

```
ClusterPort    <portnumber>
```

Example

```
ClusterPort    7072
```

ConnectControlList

List of domain names that are allowed to access RealAudio Server.

If you purchased an intranet license for RealAudio Server, you must specify a **ConnectControlList** to enable the users on your intranet to access your RealAudio Server.

If you purchased an Internet license for RealAudio Server, you can optionally use **ConnectControlList** to restrict access to your Server.

Used by	**pnserver**
Default value	(none)
Range of values	Valid IP addresses
Restart Server after change	No

```
ConnectControlList [{<address>, <net mask>}, …]
```

Where:

`address` is the domain address of the computer allowed to access RealAudio Server. All four octets of the address must be specified.

`net mask` is a mask that specifies the bits in the domain address that are treated as wildcards. The bits in the IP address that correspond with the zeros in the net mask are treated as wildcards. For example, an address of 121.23.101.0 with a net mask of 255.255.255.0 accepts all IP addresses from 121.23.101.0 to 121.23.101.255. If the net mask is 255.255.255.128, all IP

addresses from 121.23.101.0 to 121.23.101.127 are accepted. The net mask 255.255.255.255 accepts only the single IP address specified.

Note Servers with intranet licenses cannot specify a net mask of 0.0.0.0.

To allow any player to connect, do not include a **ConnectControlList** setting in your configuration file. To prevent any player from connecting, specify:

```
ConnectControlList [{0.0.0.0, 255.255.255.255}]
```

Example

```
ConnectControlList [{100.61.0.0, 255.255.0.0},
{204.71.154.0, 255.255.255.0}, {204.71.155.202,
255.255.255.255}]
```


CustomerName

Your name specified on the license you received from Progressive Networks or from your RealAudio reseller.

Used by	**pnserver**
Default value	(none)
Range of values	Valid alpha-numeric string
Restart Server after change	No

For your RealAudio Server to function, you must enter this parameter and the **LicenseKey** value. You must enter the exact information or RealAudio Server will not operate.

```
CustomerName   <licensename>
```

If you purchase a new or upgraded license you must re-enter the CustomerName and LicenseKey values.

Example

```
CustomerName   WorldJam Corporation
```

DefaultErrorFile

Audio file to play when a file is inaccessible.

Used by	**pnserver**
Default value	**error.ra**
Range of values	RealAudio file name and path
Restart Server after change	No

RealAudio Server sends RealAudio Player an error message when a requested file is not available. If you set this configuration parameter, RealAudio Server plays the specified RealAudio file instead of displaying a message box.

```
DefaultErrorFile      <path>
```

The path to your error file should be an absolute path. Your error file should be recorded in 14.4 format and indicate that there was a format compatibility problem. For example, “We are sorry but the file requested is not available in your Player’s format. Please try another file.”

Example

```
DefaultErrorFile      /pnserver/rafiles/nofile.ra
```

EncoderPassword

Password used by RealAudio Encoder and the slta utility program to connect to RealAudio Server.

Used by	**pnserver**
Default value	(none)
Range of values	Alpha-numeric string without spaces
Restart Server after change	No

EncoderPassword <password>

Note that the default setting of no password allows any RealAudio Encoder to connect to the server.

Example

EncoderPassword raRecord1

EncoderTimeout

The time in seconds that the Server will wait before disconnecting a RealAudio Encoder that is not sending data. If the connection to the Encoder is lost, the Server must disconnect before the Encoder can reconnect.

Used by	**pnserver**
Default value	30
Range of values	1 - 32767 seconds
Restart Server after change	No

EncoderTimeout <seconds>

Setting EncoderTimeout to less than 10 seconds is not recommended.

Example

EncoderTimeout 20

ErrorLogPath

File storing information about errors which occur during the operation of RealAudio Server.

Used by	**pnserver**
Default value	**pnerror.log**
Range of values	Valid file name

Restart Server after change	No

Enter a line using the following format into **server.cfg**:

```
ErrorLogPath <path>
```

During installation, this option is set to the file **pnerror.log** in the **logs** subdirectory of your RealAudio Server installation directory. If this option is not present, RealAudio Server records errors in the **pnerror.log** file located in the same directory as **pnserver**.

Example

```
ErrorLogPath   /pnserver/beta/pnerror1.log
```

Group

Default group ID for RealAudio Server for UNIX.

Used by	**pnserver**
Default value	(none)
Range of values	Valid user and group names
Restart Server after change	Yes

To automatically allocate additional system resources for delivering a large number of RealAudio streams, the Server must be started under the super-user account. Once the program has started and these resources have been allocated, RealAudio Server can change to a less privileged user and group ID.

```
User     <UserName>
Group    <GroupName>
```

Examples:

```
User     danw
Group    users

User     randio
Group    daemon
```

InputFile

The path of a file to convert to a live file.

Used by	**slta**
Default value	(none)
Range of values	Valid file name
Restart Server after change	No

By default, **slta** uses this value unless overridden by a filename on the command line.

```
InputFile <filename>
```

For more information, see “slta” on page 127.

Example

```
InputFile /usr/cnfn/show1.ra
```

LicenseClients

List of servers that can request license information from a remote license host. To use this setting, you must purchase remote license management as part of your RealAudio Server license.

Used by	**pnserver**
Default value	(none)
Range of values	N/A
Restart Server after change	No

```
LicenseClients [{<host>:<port>,<streams>},…]
```

where:

`host` is the name of a license client

port is PnaPort value of the license client

streams is the number of streams to allot to the license client

Example

```
LicenseClients
[{chris.inet.com:7075,50},{yuri.f4.com:7073,75}]
```

LicenseKey

Encrypted license string enabling your RealAudio Server to operate.

Used by	**pnserver**
Default value	Default license allows two streams
Range of values	N/A
Restart Server after change	No

For your RealAudio Server to function, you must enter this setting and the **CustomerName** setting. You must enter the exact information or RealAudio Server will not operate.

```
LicenseKey      <encryptedkey>
```

If you downloaded your software, **encryptedkey** is in the e-mail that gives you access to the download URL. Use a word processor or text editor to cut and paste the license information. If you purchased your software on CD-ROM, **encryptedkey** is provided. If you purchase a new or upgraded license you must re-enter this information for the new license to take effect.

Example

```
LicenseKey      3a019Jd011201998c1427ca200…
```

LiveFileBandwidthNegotiation

Specifies that the rafile program use bandwidth-negotiation style of naming for archive files of live broadcasts.

Used by	**pnserver, rafile**
Default value	False
Range of values	True, False
Restart Server after change	No

By default, **rafile** uses this setting unless overridden with the **-b** option.

```
LiveFileBandwidthNegotiation <value>
```

For more information, see “rafile” on page 120.

Example

```
LiveFileBandwidthNegotiation TRUE
```

LiveFilePassword

Password used for archiving live broadcasts. Used by RealAudio Server for automatic archiving and by the **rafile** utility program.

Used by	**pnserver, rafile**
Default value	(none)
Range of values	alphanumeric string without spaces
Restart Server after change	no

```
LiveFilePassword <password>
```

For information on **rafile**, see “rafile” on page 120.

Example

```
LiveFilePassword raBroadcast1
```

LiveFileSize

Size of file, in megabytes, used for creating archive files of live broadcasts.

Used by	**pnserver, rafile**
Default value	0
Range of values	Integers greater than or equal to zero
Restart Server after change	No

By default, **rafile** uses this setting unless overridden with the **-s** option.

```
LiveFileSize <value>
```

For information on **rafile**, see “rafile” on page 120.

Example

```
LiveFileSize 5
```

LiveFileTarget

File or directory to use to create the archive files of live broadcasts.

Used by	**pnserver, rafile**
Default value	(none)
Range of values	Valid file name
Restart Server after change	No

By default, **rafile** uses this value unless overridden by a file or directory name on the command line.

```
LiveFileTarget <name>
```

If **name** is a directory name, **rafile** uses the filename of the live broadcast to name files. If it is a filename, it creates files in the working directory used to

start **rafile** or RealAudio Server. In either case, it appends numbers to the archive files, starting at 0. For information on **rafile**, see “rafile” on page 120.

Example

```
LiveFileTarget pnfm.ra
```

Makes **rafile** create archive files named **pnfm1.ra**, **pnfm2.ra**, and so on.

```
LiveFileTarget /usr/evand/rafiles
```

Makes **rafile** create archive files in the directory **/usr/evand/rafiles** and names files using the filename list in the URL setting.

LiveFileTime

Maximum length, in time, of a archive file of a live broadcast.

Used by	**pnserver, rafile**
Default value	0
Range of values	Integers greater than or equal to zero and letters d, h, and m.
Restart Server after change	No

By default, **rafile** uses this setting unless overridden with the **-t** option.

```
LiveFileTime <value>
```

Specify time as a number and letter, such as 1m for one minute, 1h for one hour, and 1d for one day. For information on **rafile**, see “rafile” on page 120.

Example

```
LiveFileTime 1h
```

LocalHost

Fully-qualified domain name that overrides the system default domain name.

Used by	**pnserver**
Default value	(none)
Range of values	valid domain name
Restart Server after change	no

On some platforms, the system does not return a fully-qualified domain name, which causes difficulty for RealAudio Server in locating other RealAudio Servers in a clustering configuration or in locating itself in a multiprocessing configuration. With the **LocalHost** parameter, you can override the system default domain name and provide RealAudio Server with a fully-qualified domain name:

```
LocalHost       <domain name>
```

If you experience problems running multiple processes, you can set the **LocalHost** parameter in your RealAudio Server configuration file. If you experience problems running a clustering configuration, you can set the **LocalHost** parameter in the configuration file of the particular RealAudio Server which the control Server is having difficulty locating.

Example

```
LocalHost       mycomputer.mydomain.com
```

LogPath

Path and file name of the access log file.

Used by	**pnserver**
Default value	access.log
Range of values	Valid filename
Restart Server after change	No

The RealAudio Server logs information regarding every access to your Server into the file specified by the **LogPath**. Enter a line using the following format into the **server.cfg**:

```
LogPath          <path >
```

During installation, this option is set to the file **pnerror.log** in the **logs** subdirectory of your RealAudio Server installation directory. If this option is not present, RealAudio Server records errors in the **pnerror.log** file located in the same directory as **pnserver**.

Example

```
LogPath          logs/pnaccess.log
```

Uses a relative path from the directory from which RealAudio Server was started.

LoggingStyle

Specifies whether to use the original access log format, or the new format with additional information.

The **StatsMask** configuration parameter specifies which additional information is included when **LoggingStyle** is set to 1.

Used by	**pnserver**
Default value	0
Range of values	0, 1
Restart Server after change	No

`LoggingStyle <value>`

To include the additional information in the access log file, set **`value`** to 1. For more information about log files, see “Using the Access and Error Log Files” on page 85 and “Access and Error Log Messages” on page 97.

Example

`LoggingStyle 1`

MailMessageLevel

Specifies the severity of error messages that are e-mailed to the system administrator.

Used by	**pnserver**
Default value	(none)
Range of values	Info, warning, error
Restart Server after change	No

`MailMessageLevel <level>`

where **`level`** can be INFO, WARNING, or ERROR, in ascending order of severity. Specifying a higher level excludes all lower-level messages.

Example

`MailMessageLevel WARNING`

Sends e-mail about warning and error message, but not informational messages.

MailMessageLimit

The number of times a specific INFO message will be e-mailed to a system administrator.

Used by	**pnserver**
Default value	5
Range of values	Integers greater than or equal to 0
Restart Server after change	No

`MailMessageLimit number`

Example

`MailMessageLimit 3`

MailMessageSMTPHost

The e-mail server that RealAudio Server uses to send system error messages.

Used by	**pnserver**
Default value	(none)
Range of values	Valid DNS name or IP address
Restart Server after change	No

`MailMessageSMTPHost <address>`

Example

`MailMessageSMTPHost mail.mycorp.com`

MailMessageUser

The e-mail address of the system administrator to receive system error messages.

Used by	**pnserver**
Default value	(none)
Range of values	Valid e-mail address
Restart Server after change	No

```
MailMessageUser <address>
```

Example

```
MailMessageUser sysadmin@mycorp.com
```

MailUsageCC

The e-mail address, in addition to that specified in **MailMessageUser**, to receive e-mail when the audio stream usage of RealAudio Server is approaching 100% of capacity.

Used by	**pnserver**
Default value	sales@prognet.com
Range of values	Valid e-mail address
Restart Server after change	No

```
MailUsageCC <address>
```

Example

```
MailUsageCC support@corp.com
```

MailUsagePeriod

Specifies how often, in hours, RealAudio Server resets the statistics for sending e-mail and tracking stream usage.

Used by	**pnserver**
Default value	24
Range of values	Positive Integers
Restart Server after change	No

`MailUsagePeriod <hours>`

Example

`MailUsagePeriod 168`

Makes RealAudio reset statistics every week.

MailUsageThreshold

Percentage of total license streams that must be in use before e-mail is sent to the addresses specified in **MailMessageUser** and **MailUsageCC**.

Used by	**pnserver**
Default value	80
Range of values	1 to 100
Restart Server after change	No

`MailUsageThreshold <percent>`

Example

`MailUsageThreshold 85`

MaxBandwidth

Maximum bandwidth, in Kbps, that a RealAudio Server can use.

Used by	**pnserver**
Default value	0
Range of values	Positive Integers
Restart Server after change	No

The default value of 0 forces RealAudio Server to use the values specified in **AudioConnections** and the license string as the maximum bandwidth.

```
MaxBandwidth <number>
```

Example

```
MaxBandwidth 750
```

Restricts RealAudio Server to using half of a T1 connection's capacity.

MaxThreads

Maximum number of threads, or processes, used by RealAudio Server.

Used by	**pnserver**
Default value	1
Range of values	Integers greater than zero
Restart Server after change	Yes

This entry lets RealAudio Server run multiple processes within a single machine. RealAudio Server can take advantage of multiple process on the Windows NT and UNIX.

```
MaxThreads          <count>
```

Because this configuration parameter affects your computer's CPU usage, experiment to find the optimal number of processes for your system.

Example

```
MaxThreads          5
```

MinPlayerProtocol

The minimum RealAudio protocol supported by RealAudio Server.

Used by	**pnserver**
Default value	0
Range of values	0, 4, 7, 9
Restart Server after change	No

RealAudio Players that do not supply a protocol number equal to or greater than this value as part of their connection information cannot connect to RealAudio Server.

```
MinPlayerProtocol <number>
```

Valid values are:

0 All players
4 RealAudio Player 1.0 and later (same a 0)
7 RealAudio Player 2.0 and later
9 RealAudio Player 3.0 only

Example

To allow only RealAudio 2.0 and later players, enter:

```
MinPlayerProtocol 7
```

MonitorConnections

Maximum number of System Manager sessions that can connect to RealAudio Server.

Used by	**pnserver**
Default value	4
Range of values	Whole number greater than or equal to zero
Restart Server after change	No

The System Manager is a Windows application used to monitor a running RealAudio Server. The System Manager connects to RealAudio Server over a TCP/IP connection. The maximum number of these connections should be restricted to the number of System Managers that you anticipate running.

```
MonitorConnections   <count>
```

The maximum number of System Manager connections does not reduce the allowed number of audio connections.

Example

```
MonitorConnections   6
```

MonitorPassword

Password that System Manager must use to connect to RealAudio Server.

Used by	**pnserver**, **rasm**
Default value	(none)
Range of values	Alpha-numeric string without spaces
Restart Server after change	No

```
MonitorPassword      <password>
```

Example

```
MonitorPassword      SrvTest1
```

MulticastAddressRange

The range of multicast IP addresses available to RealAudio Server.

RealAudio Server scans the specified range for an available address when it starts multicast delivery of a live broadcast. The number of addresses in the range should be at least the number of live streams to be delivered by multicast simultaneously times the number of forks used by RealAudio Server.

This parameter is required for multicast support.

Used by	**pnserver**
Default value	(none)
Range of values	Valid IP addresses in the range 224.0.0.0 - 239.255.255.255
Restart Server after change	No

`MulticastAddressRange <address>-<address>`

where:

`address` is an IP address configured for multicast delivery.

Example:

`MulticastAddressRange 230.125.141.0-230.125.141.255`

MulticastControlList

List of client computers or networks for which RealAudio Server uses multicast delivery if requested. RealAudio Server uses multicast delivery only when requested by the client. Client multicast support requires RealAudio Player 3.0 or later.

This parameter is required for multicast support.

Used by	**pnserver**
Default value	(none)
Range of values	Valid IP addresses
Restart Server after change	No

`MulticastControlList [{<address>, <net mask>}, …]`

where:

`address` is the domain address of the client computer or network for which RealAudio Server uses multicast delivery if requested.

`net mask` is a mask that specifies the bits in the domain address that are treated as wildcards. The bits in the IP address that correspond with the zeros in the net mask are treated as wildcards. For example, an address of 121.23.101.0 with a net mask of 255.255.255.0 accepts all IP addresses from 121.23.101.0 to 121.23.101.255. If the net mask is 255.255.255.128, all IP addresses from 121.23.101.0 to 121.23.101.127 are accepted. The net mask 255.255.255.255 accepts only the single IP address specified.

Note Servers with intranet licenses cannot specify a net mask of 0.0.0.0, and this value is not recommended for any Server.

RealAudio Server uses multicast delivery only specified client addresses. To prevent any player from using multicast delivery, do not include a **MulticastControlList** value in your configuration file.

Example

`MulticastControlList [{204.71.154.0, 255.255.255.0}]`

MulticastDeliveryOnly

Restrict RealAudio Server to multicast delivery only. This option can be used to help control bandwidth use by limiting all streams to multicast delivery.

This parameter is optional for multicast support.

Used by	**pnserver**
Default value	False
Range of values	True, False
Restart Server after change	No

`MulticastDeliveryOnly <value>`

Where:

`value` is True to restrict RealAudio Server to multicast delivery only, or False to allow any type of delivery.

Example

```
MulticastDeliveryOnly True
```

MulticastPort

The port number for multicast broadcasts.

This parameter is optional for multicast support.

Used by	**pnserver**
Default value	7070
Range of values	Any valid port number
Restart Server after change	No

`MulticastPort <value>`

Where:

`value` is the port number for multicast broadcasts.

Example

```
MulticastPort 7075
```

MulticastTTL

The Time To Live (TTL) for multicast packets. This value is used by routers in your network to determine whether a multicast packet is allowed to pass through the router.

This parameter is optional for multicast support.

The following are the typical TTL values and their meanings:

TTL Value	Keep Packets Within
0 or 1	Local host
16	Site
63	Region
129-255	World

For most multicast uses, you should keep the multicast packets within your intranet by setting **MulticastTTL** to 16 or less.

See your network administrator for information on how your network is configured.

Used by	**pnserver**
Default value	16
Range of values	0 - 255
Restart Server after change	No

`MulticastTTL <value>`

where:

`value` is the TTL value included in multicast packet headers.

Example

```
MulticastTTL 16
```

OutputFile

Name of the simulated live stream sent using the **slta** utility.

Used by	**slta**
Default value	(none)
Range of values	Valid RealAudio file name
Restart Server after change	No

slta uses this setting unless overridden by a filename on the command line.

```
OutputFile <filename>
```

For more information, see “slta” on page 127.

Example

```
OutputFile broadcast.ra
```

PnaPort

Number of the TCP port the RealAudio Server uses for receiving requests from clients.

Used by	**pnserver**
Default value	7070
Range of values	Valid port number
Restart Server after change	Yes

```
PnaPort          <number>
```

To use a port lower than 1024 on a UNIX system, you need to be logged on with super-user privileges. The only reason to use a port other than the default is to allow several Servers to coexist on one system, or to achieve some level of privacy when serving information by using an unusual port number.

Example

```
PnaPort          7074
```

PidPath (UNIX Only)

File used by RealAudio Server for UNIX to record its process ID.

Used by	**pnserver**
Default value	**pnserver.pid**
Range of values	Valid file name
Restart Server after change	No

If specified, RealAudio Server for UNIX records its process ID in a file. Use the following format to specify the filename for the process ID log:

```
PidPath  <file>
```

For simple administration, the process ID file should reside in the same directory as your access and error log files.

Example

```
PidPath  pnserver/logs/pnserver.pid
```

RemoteLicenseHost

Name of the RealAudio Server acting as a remote license host. To use this setting, you must purchase remote license management as part of your RealAudio Server license.

Used by	**pnserver**
Default value	(none)
Range of values	Valid host name
Restart Server after change	Yes

```
RemoteLicenseHost <name>
```

Note The **RemoteLicenseHost** setting must specify a different RealAudio Server from the one on which this configuration file is used.

Example

```
RemoteLicenseHost license.prognet.com
```

RemoteLicensePort

The TCP port used by the license client to connect to the remote license host. To use this setting, you must purchase remote license management as part of your RealAudio Server license.

Used by	**pnserver**
Default value	7071
Range of values	Valid port number
Restart Server after change	Yes

```
RemoteLicensePort <port>
```

Example

```
RemoteLicensePort 7075
```

Note The **RemoteLicensePort** setting must specify a different RealAudio Server from the one on which this configuration file is used.

ResolverPort

The TCP port to use for resolving DNS addresses between RealAudio Servers involved in clustering or splitting.

Used by	**pnserver**
Default value	**PnaPort** + 1
Range of values	Valid port number
Restart Server after change	No

```
ResolverPort <port>
```

Example

```
ResolverPort 8081
```

ServerHost

Name of a RealAudio Server to receive the live file.

Used by	**slta**
Default value	(none)
Range of values	Valid DNS name
Restart Server after change	N/A

The **slta** utility uses this setting unless overridden by a host name on the command line. For more information, see “slta” on page 127.

```
ServerHost <host>
```

Example

```
ServerHost server1.realaudio.com
```

ServerPassword

Password that slta must use to connect to RealAudio Server.

Used by	**slta**
Default value	(none)
Range of values	Alpha-numeric string without spaces
Restart Server after change	Yes

By default, **slta** uses this value unless overridden by a password on the command line. For more information, see “slta” on page 127.

```
ServerPassword <password>
```

Example

```
ServerPassword StreamKey1
```

ServerPort

Number of port on the RealAudio Server to receive the live file from **slta**.

Used by	**slta**
Default value	(none)
Range of values	Valid port number
Restart Server after change	Yes

Must be the port number of the RealAudio Server specified by the **ServerHost** setting. **slta** uses this setting unless overridden by a port number on the command line.

```
ServerPort <port>
```

For more information, see “slta” on page 127.

Example

```
ServerPort 8081
```

SourceControlList

List of source servers and streams accepted by this RealAudio Server acting as a splitter. Full and partial URLs are accepted; partial URLs act as wildcards.

Used by	**pnserver**
Default value	If not specified, all sources are accepted
Range of values	URLs separated by commas
Restart Server after change	no

If you specify any value, then only the specified URLs are accepted.

```
SourceControlList [ <URL>, <URL>, … ]
```

To prevent this RealAudio Server from using any source for splitting, specify:

```
SourceControlList [pnm://0.0.0.0]
```

Example

```
SourceControlList [
   pnm://server1.realaudio.com/test.ra,
   pnm://server2.realaudio.com,
   pnm://204.71.154.86,
   pnm://server1.realaudio.com:7075/split ]
```

SplitterBufferDelay

Amount of audio, in seconds, to store in the TCP buffer for splitting. Buffering helps reduce packets loses (dropouts) over a splitter connection.

The recommended value is 20 seconds; a minimum of at least 10 seconds should usually be used. This parameter is set on the RealAudio Server acting as a splitter for another Server.

To use this setting, you must purchase splitting as part of your RealAudio Server license.

Used by	**pnserver**
Default value	0
Range of values	positive Integers
Restart Server after change	no

```
SplitterBufferDelay <time>
```

Example

```
SplitterBufferDelay 20
```

SplitterControlList

List of splitter domain names that are allowed to access RealAudio Server. To use this setting, you must purchase splitting as part of your RealAudio Server license.

If you purchased an intranet license for RealAudio Server, you must specify a **SplitterControlList** to enable splitters on your intranet to access your RealAudio Server.

Used by	**pnserver**
Default value	(none)
Range of values	Valid IP addresses
Restart Server after change	No

`SplitterControlList [{<address>, <net mask>}, …]`

where:

`address` is the domain address of the splitter computer allowed to access RealAudio Server.

`net mask` is a mask that specifies the bits in the domain address that are treated as wildcards. The bits in the IP address that correspond with the zeros in the net mask are treated as wildcards. For example, an address of 121.23.101.0 with a net mask of 255.255.255.0 accepts all IP addresses from 121.23.101.0 to 121.23.101.255. If the net mask is 255.255.255.128, all IP addresses from 121.23.101.0 to 121.23.101.127 are accepted. The net mask 255.255.255.255 accepts only the single IP address specified.

Note Servers with intranet licenses cannot specify a net mask of 0.0.0.0.

To allow any player to connect, do not include a **SplitterControlList** setting in your configuration file. To prevent any player from connecting, specify:

`SplitterControlList [{0.0.0.0, 255.255.255.255}]`

Example

`SplitterControlList [{204.71.154.0, 255.255.255.0}]`

StatsMask

Specifies the additional access log statistics to request from RealAudio Player.

These statistics are included in the access log only when the **LoggingStyle** configuration parameter is set to 1.

Used by	**pnserver**
Default value	0
Range of values	0 - 3
Restart Server after change	No

```
StatsMask <value>
```

Where **<value>** is:

0	No additional statistics
1	Statistics type 1 only
2	Statistics type 2 only
3	Both statistics types 1 and 2

Note: Statistics type 2 are returned only by RealAudio Player 3.0.

For more information about access log files, see “Using the Access and Error Log Files” on page 85 and “Access and Error Log Messages” on page 97.

Example

```
StatsMask 3
```

Timeout

Number of seconds to wait before disconnecting an inactive RealAudio Player.

Used by	**pnserver**
Default value	300 seconds
Range of values	120 - 900
Restart Server after change	No

Because every connection consumes valuable resources, connections should not be permitted to sit idle for long periods of time. A connection is idle only if it is used to pause audio, or the Player has reached the end of the audio program without disconnecting.

```
Timeout  <Seconds>
```

The client can automatically reconnect after being timed out by RealAudio Server if the user clicks the **Play** button.

Example

```
Timeout  240
```

URL

URL that points to the live audio stream to be recorded by rafile.

Used by	**rafile**
Default value	(none)
Range of values	valid URL
Restart Server after change	No

rafile uses this setting unless overridden by a URL on the command line.

```
URL <url>
```

For more information, see “rafile” on page 120.

Example

```
URL pnm://server:7071/live1.ra
```

User

Default user ID for RealAudio Server for UNIX.

Used by	**pnserver**
Default value	(none)
Range of values	Valid user and group names
Restart Server after change	Yes

To automatically allocate additional system resources for delivering a large number of RealAudio streams, the Server must be started under the super-user account. Once the program has started and these resources have been allocated, RealAudio Server can change to a less privileged user and group ID.

```
User     <UserName>
Group    <GroupName>
```

Examples

```
User     danw
Group    users

User     randio
Group    daemon
```

UserDir

Path to be appended to the path defined for the account entries defined in the **UserList** setting. To use this setting, you must have RealAudio hosting as part of your RealAudio Server license.

Used by	**pnserver**
Default value	(none)
Range of values	Valid path name
Restart Server after change	No

```
UserDir        <string>
```

If no **UserDir** is specified then RealAudio Server looks for RealAudio files in the path specified in the **UserList** entry.

Example

```
UserDir        rafiles
```

makes RealAudio Server look for RealAudio files in the subdirectory **rafiles** of the directory specified in the **UserList** entry.

UserList

List of accounts that are allocated audio streams for private use. To use this setting, you must have RealAudio hosting as part of your RealAudio Server license.

Used by	**pnserver**
Default value	(none)
Range of values	N/A
Restart Server after change	No

This field is used to create RealAudio Server Hosting.

UserList

```
[ {<Accnt>, <privateRApath>, <minStreams>,
<maxStreams>}, … ]
```

There can be as many entries in this list as required. For more information on hosting, see “Creating Accounts on RealAudio Server” on page 63.

Two special values (**~*** and ***n**) for <Accnt> enable you to define accounts using naming conventions. You can have a large number of accounts without having to list them individually. For more information, see “Creating Accounts Using a Naming Convention” on page 65.

Example

```
UserList
[{~*, /usr/persacct/, 1, 2},
{ElectroMotors, /usr/electro/ra, 2, 5},
{CityWeld, /usr/cityweld/ra, 1, 3}]
```

Installing RealAudio Encoder

RealAudio Encoder compresses high-bandwidth audio signals to a low-bandwidth signal. This compression allows for the real-time transmission of audio via the Internet, even over a connection as slow as a 14.4 Kbps modem. RealAudio Encoder can be installed on Windows, Macintosh, or UNIX platforms.

RealAudio Encoder is available for the following platforms:

- Windows 95 and Windows NT
- Macintosh
- UNIX (Solaris, SunOS, Linux, Irix)

Installing Windows Encoder

There are two versions of RealAudio Encoder for Windows: a free Encoder available for download from the Progressive Networks Web site and a Live Encoder that is included when you purchase RealAudio Server.

The free RealAudio Encoder for Windows is designed to work under Windows 95 and Windows NT. It works under Windows 3.1 and 3.11 with the Win32s extensions, but this configuration is not supported.

RealAudio Live Encoder for Windows is designed to work under the Windows 95 and Windows NT environments.

System and Software Requirements

The following table explains which hardware is required for specific Encoder uses. Note that different hardware is required for encoding from a file and encoding a live audio stream.

Requirement	File Encoding	Live Broadcasting
CPU	486/66 DX	Pentium/586, 75 MHz
RAM	8 MB	8 MB required 16 MB recommended
Hard Disk Space (software)	1 MB	1 MB
Sound Card	Depends on the encoding algorithm chosen. The following table shows the sampling rate required for each encoding algorithm.	

Encoding Algorithm	Sampling Rate
RealAudio 2.0 - 14.4	8000 kHz
RealAudio 2.0 - 28.8	8000 kHz
RealAudio 3.0 - 28.8 Mono, full response	11025 kHz
RealAudio 3.0 - 28.8 Mono, medium response	11025 kHz
RealAudio 3.0 - 28.8 Mono, narrow response	8000 kHz
RealAudio 3.0 - 28.8 Stereo	8000 kHz
RealAudio 3.0 - ISDN Mono	22050 kHz
RealAudio 3.0 - ISDN Stereo	16000 kHz
RealAudio 3.0 - Dual ISDN Mono	44100 kHz
RealAudio 3.0 - Dual ISDN Stereo	32000 kHz

Installing

To download and install the free RealAudio Encoder for Windows:

1. Download the installer from:

   http://www.realaudio.com/products/

2. When prompted, click **Save to Disk** and specify the temporary directory for the RealAudio installation program. Note where you saved it.

3. In File Manager or Explorer, double-click the icon to activate the automated installation process.

4. Follow the Install program instructions.

To install the RealAudio Encoder for Windows from the Server CD-ROM:

1. In File Manager or Explorer, double-click **setup.exe** in the **\encoder\intel-nt** directory of the RealAudio Server CD-ROM to activate the automated installation process.

2. Follow the Install program instructions.

Installing Macintosh Encoder

There are two versions of Encoder for Macintosh: a free Encoder available for download from Progressive Networks web site and the RealAudio Live Encoder that is included when you purchase RealAudio Server.

System and Software Requirements

- Apple System 7.1 or later (System 7.5.3 recommended)
- 68040 Macintosh with a floating point coprocessor (FPU) or Power Macintosh.

Installing

To download and install RealAudio Encoder for Macintosh:

1. Download the installer from:

   http://www.realaudio.com/products/

2. When prompted, click **Save to Disk** and specify the temporary folder for the RealAudio installation program. Note where you saved it.

3. Double-click the icon to activate the automated installation process.

4. Follow the Install program instructions.

5. When the installation is complete, you need to restart your computer before you can use RealAudio Encoder.

To install the RealAudio Encoder for Macintosh from the Server CD-ROM:

1. Insert the RealAudio Server CD-ROM into the drive. Double-click the **PNEncoder Installer** icon to activate the automated installation process.

2. Follow the instructions on the screen.

3. When the installation is complete, you need to restart your computer before you can use RealAudio Encoder.

Installing UNIX Encoder

There are two versions of Encoder for UNIX: a free Encoder available for download from Progressive Networks web site and the RealAudio Live Encoder that is included when you purchase RealAudio Server.

The RealAudio Encoder for UNIX is designed to work with several UNIX operating systems. Refer to our web site for a complete list of supported UNIX operating systems at:

http://www.realaudio.com

Installing

To download and install RealAudio Encoder for UNIX:

1. Download the installer from:

   http://www.realaudio.com/products/

2. When prompted, click **Save to Disk** and specify the temporary directory for the RealAudio installation program.

3. Change directories to the directory that contains the downloaded file and decompress the file by typing: **zcat <*filename*> | tar xvf -**

   where *filename* is the name of the downloaded file.

4. Add the RealAudio Encoder and Exchange tool to your path.

   - If you are using the csh, zsh, or tsch shell, add the following command to your **.cshrc** file after all other set path commands:

     `set path=($path $HOME/`*`your_encoder_dir_name`*

   - If you are using the ksh, bash, or bsh shell, add the following command to your **.profile** file after all other PATH commands:

     `PATH=$PATH:$HOME/`*`your_encoder_dir_name`*

5. Test RealAudio Encoder by changing directories to the directory specified in Step 4 and typing: **raencoder**

The Encoder prints usage information.

To install RealAudio Live Encoder for UNIX from the Server CD-ROM:

1. Copy the RealAudio installation program from the UNIX directory of the RealAudio Server CD-ROM.

2. Change directories to the directory that contains the downloaded file and decompress the file by typing: **zcat <*filename*> | tar xvf -**

   where *filename* is the name of the downloaded file.

3. Add the RealAudio Encoder and Exchange tool to your path.

   - If you are using the csh, zsh, or tsch shell, add the following command to your .cshrc file after all other "set path" commands:

     `set path=($path $HOME/`*`your_encoder_dir_name`*

   - If you are using the ksh, bash, or bsh shell, add the following command to your .profile file after all other PATH commands:

     `PATH=$PATH:$HOME/`*`your_encoder_dir_name`*

4. Test RealAudio Encoder by changing directories to the directory specified in Step 3 and typing: **raencoder**

   The Encoder prints usage information.

Encoding RealAudio Clips

RealAudio Encoder enables you to compress audio files or input from a sound device into one or more RealAudio formats. Output can be sent to a file or directly to RealAudio Server for live broadcasting. You can select input files by browsing from within the Encoder, or drag and drop files onto the Encoder icon for automated processing. The Encoder window displays information about input and output file formats and has fields for entering descriptive information. (UNIX users work in a command line environment.)

This chapter details RealAudio Encoder operations, including supported input data formats, output options, and how to achieve the best possible sound quality.

Some sound editing programs can encode and write files in the RealAudio format. These include Macromedia Sound Edit 16 (Macintosh), Sonic Foundry Sound Forge, and Syntrillium CoolEdit.

There is a difference between encoding from a live source and broadcasting a live event. The RealAudio Encoder included with RealAudio Server can deliver live content for broadcasting live events. For information about serving a live stream refer to “Delivering Live Content” on page 218. The free RealAudio Encoder available from Progressive Network’s Web site does not support live broadcasting.

Source Files

RealAudio content may be created either from previously recorded digital audio files or from an external audio source. The Encoder does not support compressed input files. Use a sound-editing utility to convert non-supported formats to a supported format.

The following inputs are supported:

Type	Platform	Sample Size
.wav audio	Windows, UNIX	8- or 16-bit mono or stereo
.au audio	Windows, UNIX, Macintosh	8-bit μ or stereo or 16-bit linear mono or stereo
.pcm audio	Windows, UNIX	8- or 16-bit mono or stereo
.snd audio	Windows, Macintosh	8- or 16-bit mono or stereo
.sd2 audio	Macintosh	8- or 16-bit mono or stereo
.aiff audio	Macintosh	8- or 16-bit mono or stereo
Live feed	Windows Live, Mac Live, UNIX Live	8- or 16-bit mono or stereo

Note You can use a stereo input file to produce a mono or a stereo output file. However, you cannot use a mono input file to produce a stereo output file.

The valid sampling rates are: 8 kHz, 11.025 kHz, 16 kHz, 22.05 kHz, and 44.1 kHz.

Producing Higher Quality Sound

The quality of your RealAudio clips depends on the quality of the input source. Because the RealAudio compression algorithms are lossy, some of the information contained in your original audio input will not be included in the reconstructed signal sent to the RealAudio Player. You produce higher-grade audio following compression/decompression if you start with a high-fidelity recording with full dynamic range and a high signal-to-noise ratio.

The following is some advice for producing high-quality source files:

Sound Cards

- Recording with direct digital input achieves the best quality sound. This can be achieved if you have a professional CD-ROM or Digital Audio Tapes (DATs) player with digital output and a sound card with digital input. If you do not have this setup, use the highest quality sound card possible.

Creating Input Files

- Use a sound editor that lets you modify the settings and control the attributes of the file; for example, Macromedia Sound Edit 16 (Macintosh), Sonic Foundry Sound Forge, Sound Wave Designer, and Syntrillium CoolEdit.
- Use high quality source files from compact disks (CDs) or DATs.
- When possible, digitize the sound to a supported file format. Then pre-process the file with a sound editing program. Set the amplitude of your input signal to maximize the use of the available dynamic range.
- Eliminate any DC offset either while recording content or later with an audio editor. This removes low frequency noise.
- Use a CD quality sampling rate (44.1 kHz), sampling width (16-bit) and two channels when creating an input file. You can always downsample and convert to one channel later.
- The source files should contain signals of the maximum allowable amplitude. If the full amplitude range is not used, the resulting RealAudio files may sound hollow. Adjust the range using a sound editor before

encoding the file. Some sound editors have a **Normalize** function that will maximize levels automatically.

- If your original audio file signal exceeds the acceptable amplitude range, the file may contain "clipping." Clipping can give rise to clicks or pops on playback. If your source file contains a clipped signal, your final RealAudio file will have high-frequency background noise or static.
- When encoding live-source audio, you have less opportunity to manipulate your input signal. Be sure that volume levels are prepared and tested. If you are not doing a live broadcast, you may want to record your input as a .wav or .au file so that you may digitally edit it prior to compression.
- Cut any unnecessarily long silences from the beginning or end of the output file to conserve space.

For an in-depth discussion concerning pre-processing, read "Improve Sound Quality in RealAudio Clips" on Progressive Networks' Web site:

http://www.realaudio.com/help/

Choosing an Encoding Algorithm

When you encode an audio file, you select an encoding algorithm. The RealAudio Encoder can encode using several different algorithms. Each encoding algorithm is optimized for a particular type of audio and connection speed bandwidth. You need to select one or more algorithms that best suit your needs.

It is possible to offer more than one encoding algorithm from your RealAudio Server. In this way, you can reach the widest possible audience while still providing high-bandwidth users with the best listening experience. Using **Bandwidth Negotiation**, you can configure your site to automatically serve the appropriately encoded file.

For more information about Bandwidth Negotiation, refer to “Managing Content on RealAudio Server” on page 241.

The following algorithms are available:

Encoding Algorithm	Description	File Size per Second
RealAudio 2.0 - 14.4	Use for speech over 14.4 Kbps modems. Frequency response: 4.0 kHz	1 KB
RealAudio 2.0 - 28.8	Use for voice content and voice with background music over 28.8 Kbps modems. This option increases intelligibility under high packet loss conditions. Frequency response: 4.0 kHz	1.8 KB

Encoding Algorithm	Description	File Size per Second
RealAudio 3.0 - 28.8 Mono, full response	This option gives the brightest sound for delivery over 28.8 Kbps modems. If audio artifacts occur, encode with the medium response option. Frequency response: 5.5 kHz	2 KB
RealAudio 3.0 - 28.8 Mono, medium response	This option may improve clarity for music with snare drums, cymbals and vocals. If audio artifacts occur, encode with the narrow response option. Frequency response: 4.7 kHz	2 KB
RealAudio 3.0 - 28.8 Mono, narrow response	This option may improve clarity for speech-intensive music or noisy signals. Frequency response is somewhat reduced. Frequency response: 4.0 kHz	2 KB
RealAudio 3.0 - 28.8 Stereo	Use for general stereo content. Frequency response: 4.0 kHz	2.5 KB
RealAudio 3.0 - ISDN Mono	Use for general mono content over IDSN connections. Frequency response: 11.0 kHz	4.9 KB
RealAudio 3.0 - ISDN Stereo	Use for stereo content over ISDN connections. Frequency response: 8.0 kHz	4.9 KB

Encoding Algorithm	Description	File Size per Second
RealAudio 3.0 - Dual ISDN Mono	Use for optimal quality for mono content. Frequency response: 20.0 kHz (CD Quality)	9.8 KB
RealAudio 3.0 - Dual ISDN Stereo	Use for optimal quality for stereo. Frequency response: 16.0 kHz (Broadcast Quality)	9.8 KB

Encoding RealAudio files with Sound Forge

Sound Forge by Sonic Foundry provides excellent sound editing tools as well as the ability to save files in RealAudio format. This is a four step process:

- Recording the file
- Processing the file
- Setting the RealAudio text fields
- Saving the file in RealAudio format

Sonic Foundry has recently updated Sound Forge 4.0 and the Batch Converter Plug-In to fully support RealAudio 3.0. The update is available to all Sound Forge 4.0 users on Sonic Foundry's Web site: **http//www.sfoundry.com**

Sound Forge enables you to batch encode files easily. Refer to "Batch Encoding" on page 194 for more information.

Note For more information about using the Sound Forge application, refer to the Sound Forge documentation.

To record a file in Sound Forge:

1. Click the **Record** button. The Record window appears displaying the settings from the last clip recorded.

2. Use the defaults or click the **New** button to change the Sample Rate, Sample Size or number of channels of the source file.

3. Check the **Monitor** box and play the clip to be encoded. Check for clipping. You want the levels to be mostly in the green area, a little in the yellow and only occasionally in the red. If Sound Forge displays a red **Clip** warning above the Monitor, you should:

   a) Stop the input source.

   b) Click the **Reset** button.

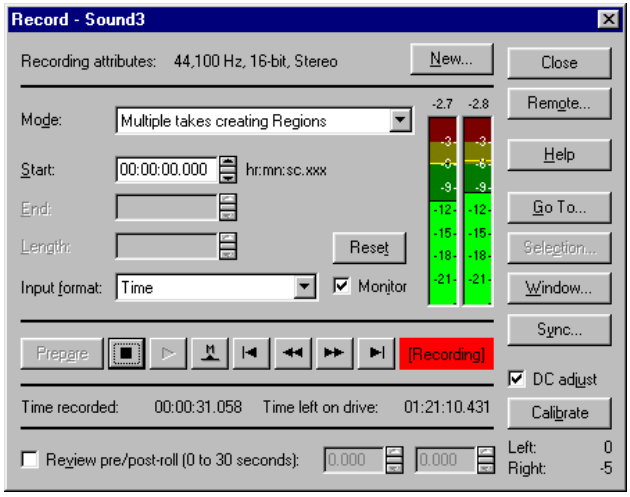
   c) Lower the volume of the input source either by turning down the output of your sound source or by turning down the input volume on

your sound card's mixer window. In general, you don't want any of your levels too high or too low.

d) Check the levels again. It is better to be conservative with the starting levels.

4. Check the **DC Adjust** box. Sound Forge can automatically calculate how much offset is necessary. With your sound source connected but no sound playing, click the **Calibrate** button. If you always use the same input device, you only have to perform this step once. Otherwise, you should re-calibrate each time you switch input devices.

5. Click the **Record** button on the Record window to start the record process.



6. When the file is recorded completely or when you click the **Stop** button, a graphical display of the wave file appears.

7. Click the **Close** button to close the Record window.

To prepare a recorded file for RealAudio encoding:

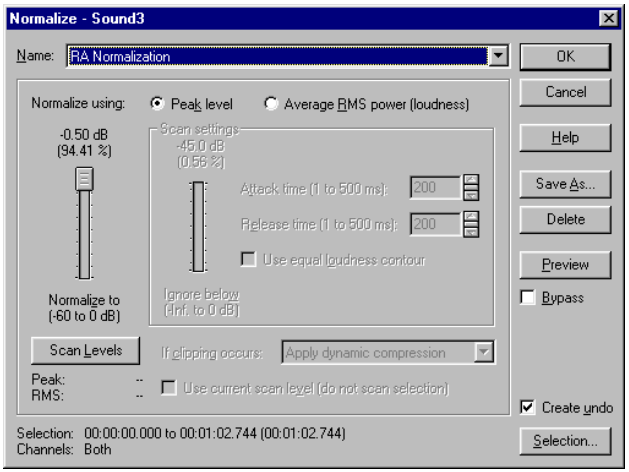
When you have finished recording a file, it is recommended that you perform the following processes on the file before saving the file in a RealAudio format.

Note Sound Forge allows you to save settings for each of these processes. So once you set them up the first time, you can always use the same settings. Refer to the Sound Forge documentation for information on setting presets.

Normalize

This process ensures that the loudest part of the file is at the maximum recording level.

1. Press Ctrl-A to select the entire file.
2. Click **Normalize** from the Process menu. The Normalize window appears:



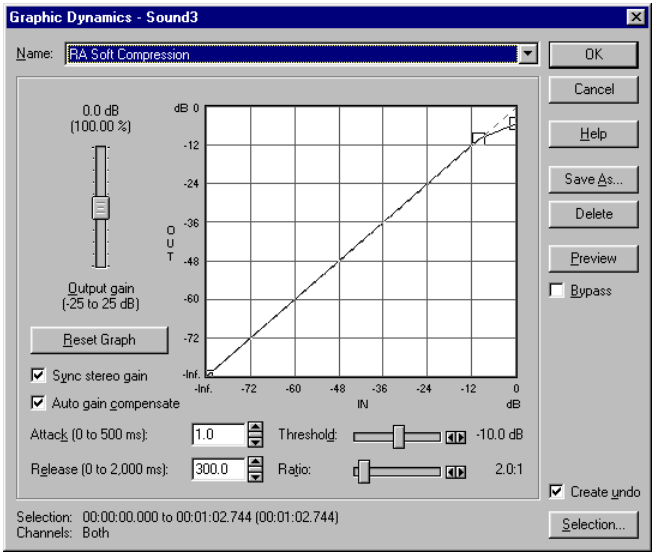
3. Click the **Peak Level** box.
4. Move the **Normalize to** slider to **-.50 dB (94.41%)**.
5. Click the **OK** button. Sound Forge normalizes the file.

Compress

If you have not already audio compressed the clip, you can do so now. RealAudio files benefit from compression because it increases the overall volume and intelligibility of the sound. The suggested settings use very light compression.

1. Press Ctrl-A to select the entire file.

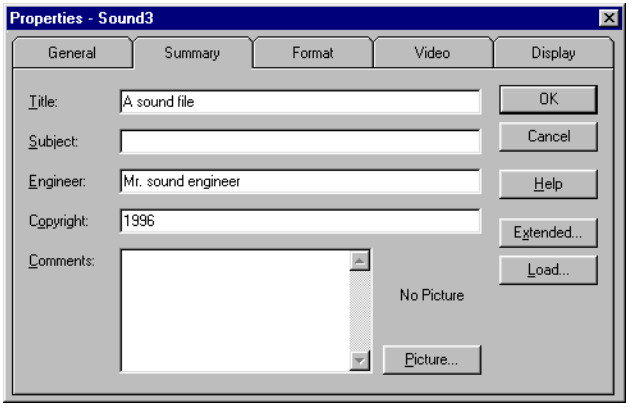
2. Click **Dynamics** from the Effects menu and select **Graphic**. The Graphic Dynamics window appears:



3. Check the **Sync Stereo Gain** box.
4. Check the **Auto Gain Compensate** box.
5. Move the **Threshold** slider to **-10.00 dB**.
6. Move the **Ratio** slider to **2.0:1**.
7. Set the **Attack** box to **1.0** milliseconds.
8. Set the **Release** box to **300.0** milliseconds.
9. Click the **OK** button. Sound Forge compresses the file.

To set the RealAudio text fields:

1. Click **Properties** on the File menu. The Properties window appears.
2. Click the **Summary** tab.

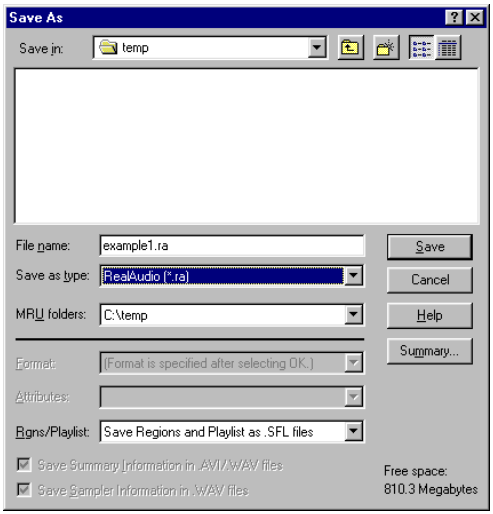


3. Enter the Title, Engineer, and Copyright information. This information will appear in the Title, Author, and Copyright text boxes on the RealAudio Player.

4. Click the **OK** button.

To save the file in RealAudio format:

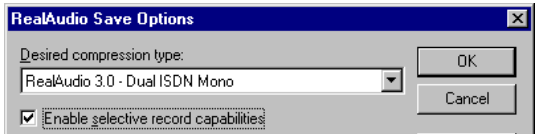
1. Click **Save As** on the File menu. The Save As window appears.



2. Enter the file name of the file you are saving.

3. Select **RealAudio (*.ra)** as the Save As Type.

4. Click the **Save** button. The RealAudio Save Options window appears:



5. Select the **Desired Compression Type**.

6. If the file you recorded was stereo and you selected a mono Compression Type, select the **Stereo File Conversion**. It is recommend that you use the **Both Channels** option.

7. Click the **OK** button. The following message appears:

8. This message verifies that you have saved the file in RealAudio format. You can play the file by clicking the **Yes** button.

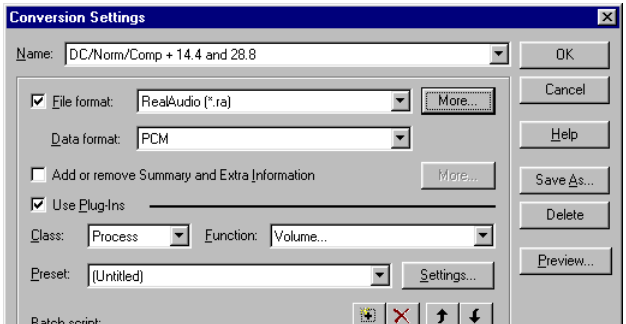
Batch Encoding with Sound Forge

Sound Forge provides a quick and easy tool for batch encoding. This tool is an add-on to the basic Sound Forge package. All the options and processes available in Sound Forge can be performed during a batch encoding. For instance, all the preprocessing described in "Encoding RealAudio files with Sound Forge" on page 188 can be saved as one conversion setting.

Note Progressive Networks has made available a script which incorporates all the recommended preprocessing for encoding RealAudio files at: **http://www.realaudio.com/help/content/soundhints.html**

To batch encode with Sound Forge:

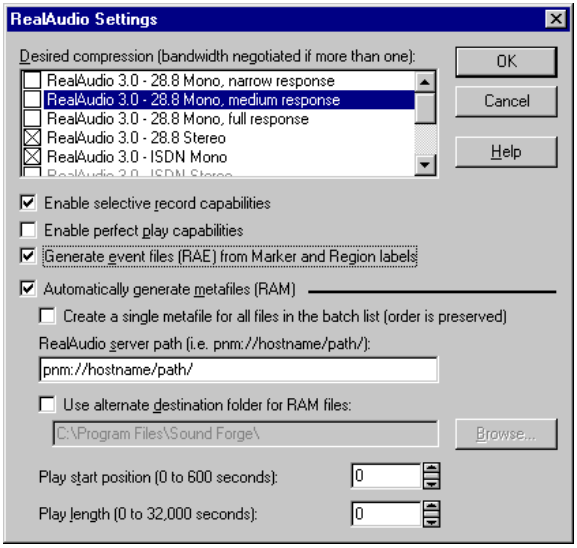
1. Click **Add** on the File menu.
2. Select the files you want to encode and add them to the list.
3. Click **Conversion** on the Options menu and select **Settings**.



4. Make a simple RealAudio bandwidth negotiation script, by doing the following:

   a) Check the **File Format** box and select **RealAudio (*.ra)** from the drop-down menu.

b) Click the **More** button to access the RealAudio Settings window:



c) Select one or more types of compression. If you select more than one, Sound Forge automatically sets them up for bandwidth negotiation. In addition, Sound Forge creates a .ram file if you check the **Automatically Generate Metafiles (RAM)** box.

d) Click the **OK** button in the RealAudio Settings window.

5. Click the **OK** button in the Conversion Settings window.

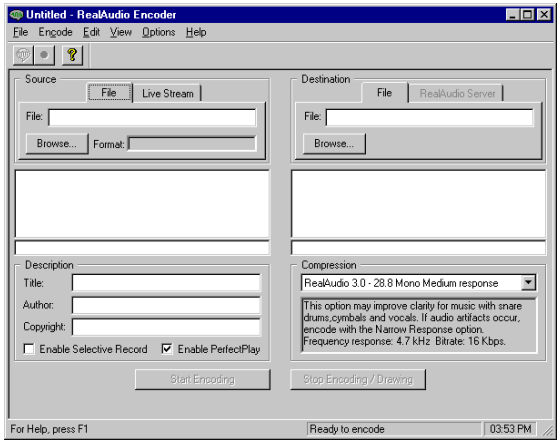
6. Click the **Run Current Script** on the Convert menu. You have the option of having Sound Forge stop converting when it encounters an error or to continue encoding. Your files are encoded to your specifications.

Using the RealAudio Encoder for Windows

The RealAudio Encoder window is comprised of a menu bar, toolbar, encoding status display, and four information panes: Source, Destination, Description, and Compression.

There are two versions of Encoder for Windows: a free Encoder available for download from Progressive Networks web site and a Live Encoder that is included when you purchase RealAudio Server. You can encode a static file using either Encoder.

Note The RealAudio Encoder included with RealAudio Server can deliver live content for broadcasting live events. For information about RealAudio Live Encoder for Windows, refer to “Live Encoder for Windows” on page 222.



To encode a file using RealAudio Encoder for Windows:

1. In the Source pane, select the **File** tab to encode from a static file or select the **Live Stream** tab to encode from a live source. If you select the **Live Stream** tab, continue with Step 4.

   Note The free RealAudio Encoder cannot broadcast a live event. If you have the RealAudio Live Encoder and want to broadcast a live event, refer to "Delivering Live Content" on page 218.

2. In the **File** tab, enter the directory and filename of the previously digitized audio file or click **Browse** to find the file. RealAudio Encoder automatically detects the sampling rate, format and resolution of a source file and display them in the **Format** box. If the Encoder cannot recognize these attributes, a dialog box appears where you can specify the information.

   When you have selected the file to encode, a graphical representation of the file appears below the Source pane and the length of the clip is displayed. You can choose to not display the Audio Signal by clearing **Display Audio Signal** from the Options menu.

3. In the Description pane, enter the Title, Author, and Copyright information for your RealAudio output. These fields are optional.

4. If you want to allow RealAudio Player Plus users to save your RealAudio signal to disk, select **Enable Selective Record**.

5. If you want to allow RealAudio Player Plus users with slower connections (for example 14.4 Kbps modems) to experience RealAudio files encoded for a higher bandwidth by partially downloading audio data before beginning playback, select **Enable PerfectPlay**.

6. In the Destination pane, select **File** to encode a static file. If you have the RealAudio Live Encoder, and want to serve the file as you encode, select the **RealAudio Server** tab. (This option is not available in the free RealAudio Encoder.)

   Note For information about encoding live audio and the RealAudio Server tab, refer to "Delivering Live Content" on page 218.

7. In the fields on the **File** tab, enter the name and location of the .ra output file. The Encoder suggests a default output file with the same name (but

with a .ra filename extension) and in the same directory as the source file. You can modify the output filename.

8. In the Compression pane, select the appropriate compression type.

   For a description of each encoding algorithms, refer to “Choosing an Encoding Algorithm” on page 184.

9. If you want to listen to your audio as it is being encoded, select **Play While Encoding** from the Options Menu. Using this feature, however, may slow the encoding process.

10. If you select **Play While Encoding**, you can choose to listen either to the input file or to the decompressed .ra output file. Select one of these options from the Options menu.

11. Click  , or the **Start Encoding** button to start the encoding process.

    You may choose to view the progress indicator which shows the percentage completed or to view side-by-side plots of the input and output waveforms by clicking **Show Audio Signal** on the Options menu. Showing the waveforms may slow down the encoding process.

    Note You can change Encoder default settings on the Preferences window. For more information, refer to “Setting Windows Encoder Options and Preferences” on page 199.

12. Listen to the newly encoded file with a RealAudio Player.

Setting Windows Encoder Options and Preferences

Windows Encoder enables to do set certain options and preferences. These options and preferences

Show Audio Signal

The RealAudio Encoder displays the audio signal for both the input and output files. Turning off this feature results in somewhat faster Encoding.

To change the setting of this option:

- Toggle **Show Audio Signal** from the Options menu.

Play While Encoding

You can listen to the audio as it is encoded if your PC has sufficient performance.

Note This option is not available for live input streams.

To play while encoding:

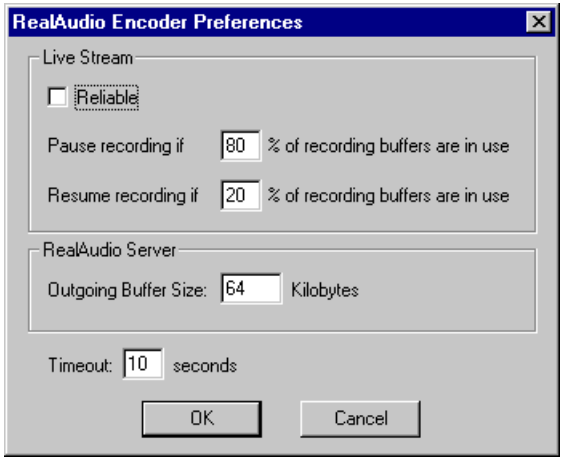
- Click **Play While Encoding** in the Options panel.

Note If the audio skips or is not available, your computer may not have sufficient performance to play correctly.

Preferences Window

To set preferences:

1. Click **Preferences** on the Options menu. The Preferences Window appears:



2. Set the appropriate settings.

Option	Description
Live Stream	Click **Reliable** from a live source using a reliable connection that can keep up with the data flow. If this field is checked, and the recording buffers fill, you receive an error message and RealAudio Encoder stops encoding. If your connection is not reliable, set the other two fields. The **Pause Recording** field indicates the highest percentage to allow the recording buffers to reach. The **Resume Recording** field indicates at what percentage to begin recording after pause.
RealAudio Server	This field is unavailable in the free Encoder. For the Live Encoder, this field indicates the capacity of the RealAudio Server receiving the live broadcast.

Option	Description
Timeout	This field indicates when the Encoder should timeout if it cannot connect to RealAudio Server.

Set Default Settings

You can set certain Encoder options to default to a particular setting. These defaults appear in the Encoder window when you encode a file, and are applied to any file being encoded through drag-and-drop encoding.

Note When you are encoding a file in the Encoder window, you can modify the default settings on a file-by-file basis.

To set default Encoder options:

- Set the options on the Encoder window and click **Save Default Setting** on the Options menu.

The following options can be set through Save Default Setting:

- Title
- Author
- Copyright
- Compression
- PerfectPlay
- Selective Record

Drag-and-Drop Encoding for Windows

RealAudio Encoder for Windows supports two types of drag-and-drop encoding:

- Clicking an input-audio-file icon and dragging it onto an open Encoder window enters path and filename information into the appropriate Encoder fields. Then, you only need to enter the descriptive information and settings and click  to begin the encoding process.
- You can also drag and drop an input-file icon onto the RealAudio Encoder icon. The file will be encoded using the default output filename and the most-recently saved Description and Options. Be sure that you have saved the settings that you want applied. Refer to "Setting Windows Encoder Preferences" on page 199.

Command Line Encoding for Windows

In some situations you may find it convenient to encode within the DOS command line environment by creating a batch file to automate the encoding of many separate input files.

You can specify command line arguments that direct the Encoder to process an input file and then shut down. The syntax is:

ENCODER *file_to_encode* **[***settings_file***]**

where *file_to_encode* is the digital audio input file and *settings_file* is an optional file in which you have saved your encoding preferences.

For example, the command:

```
ENCODER one.wav prefs.txt
```

encodes the file one.wav using the Encoder settings specified in the file prefs.txt.

If you place the files you want to encode and the corresponding settings files in the same directory as RealAudio Encoder, you do not have to specify file paths. However, if you want to encode files in other directories, you need to specify the complete paths to these files. Likewise, if your working directory is

not the one in which your Encoder is installed, you need to specify its location. For example, the command:

```
C:\raencode\encoder C:\docs\one.wav C:\prefs.txt
```

creates one.ra in the directory C:\docs from within any working directory.

Settings File

The settings file allows you to specify Compression, Selective Record, PerfectPlay, and Title, Author, and Copyright strings for the .ra file. Any setting not specified within the settings file take the values specified as the default settings within the Encoder.

Setting	Options
Title	Text you want to appear as the Title of the RealAudio file. Default: blank
Author	Text you want to appear as the Author of the RealAudio file. Default: blank
Copyright	Text you want to appear as the Copyright of the RealAudio file. Default: blank
Codec	This is the Codec with which to encode and decode this file. Valid options are: **Codec** — **Algorithm** lpcJ — RealAudio 2.0 - 14.4 28_8 — RealAudio 2.0 - 28.8 DNET — RealAudio 3.0 algorithms Default: DNET

<table>
<tr><th>Setting</th><th>Options</th></tr>
<tr><td>Flavor</td><td>This is the Flavor of the Codec. Depending on the Codec chosen valid options are:

<table>
<tr><th>Codec</th><th>Flavor</th><th>Algorithm</th></tr>
<tr><td>lpcJ</td><td>0</td><td>RealAudio 2.0 - 14.4</td></tr>
<tr><td>28_8</td><td>0</td><td>RealAudio 2.0 - 28.8</td></tr>
<tr><td>DNET</td><td>0</td><td>RealAudio 3.0 - 28.8 Mono, narrow response</td></tr>
<tr><td>DNET</td><td>1</td><td>RealAudio 3.0 - 28.8 Mono, medium response</td></tr>
<tr><td>DNET</td><td>2</td><td>RealAudio 3.0 - 28.8 Mono, full response</td></tr>
<tr><td>DNET</td><td>3</td><td>RealAudio 3.0 - 28.8 Stereo</td></tr>
<tr><td>DNET</td><td>4</td><td>RealAudio 3.0 - ISDN Mono</td></tr>
<tr><td>DNET</td><td>5</td><td>RealAudio 3.0 - ISDN Stereo</td></tr>
<tr><td>DNET</td><td>6</td><td>RealAudio 3.0 - Dual ISDN Mono</td></tr>
<tr><td>DNET</td><td>7</td><td>RealAudio 3.0 - Dual ISDN Stereo</td></tr>
</table>

Default: 2</td></tr>
<tr><td>SelectiveRecord</td><td>This determines if a RealAudio Player Plus user will be able to record the RealAudio file. Valid options:

0 Disabled
1 Enabled

Default: 0</td></tr>
<tr><td>PerfectPlay</td><td>This determines if a RealAudio Player Plus user will be able to use PerfectPlay. Valid options:

0 Disabled
1 Enabled

Default: 1</td></tr>
</table>

Example Settings File:

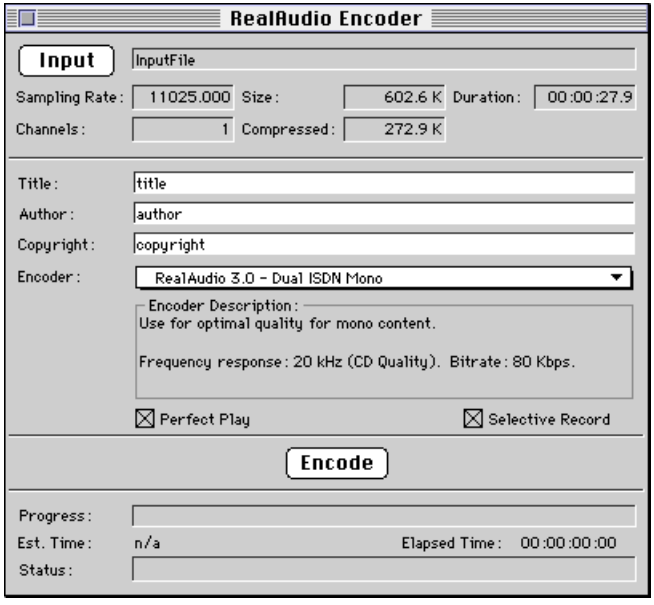
```
[Default Settings]
Title = My Song
Author = Progressive Networks
Copyright = 1996
Codec = DNET
Flavor = 3
SelectiveRecord = 1
PerfectPlay = 1
```

Note The settings file must start with the **[Default Settings]** line; all other lines are optional. Any option you do not specify in the settings file will be set to the default setting.

Using the Encoder for Macintosh

There are two version of the RealAudio Encoder for Macintosh: a free Encoder available for download from Progressive Networks web site and a Live Encoder that is included when you purchase RealAudio Server. You can encode a static file using either Encoder.

Note The RealAudio Encoder included with the RealAudio Server can deliver live content for broadcasting live events. For information about RealAudio Live Encoder for Macintosh, refer to “Using the Live Encoder for Macintosh” on page 225.



To encode a file with RealAudio Encoder for Macintosh:

1. Select a previously existing audio file to convert into the RealAudio format, by clicking **Input**.

2. Select the file you want to compress from the Directory window and click **Open**. When you open a file, the Sampling Rate, Duration, Size, and Compressed Size appear at the top of the window.

3. Enter Title, Author, and Copyright information for your RealAudio output. These fields appear both within the main Encoder window and within the Preferences window. If you do not want to establish default values for this information, enter the information in the Encoder window.

   Note If you plan to encode multiple files with the same information, you can save time by using the Preferences window to specify information that is common to all of your files, such as Copyright. Access the RealAudio Preferences window by choosing **Preferences** from the View menu. Refer to “Macintosh Preferences Window” on page 209.

4. In the **Encoder** box, choose the encoding algorithm for this file. A description of the chosen algorithm appears in the Encoder Description field.

   For a description of each encoding algorithms, refer to “Choosing an Encoding Algorithm” on page 184.

5. If you want to allow RealAudio Player Plus users to save your RealAudio signal to disk, select **Enable Selective Record**.

6. If you want to allow RealAudio Player Plus users with slower connections (for example 14.4 Kbps modems) to experience RealAudio files encoded for a higher bandwidth by partially downloading audio data before beginning playback, select **Enable PerfectPlay**.

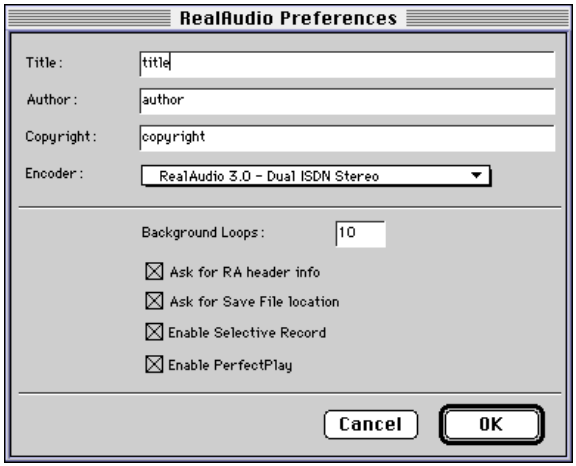
7. Click the **Encode** button to start the encoding process.

8. Select folder and filename for the output file in the Directory window. While the file is encoding, the Progress bar at the bottom of the RealAudio Encoder window indicates what percentage of the file is encoded.

9. Verify the encoding by playing the newly created file with a RealAudio Player.

Macintosh Preferences Window

The Preferences window displays the default settings used by RealAudio Encoder. Information that you enter here is saved when you close this window. Do not enter information into the Preferences window unless you intend to set default parameters for encoding.



Feature	Description
Title	Sets the default Title.
Author	Sets the default Author.
Copyright	Sets the default Copyright.
Encoder	Sets the default Encoder algorithm.

Feature	Description
Background Loops	The number in this field controls how the Encoder shares CPU time with other active applications. The default is set to 10 for Power PC Macintoshes. The higher this value is set, the faster files encode. However, your computer will be less responsive if you switch to other applications. **Note** Macintosh 680x0 users may want to set this field to 1.
Ask for RA Header Info	Select this check box to have a window appear before each file encodes. This gives you the opportunity to specify new Title, Author, and Copyright information for each file.
Ask for Save File Location	Select this check box to have a **Save File** window appear as each file is encoded so you can specify the folder and filename for the RealAudio output file. If you do not select this check box and are encoding multiple files, the RealAudio files are saved in the same folder as the input file, with the .ra filename extension added.
Enable Selective Record	Select this check box to allow RealAudio Player Plus users to save your RealAudio clip to disk.
Enable PerfectPlay	Select this check box to allow RealAudio Player Plus users with slower connections (for example 14.4 Kbps modems) to play RealAudio files encoded for a higher bandwidth by partially downloading audio data before beginning playback.

Drag-and-Drop Encoding for Macintosh

RealAudio Encoder for Macintosh supports drag-and-drop encoding. You can drag and drop input file icons onto the **RealAudio Encoder** icon. This automatically encodes files using the default output filename and the most recently saved encoding preferences. If you have selected the **Ask for RA Header Info** check box or the **Ask for Save File Location** check box, you are prompted for information as each file is encoded.

Encoding with AppleScripts for Macintosh

If you plan to encode large numbers of files on a regular basis, you may want to consider writing AppleScripts to perform batch encoding. This automatically encodes files using the default output filename and the most-recently saved encoding preferences. Sample AppleScripts are provided in the AppleScript Examples folder in the RealAudio Encoder folder. Three scripts are provided: one to encode a single file, one to encode multiple files, and one to record an Encoder session. A sample of an AppleScript is included in this document, refer “AppleScript Sample Code” on page 213.

The following is a list of AppleScript verbs:

Required Suite: Terms that every application should support

Verb	Description
open	Open the specified object(s).
print	Print the specified object(s),
quit	Quit application.
Run	Sent to an application when it is double-clicked.

Standard Suite: Common terms for most applications

Verb	Description
close	Closes an element.
Delete	Deletes an element.

Verb	Description
Get	Get the data for an object.
Make	Make a new element.
Set	Set an object's data.
encode	Encodes **inFile** into **outfile** in RealAudio format.
Class application	An application program.
Elements	Encoder by name.
Class encoder	A RealAudio encoder object. Properties: **Client Object** reference—The AppleEvent target for status messages **name** string [r/o]—The title of the session. **Title** string—Title field of RA header in output file. **Author** string—Author field of RA header in output file. **Copyright** string—Copyright field of RA header in output file. **Infoprompt** boolean—Prompt user for RA header info before encoding. **Saveprompt** boolean—Prompt user for output file before encoding. **Loopcount** integer—Number of encoding loops before yielding to another application. **Infile** string—Input file to the RealAudio Encoder. **Outfile** string—Output file for the RealAudio Encoder. **Processing** boolean [r/o] —Flag to indicate if encoder is processing (processing == TRUE). **Compression** string—Name of encoder to use for encoding.

Verb	Description
Class RACut	Copies the specified amount of audio into output file. Properties: **cutfile** string—Input file to the RealAudio Encoder. **outfile** string—Output file for the RealAudio Encoder. string—Start time. string—End time.
Class RAPaste	Concatenates all input files into the specified output file. Properties: a list of string—Input files. **outfile** string—Output file for the RealAudio Encoder.

AppleScript Sample Code

This is an AppleScript example that demonstrates how to create an encoder session for the RealAudio Encoder, as well as encoding the file.

```
tell application "RealAudio Encoder (PPC)"
  activate
  with timeout of 90000 seconds

  make encoder -- make a new encoder session
  copy result to myencoder -- save reference to the new
                           -- encoder session

  -- set session default settings
  set infoprompt of myencoder to false -- don't ask for RA
                                       -- Info
  set saveprompt of myencoder to false -- don't put up
                                       -- Save File box

  -- select the encoder
  set compression of myencoder to "RealAudio Encoder 1.0"

  -- set processing loops
  set loopcount of myencoder to 10

  -- set Title, Author, and Copyright messages
  set title of myencoder to "Goodbye"
  set author of myencoder to "My name"
```

```
    set copyright of myencoder to "©1995 My Company Inc."

    -- select input file
    set infile of myencoder to ":AppleScript Examples:Sample
    Sounds:Goodbye"
    set outfile of myencoder to ":AppleScript xamples:Sample
    Sounds:Goodbye.ra"

    -- encode the file
    encode myencoder

    -- wait until processing is complete
    repeat while myencoder is processing
    end repeat

    close myencoder
    delete myencoder
    quit

  end timeout
end tell
```

Using the RealAudio Encoder for UNIX

There are two versions of RealAudio Encoder for UNIX: a free Encoder available for download from the Progressive Networks Web site and a Live Encoder that is included when you purchase RealAudio Server. You can encode a static file using either Encoder.

Note The RealAudio Encoder included with RealAudio Server can deliver live content for broadcasting live events. For information about RealAudio Live Encoder for UNIX, refer to "Live Encoder for UNIX" on page 226.

RealAudio Encoder for UNIX is run from the command line, using the following syntax:

raencoder *options file*

where *options* are any of the RealAudio Encoder options described below and *file* is the input audio file to be compressed into the RealAudio format.

Note If no input filename is specified, STDIN is assumed.

By default, RealAudio Encoder for UNIX displays a progress indicator on your screen as the file is encoded. If you plan to encode large numbers of files on a regular schedule, you can write a shell script file for multiple encoding.

Option	Description
-a	Use this option to specify an Author string.
-c	Use this option to specify a Copyright string.
-C	Use this option to specify the Codec with which to encode and decode this file. Valid options are: **Codec** — **Algorithm** 14_4 — RealAudio 2.0 - 14.4 28_8 — RealAudio 2.0 - 28.8 DNET — RealAudio 3.0 algorithms Default: 28_8

<table>
<tr><th>Option</th><th>Description</th></tr>
<tr><td>-F</td><td>Use this option to specify the Flavor of the Codec. Depending on the Codec chosen valid options are:

<table>
<tr><th>Codec</th><th>Flavor</th><th>Algorithm</th></tr>
<tr><td>14_4</td><td>0</td><td>RealAudio 2.0 - 14.4</td></tr>
<tr><td>28_8</td><td>0</td><td>RealAudio 2.0 - 28.8</td></tr>
<tr><td>DNET</td><td>0</td><td>RealAudio 3.0 - 28.8 Mono, narrow response</td></tr>
<tr><td>DNET</td><td>1</td><td>RealAudio 3.0 - 28.8 Mono, medium response</td></tr>
<tr><td>DNET</td><td>2</td><td>RealAudio 3.0 - 28.8 Mono, full response</td></tr>
<tr><td>DNET</td><td>3</td><td>RealAudio 3.0 - 28.8 Stereo</td></tr>
<tr><td>DNET</td><td>4</td><td>RealAudio 3.0 - ISDN Mono</td></tr>
<tr><td>DNET</td><td>5</td><td>RealAudio 3.0 - ISDN Stereo</td></tr>
<tr><td>DNET</td><td>6</td><td>RealAudio 3.0 - Dual ISDN Mono</td></tr>
<tr><td>DNET</td><td>7</td><td>RealAudio 3.0 - Dual ISDN Stereo</td></tr>
</table>

Default: 0</td></tr>
<tr><td>-h</td><td>Use this option to display this list of options.</td></tr>
<tr><td>-i</td><td>Use this option to display the information stored in the header of your input file. For example, typing:

raencoder -i file

might produce the output:

WAVE Header
Encoding is linear; 2 bytes per sample
Number of bytes of audio is 23038.
Sampling rate: 8000
# of channels: 1</td></tr>
<tr><td>-l</td><td>Required for live recording. Use to indicate source of audio plugged into your sound card. Valid options are:

line
cd
mic</td></tr>
</table>

Option	Description
-o	Use this option to specify the output RealAudio filename.
-p	Use this option to enable or disable PerfectPlay. In PerfectPlay mode, the RealAudio Player Plus uses an expanded audio buffer so users with slow connections (for example 14.4 Kbps modems) can play files encoded for higher bandwidths. Valid options are: 0 Disable PerfectPlay 1 Enable PerfectPlay Default: 1
-q	Use this option to disable the status indicator while encoding.
-r	Use this option to set the input file sampling rate. This option overrides the sampling rate specified in the header of the input audio file. Valid values are 8, 11, 16, 22, 32, 44. Default: 8
-s	Use this option to specify the sample width of .pcm input audio data. Valid options are: 8 8-bit .pcm data 16 16-bit .pcm data Default: 16
-t	Use this option to specify a Title string. The string is displayed in the RealAudio Player window.
-v	Use to display the version number of RealAudio Encoder.

Option	Description
-w	Use this option to enable or disable Selective Record. Enabling Selective Record allows listeners to save your RealAudio data. Valid options are: 0 Disable Selective Record 1 Enable Selective Record Default: 0

The following are examples of the command line:

Encoding a .wav file with the RealAudio 3.0 - 28.8 Mono, medium response algorithm:

```
raencoder -t"My Title" -a"My Name" -c"My
Company, 1996" -omyfile.ra myfile.wav
```

Encoding an .au file with the RealAudio 2.0 - 14.4 algorithm

```
raencoder -f1 -t"My Title" -a"My Name" -c"My
Company, 1996" -omyfile.ra myfile.au
```

Batch Encoding

You can batch encode multiple files in several ways depending on your operating system and the tools you have available. For more information refer to the following sections:

- “Batch Encoding with Sound Forge” on page 195.
- “Command Line Encoding for Windows” on page 203.
- “Encoding with AppleScripts for Macintosh” on page 211.
- “Batch Encoding” on page 194.

Delivering Live Content

The RealAudio Encoder included with RealAudio Server can deliver live content for broadcasting live events. The free RealAudio Encoder available from the Progressive Networks Web site does not support live delivery.

Note Previous releases of RealAudio Encoder and RealAudio Server used the Live Transfer Agent (LTA) to deliver live content; the LTA is no longer used.

To deliver live content, you need:

- A live audio source
- A computer running a RealAudio Encoder
- A server running a RealAudio Server

RealAudio Encoder and RealAudio Server computers can be on different platforms.

To deliver live content using bandwidth negotiation, use one computer for each bandwidth. Each computer runs a Live Encoder connected to one RealAudio Server. For more information on bandwidth negotiation, refer to “Managing Content on RealAudio Server” on page 241.

Setting Up RealAudio Server

To enable live delivery, be sure the following configuration settings are included in the RealAudio Server configuration file:

- **PnaPort** - the port number to which the Encoder connects
- **EncoderPassword** - the password the Encoder uses to connect

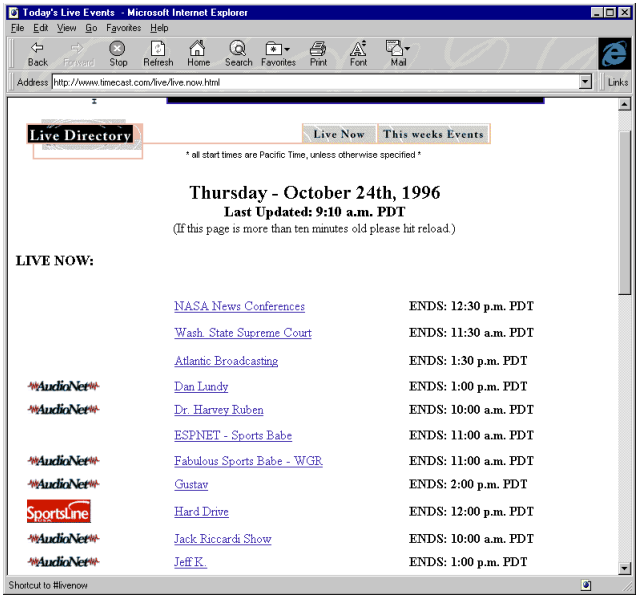
You have the option of specifying that the Server saves the live content as a RealAudio file by setting the **LiveFileTarget** and **LiveFilePassword** configuration option.

For more information on setting up RealAudio Server, refer to “Broadcasting Live” on page 67.

Advertising Your Live Event

If you want to advertise your live event, you can list it in Timecast: The RealAudio Guide **(http://www.timecast.com**), Progressive Networks online resource for RealAudio sites and live events. Thousands of people use Timecast to determine what broadcasts are available. By listing your live event on Timecast, you can greatly increase your audience.

Your listing appears in the Live Directory:



There are two ways to list your live events.

- Fill out a Web form with the relevant information.
- Place special tags in your HTML code.

Filling out a Web Form

Use the Web form (**http://www.realaudio.com/live/addlive.html**) if you have only a few events or events/programs that occur at the same time each day, or once a week. On the Web form, you enter basic information about the event, such as name, complete URL, date and time of the event, and a short description. After submitting the form, the data is verified by a staff member of Timecast and posted on Timecast.

Place Special Tags in your HTML Code

If you have several different events, you can save time by inserting special "live tags" in your HTML code. The live tags are placed within comment lines in the source html, so that they are invisible to your users. A software robot reads the information in the live tags and automatically enters the event(s) in Timecast.

To advertise your live event using special tags:

1. On the web page with the link to your live event, insert the live tags using the following format:

```
<!--@Rastart event="Brief Event Description"
start="Thu, 11 Apr 1996 20:30:00 EST" -->
(some HTML that describes the event)
<!--@RAend-->
```

   Note For more information about the live tag, refer to:
   http://www.realaudio.com/help/content/livetags.html

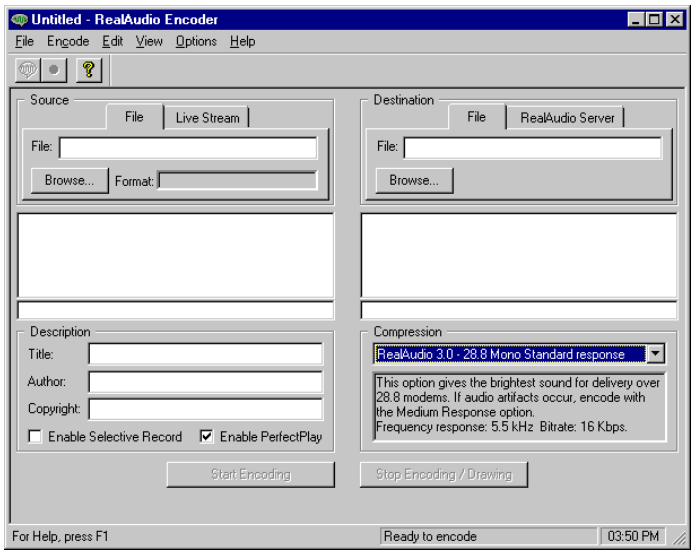
2. Send e-mail to: *live_event@prognet.com.* Do not enter a subject. In the body of the e-mail, enter the complete URL for the page containing the live tags (for example: **http://www.realaudio.com/example/tags.html**). A software Robot gathers the information in your live tags. The data is verified by a staff member of Timecast and posted.

   Note It is VERY important that you include the full address, including the "http://" part. If you use frames, be sure to send the address for the event page that appears within a frame, not the HTML page that creates the frames.

Using the Live Encoder for Windows

RealAudio Encoder for Windows runs on Windows 95 and Windows NT.

To provide content in multiple compression algorithms, run multiple machines using the RealAudio Encoder with the same input signal. Both copies of RealAudio Encoder should use identical settings except for **Compression Type**. RealAudio Server uses bandwidth negotiation with RealAudio Player to deliver the correct content.



To encode and broadcast live content in Windows:

1. Click the **Live Stream** tab in the Source frame.
2. In the Description pane, enter the Title, Author, and Copyright information for your RealAudio output. These fields are optional.
3. If you want to allow RealAudio Player Plus uses to save your RealAudio signal to disk, select **Enable Selective Record**.

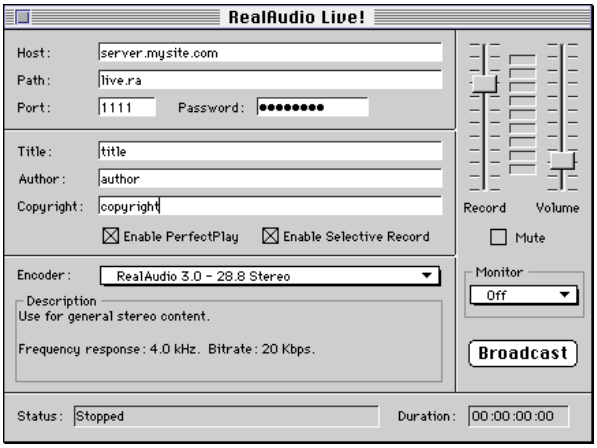
   Note Enable PerfectPlay is not available for live broadcasts.
4. In the Destination pane, click the **RealAudio Server** tab.
5. In the **Host** box, type the domain name or the IP address of the RealAudio Server computer.
6. In the **Port** box, type the port number from the PnaPort configuration setting in the RealAudio Server configuration file.
7. In the **File Name** box, type a name for the live clip being encoded. This is the filename part of the URL that goes in the metafile (.ram) used to access the live broadcast.
8. In the **Password** box, type the password from the Encoder Password configuration setting in the RealAudio Server configuration file.
9. In the Compression pane, select the appropriate compression type.

   Note You can change Encoder default settings on the Preferences window. For more information about the Preferences window, refer to “Setting Windows Encoder Preferences” on page 199.
10. Click  , or the **Start Encoding** button to begin encoding the input and sending the data to the specified RealAudio Server.

Using the Live Encoder for Macintosh

RealAudio Live Encoder for Macintosh runs on System 7.1 and later.

To provide multiple compression types, run multiple Encoder machines with the same input signal. All copies of RealAudio Encoder should use identical settings except for **Encoder**. RealAudio Server uses bandwidth negotiation with RealAudio Player to deliver the correct content.



To encode and broadcast live content for Macintosh:

1. In the **Host** box, type the domain name or the IP address of the RealAudio Server computer.

2. In the **Path** box, type a name for the live clip being encoded. This is the filename part of the URL that goes in the metafile (.ram) used to access the live broadcast.

3. In the **Port** box, type the port number from the PnaPort configuration setting in the RealAudio Server configuration file.

4. In the **TCP Packet Size** box, keep the default value of 456.

5. In the **Password** box, type the password from the Encoder Password configuration setting in the RealAudio Server configuration file.

6. Enter optional text for the **Title**, **Author**, and **Copyright** in the appropriate text boxes. This text is displayed by RealAudio Player when a user listens to the broadcast.

7. Choose the **Encoder** value.

8. If you want to allow listeners with the RealAudio Player Plus to save your RealAudio signal to disk, click **Enable Selective Record**.

   Note Enable PerfectPlay is not available for live broadcasts.

9. Drag the **Volume** slider to adjust the monitor volume.

10. Drag the **Record** slider to set the encoding volume level for best quality.

11. Click **Connect** to connect the Encoder to RealAudio Server.

12. Click **Broadcast** to begin encoding and sending data to RealAudio Server.

Live Encoder for UNIX

The RealAudio Encoder for UNIX is run from the command line, using the following syntax:

raencoder *options file*

where *options* is the any of the RealAudio Encoder options described below and *file* is the input audio file to be compressed into the RealAudio format.

Note If no input filename is specified, STDIN is assumed.

RealAudio Encoder for UNIX displays a progress indicator on your screen as the file is encoded. If you plan to encode large numbers of files on a regular schedule, you can write a shell script to do batch encoding.

Option	Description
-a	Use this option to specify an Author string.
-c	Use this option to specify a Copyright string.
-f	Use this option to specify a compression type. Valid options are: 14_4 0 RealAudio 2.0 - 14.4 28_8 0 RealAudio 2.0 - 28.8 DNET 0 RealAudio 3.0 - 28.8 Mono, narrow response DNET 1 RealAudio 3.0 - 28.8 Mono, medium response DNET 2 RealAudio 3.0 - 28.8 Mono, full response DNET 3 RealAudio 3.0 - 28.8 Stereo DNET 4 RealAudio 3.0 - ISDN Mono DNET 5 RealAudio 3.0 - ISDN Stereo DNET 6 RealAudio 3.0 - Dual ISDN Mono DNET 7 RealAudio 3.0 - Dual ISDN Stereo Default: 28_8 0
-h	Use this option to display this list of options.

Option	Description
-H	Required for live broadcasting. Use to indicate the name of the host.
-i	Use this option to display the information stored in the header of your input file. For example, typing: **raencoder -i file** might produce the output: **WAVE Header** **Encoding is linear; 2 bytes per sample** **Number of bytes of audio is 23038.** **Sampling rate: 8000** **# of channels: 1**
-l	Required for live broadcasting. Use to indicate source of audio plugged into your sound card. Valid options are: line cd mic
-L	Required for live broadcasting. Use to connect to RealAudio Server.
-o	Use this option to specify the output RealAudio file name. If you do not use this option, then the output file is named *file*.ra where *file* is the name of the input file.
-p	Use this option to enable or disable PerfectPlay. In PerfectPlay mode, the RealAudio Player Plus uses can play higher bandwidth files over slow connections (for example 14.4 Kbps modem connections). Valid options are: 0 Disabled 1 Enabled Default: 1

Option	Description
-P	Required for live broadcasting. Used to indicate the Port Number.
-q	Use this option to disable the status indicator while encoding.
-r	Use this option to set the input-file sampling rate. This option overrides the sampling rate specified in the header of the input audio file. Valid values are 8, 11, 16, 22, 32, 44. Default: 8
-s	Use this option to specify the sample width of .pcm input audio data. Valid options are: 8 8-bit .pcm data 16 16-bit .pcm data Default: 8
-S	Required for live broadcasting of an external audio source. Used to indicate the output file size to reach before stopping encoding. Valid format: xxxxx KB
-t	Use this option to specify a Title string. The string is displayed in the RealAudio Player window.
-T	Required for live broadcasting of an external audio source. Used to indicate the time to stop encoding. Valid format: DD:HH:MM:SS
-v	Use to display the version number of RealAudio Encoder.
-V	Optional for live broadcasting of an external audio source. Use to scale the input volume. Range: 1 (lowest) to 100 (highest).

Option	Description
-w	Use this option to enable or disable Selective Record. Enabling Selective Record allows RealAudio Player Plus users to save your RealAudio clip. Valid options are: 0 Disabled 1 Enabled Default: 0
-W	Required for live broadcasting. Use to specify the Password.

The following are examples of the command line for live broadcasting:

Encoding and broadcasting a live file with the RealAudio 3.0 - 28.8 Mono medium response algorithm:

```
raencoder -t"My Title" -a"My Name" -c"My
Company, 1996" -omyfile.ra -l"line" -H"Hostname"
-P"portnumber" -W"Password"
```

Editing Audio Files

If you want to edit your sound files, you have two options—you can edit your .ra files, or you can edit your original source files.

Editing Input Files

This is the editing method of choice. Encoded Audio is stored in indivisible clips of varying duration depending on the encoding algorithm. This limits how precisely encoded audio can be cut and pasted. Sound editing software can cleanly and easily cut and paste .wav or .au files, and there are numerous programs that provide such features as mixing (adding background music to a vocal segment) and fading in or out.

Editing RealAudio Files

RealAudio Encoder is distributed with two editing tools utilities, Racut and Rapaste, which enable simple editing of RealAudio files. The Racut tool cuts specific portions of a RealAudio file. The Rapaste tool combines two or more RealAudio files (encoded with the same algorithm) into one file.

Encoded Audio is stored in indivisible clips of varying duration depending on the encoding algorithm. This limits how precisely encoded audio can be cut and pasted. This is a compelling reason for editing the original source files rather than RealAudio files. The following table lists the indivisible duration for each encoding algorithm:

Encoding Algorithm	Duration
RealAudio 2.0 - 14.4	.02 seconds
RealAudio 2.0 - 28.8	1.4 seconds

Encoding Algorithm	Duration
RealAudio 3.0 - 28.8 Mono, narrow response	.139 seconds
RealAudio 3.0 - 28.8 Mono, medium response	.139 seconds
RealAudio 3.0 - 28.8 Mono, full response	.192 seconds
RealAudio 3.0 - 28.8 Stereo	.192 seconds
RealAudio 3.0 - ISDN Mono	.070 seconds
RealAudio 3.0 - ISDN Stereo	.096 seconds
RealAudio 3.0 - Dual ISDN Mono	.035 seconds
RealAudio 3.0 - Dual ISDN Stereo	.048 seconds

Editing RealAudio Files in UNIX and Windows

The RealAudio file editing tools, Racut and Rapaste, are run from a UNIX or DOS command line. An additional command line tool, Rax, is provided for editing header information of existing RealAudio files on these platforms. The rax tool can be used to change Title, Author, or Copyright strings or to modify Selective Record or PerfectPlay preferences.

Cutting RealAudio Files

Use the Racut tool to cut a specific portion of a RealAudio file.

To create a copy of a piece of a RealAudio file:

1. Listen to your original RealAudio file to determine the start and end times of the segment you want to copy (you can read the times on the status bar of your RealAudio Player).

2. Create a copy by typing:

   racut *output.ra input.ra StartTime {+}EndTime*

   where:

   input.ra is the original file from which to copy
   output.ra will contain the copied segment
   StartTime is time into original file that the segment begins
   EndTime is time into original file that the segment ends

Note A + (plus) in front of the EndTime indicates that the indicated time is the duration of the output clip rather than the time the output clip should end. For example: A StartTime of 2:00 and an EndTime of 3:00 results in a clip that is one minute long. A StartTime of 2:00 and an EndTime of +3:00 results in a clip that is three minutes long, starting two minutes into the original clip.

Both **StartTime** and **EndTime** follow the format:

[days:][hours:][minutes:]seconds[.tenths]

Bracketed data is optional—only seconds are required. However, to specify hour you must also specify minutes. To specify days you must give both hours and minutes.

The *StartTime* and *EndTime* must be an even multiple of the indivisible duration of each encoding algorithm. Otherwise, Racut rounds down to the closest such time.

Combining RealAudio Files

Rapaste creates a new RealAudio file that combines two or more existing RealAudio files that were encoded with the same RealAudio algorithm. The command uses the syntax:

```
rapaste output.ra in1.ra in2.ra [... inN.ra]
```

where:

output.ra is the name of the file you are creating
in1.ra is the input that comes first in the new file
in2.ra has content that will be second in the new file

At least two input files are required. The maximum possible number of input files depends on your command line limits.

The following examples demonstrate the use of the Racut and Rapaste tools.

1. Create a copy of the content beginning at the sixth hour of the first day and ending at the fourth hour of the third day, by typing:

   ```
   racut output.ra input.ra 00:06:00 2:04:00:00.0
   ```

2. Create a file that contains the middle twenty seconds of a sixty-second clip, by typing:

   ```
   racut excerpt.ra original.ra 20.0 40.0
   ```

3. Remove twenty seconds from the middle of a one-minute clip, by typing:

   ```
   racut part1.ra original.ra 0 20.0
   racut part2.ra original.ra 40.0 01:00
   rapaste final.ra part1.ra part2.ra
   ```

4. Insert a clip at the 10-minute mark of an existing file, by typing:

```
racut begin.ra original.ra 0 10:00
racut end.ra original.ra 10:00 endTime
rapaste new.ra begin.ra insert.ra end.ra
```

Editing RealAudio Files on Macintosh

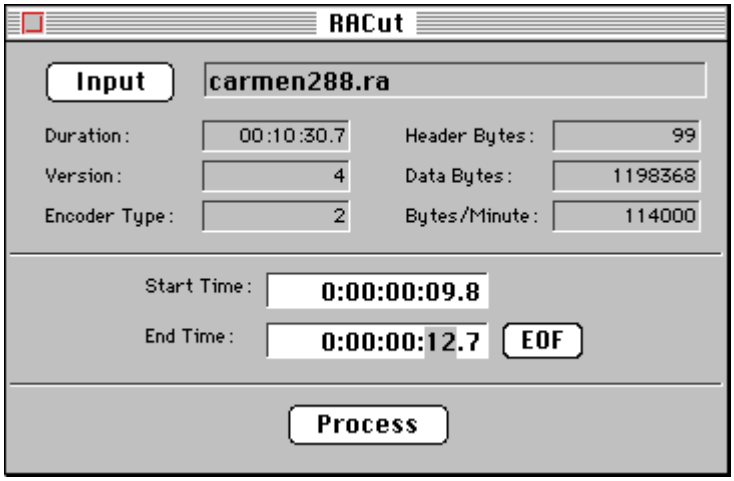
Copying Selected Portions of RealAudio Files

Use RACut to create a copy of a selected portion of a RealAudio file.

To create a copy of a selected portion of a RealAudio file:

1. Listen to the file and use the time display of your RealAudio Player to determine the start and end times of the segment you want to capture.

2. Click **RACut** on the Process menu of the RealAudio Encoder.



3. Click **Input** to browse for the .ra file from which you want to copy a segment.

4. Select your source file in the Directory window and click **Open.** Once you have opened the file, the RACut window displays its header information.

5. Type the limit times for the segment you want in the **Start Time** and **End Time** text boxes. If the segment you want extends to the end of the file, click **EOF**.

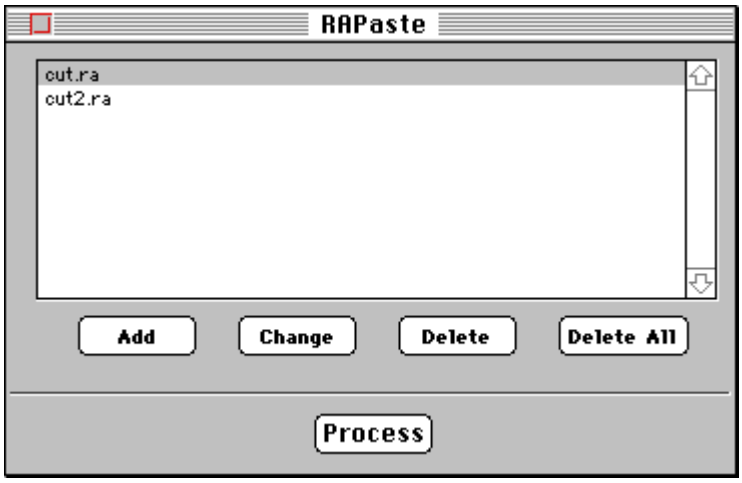
6. Click **Process**; you are prompted for the name of the new file. Type the new name and click **Save**.

Combining RealAudio Files

RAPaste creates a new RealAudio file that is a compilation of two or more existing RealAudio files.

To paste together multiple RealAudio files:

1. Click **RAPaste** on the Process menu of the RealAudio Encoder



2. Click **Add** to select .ra files you would like to combine. Each file you select is added to the Paste list in the RAPaste window.

   Click **Change** to modify a particular file in the Paste list. Click **Delete** to remove a file from the Paste list. Click **Delete All** to remove all of the files from the Paste list.

3. When the list of files is complete, click **Process.** You are prompted for the name of the new .ra file. Enter the name and click **Save.**

4. Use the RealAudio Player to verify the content of the new file.

Modifying RealAudio File Descriptions

You can change the Title, Author, or Copyright text, and modify the Selective Record and PerfectPlay settings in a .ra file using several different methods:

Method	Description
RealAudio Encoder	Open a .ra file, edit the text fields, and click Encode. RealAudio Encoder modifies the fields. The RealAudio Encoder does not re-encode the file, it just modifies the text strings. **Note** Turn off the **Listen While Encoding** option, otherwise, the entire file will be played. Refer to "Encoding RealAudio Clips" on page 181.
Rax Tool	This is a command line tool available for Windows and UNIX. Refer to "Rax Tool" on page 239.
.ram File	Set the Title, Author, and Copyright text strings in the .ram file. Refer to "RealAudio Metafiles" on page 249.
Events Compiler	Set the Title, Author, and Copyright text strings in the .rae file using either of these tools. Refer to "C" on page 267.

Rax Tool

Using the Rax tool you can modify the text strings or setting of a .ra file. The Rax tool is run from the command line by typing:

```
rax [options] file |dir
```

where the following options are available:

Feature	Description
-a	Use this option to specify an Author string.
-c	Use this option to specify a Copyright string.
-f	Use this option to fix a corrupted RealAudio file header.
-help	Use this option to print the options list to the screen.
-i	Use this option to display the .ra file header information.
-o	Use this option to specify the output RealAudio file name. If you do not use this option, then the input file is overwritten by the updated file.
-p	Use this option to enable or disable PerfectPlay. When this option is enabled, RealAudio Player Plus users with slow connections (for example 14.4 Kbps modems) to experience RealAudio files encoded for a higher bandwidth by partially downloading audio data before beginning playback. Valid options are: 0 Disabled 1 Enabled
-t	Use this option to specify a Title string.
-v	Use this option to display the version number of the RealAudio Exchange tool.

Feature	Description
-w	Use this option to enable or disable Selective Record When this option is enabled, RealAudio Player Plus users can save your RealAudio signal to disk. Valid option are: 0 Disabled 1 Enabled

Sample Rax Commands

To change the title text in a .ra **file:**

- Type the command:

```
rax -t"My New Title"  file.ra
```

To change the title of all the .ra **files in the current directory:**

- Type the command:

```
rax -t"My New Title"  *.ra.
```

To create a new file and not overwrite the original .ra **file:**

- Type the command:

```
rax -t"My New Title"  -ofile_new_title.ra
file.ra
```

To display .ra file header information:

- Type the command:

```
rax -i file.ra
```

To display .ra file header information for all .ra **files in a directory:**

- Type the command:

```
rax -i rafile_dir
```

Managing Content on RealAudio Server

You can configure RealAudio Server to deliver files encoded with different algorithms based on the capability of the user's RealAudio Player. The Player gets the best quality the connection can handle without having to explicitly choose among multiple links and Web pages. You can choose to provide as many versions of each file as you want. The bandwidth negotiation process is transparent to users.

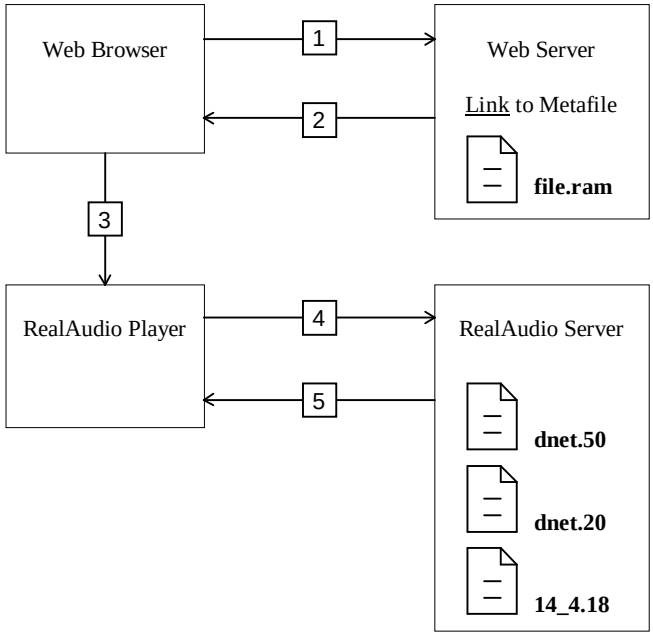
Bandwidth Negotiation

Bandwidth negotiation requires only one link on your Web site to a particular clip. To provide content in multiple formats without bandwidth negotiation, your Web site must have a separate hypertext link and metafile for each format.

For information on using Bandwidth Negotiation with Synchronized Multimedia presentations, refer to "Using Synchronized Multimedia with Bandwidth Negotiation" on page 270.

The following diagram shows how the RealAudio Player and RealAudio Server determine which file to play based on bandwidth.

File organization is the key to bandwidth negotiation. This figure shows a single link on a Web page, and three available RealAudio files encoded using different algorithms.



The following steps correspond to the numbers in the figure:

1. The user clicks a link to a RealAudio metafile on a Web page.

2. The Web server returns the metafile to the Web browser and based on the **.ram** file extension, sets the MIME type of the metafile to **audio/x-pn-realaudio**.

3. The Web browser looks up the MIME type of the metafile, starts RealAudio Player as a helper application, and passes it the metafile.

4. RealAudio Player reads the first URL from the metafile and requests it from RealAudio Server. Based on its preference settings, RealAudio Player also sends a list of RealAudio compression types it supports.

5. RealAudio Server checks the directory specified by the URL and begins streaming the highest bandwidth file supported by RealAudio Player.

The name of the RealAudio file specified in the URL in the metafile is actually a directory on the RealAudio Server computer with the .ra filename extension. Within that directory are the individual files for each format. Name the files based on the following table, which is sorted in order of increasing bandwidth:

Encoding Algorithm	Filename
RealAudio 2.0 - 14.4	14_4.18
RealAudio 3.0 - 28.8 Mono, narrow response RealAudio 3.0 - 28.8 Mono, medium response RealAudio 3.0 - 28.8 Mono, full response	dnet.20
RealAudio 3.0 - 28.8 Stereo	dnet.25
RealAudio 2.0 - 28.8	28_8.36
RealAudio 3.0 - ISDN Mono RealAudio 3.0 - ISDN Stereo	dnet.50
RealAudio 3.0 - Dual ISDN Mono RealAudio 3.0 - Dual ISDN Stereo	dnet.100

Note that several encoding algorithms have the same filename. That means that you can deliver only one of those formats for any given URL.

The following table shows the file formats that each version of RealAudio Player requests and in what order they are requested:

Player Version	Bandwidth Setting	Files Requested
1.0	All	14_4.18
2.0	14.4	14_4.18
2.0	28.8, ISDN, T1	28_8.36 14_4.18
2.1	14.4	14_4.18
2.1	28.8, ISDN, T1	28_8.36 14_4.18
3.0	14.4	14_4.18
3.0	28.8	28_8.36 dnet.25 dnet.20 14_4.18
3.0	ISDN	dnet.50 28_8.36 dnet.25 dnet.20 14_4.18
3.0	T1	dnet.100 dnet.50 28_8.36 dnet.25 dnet.20 14_4.18

Note RealAudio Player 3.0 and later with a 28.8 Kbps connection always plays the RealAudio 2.0 - 28.8 (28_8.36) format if it is available. If you want to provide another 28.8 format such as 28.8 Stereo (dnet.25), do not also provide the 28_8.36 format. If you do not provide any format supported by a Player, that Player receives a message to upgrade to the current Player release.

Bandwidth Negotiation Example

In this example, you deliver one of three RealAudio formats depending on the connection speed and RealAudio Player version.

To setup this example:

1. Encode the source file in the following formats:
   - RealAudio 2.0 - 14.4
   - RealAudio 3.0 - 28.8 Stereo
   - RealAudio 3.0 - ISDN Stereo
2. Create a metafile named **mozart.ram** containing a URL such as:

   ```
   pnm://audio.realaudio.com/music/mozart34.ra
   ```

3. Create a link to the metafile in a Web page. The following HTML code is a typical link:

   ```
   <A HREF="http://www.realaudio.com/cl/mozart.ram">
   Listen to Mozart</A>
   ```

4. On the RealAudio Server computer, create a directory named **mozart34.ra** in the **/music** directory.
5. In this directory, store the three RealAudio files, renamed **14_4.18**, **dnet.25**, and **dnet.50** as shown in the previous table. You can do this manually, use the **raconv** utility described in the next section, or write your own automation script.

   The file that is played depends on the Player connection and version:
   - ISDN or faster connection with RealAudio Player 3.0 or later: RealAudio 3.0 - ISDN Stereo format (**dnet.50**)
   - 28.8 Kbps connection with RealAudio Player 3.0 or later: RealAudio 3.0 - 28.8 Stereo format (**dnet.25**)
   - 14.4 Kbps connection with RealAudio Player 3.0 or later: RealAudio 2.0 - 14.4 format (**14_4.18**)

- 14.4 Kbps or faster connection with RealAudio Player version 2.1 and earlier: RealAudio 2.0 - 14.4 format (**14_4.18**)

Note 1 If you do not supply a RealAudio 2.0 - 14.4 or RealAudio 3.0 - 28.8 format file, users with RealAudio Player 2.1 or earlier receive an error message that they need to upgrade their Player.

Note 2 If you supply a RealAudio 2.0 - 28.8 format file (**28_8.36**), RealAudio Player 3.0 or later with a 28.8 Kbps connection always plays the 28.8 format file; the 28.8 Stereo format file is never played.

Using the Bandwidth Negotiation Utility

The Raconv utility helps you arrange your files into the organization required for bandwidth negotiation by generating the directory with the .ra extension and placing the appropriately renamed files in that directory. The utility uses information in the RealAudio file to determine how to rename the file. Because the utility renames files, keep a back up of your original files until you are sure that the process was successful.

Note The Raconv utility does not convert between RealAudio formats. Use RealAudio Encoder to create a file with each needed format.

To organize your files for bandwidth negotiation:

1. Encode your RealAudio files in the formats you want to support.
2. Store your recorded files in separate directories, one for each final format name. For example, RealAudio 3.0 - 28.8 Mono, narrow response and RealAudio 3.0 - 28.8 Mono, medium response go in the same directory, because they are both renamed dnet.20. The files that contain the same audio source encoded in different formats must have the same name. For example, if the URL specifies mozart34.ra, you need file named **mozart34.ra** in each directory.
3. Type the command:

```
raconv <InputFileName> <ContentDirectory>
```

Where **`InputFileName`** is the file to be turned into a directory and underlying RealAudio file and **`ContentDirctory`** is the directory in which you want to create the content directories.

4. Repeat the command for each RealAudio format you encoded.

For example, typing the command:

```
raconv /28_836files/mozart34.ra /music
```

creates the directory **/music/mozart34.ra**, moves the file **mozart34.ra** from the **28_836files** directory to this new directory, and renames the file **28_8.36**.

If your files are organized by encoding format, you can run **raconv** on a whole directory by entering wildcards for **`InputFileName`**. For example, typing the command:

```
raconv /28_836files/*.ra /music
```

This command takes all the RealAudio files in the directory **28_836files** and creates new directories and files under the directory **/music**.

The **raconv** utility prompts you before overwriting existing files. Use the -f option to force overwriting without prompting.

You can run **raconv** on files in one format to create the directories and then run **raconv** on files in other formats and place them in the appropriate directory.

Configuring Your Web Site

After encoding your RealAudio files, you are ready to attach the files to Web pages. The following sections explain the construction and use of RealAudio content on your Web site. When you have your RealAudio Server set up, use this information to produce audio content from your site.

Making the Most of Your Content

To get the most out of your RealAudio content, educate your Web site's visitors about RealAudio. Let people know that they can listen to your audio instantly, without download delays. Identify each audio clip with a RealAudio bubble icon to distinguish it as real-time audio.

RealAudio bubble icon

You may obtain the above graphic from *How to Design a RealAudio Site* at:

http://www.realaudio.com/help/

Capture the graphic from within your Web browser by right-clicking (Windows) or Control-clicking (Macintosh) it and saving it to file.

Make it easy for your visitors to get the RealAudio Player by providing a link to the RealAudio home page at:

http://www.realaudio.com/

The graphic below is another icon that you can capture from the *Design* page. You might want to use this graphic to identify your page's link to the RealAudio download page.

Sample link to RealAudio download page

RealAudio Metafiles

HTML documents use hyperlinks to connect Web pages. RealAudio material is also reached via links. However, the RealAudio links you put into your HTML pages are not direct references to RealAudio files but instead point to metafiles. Metafiles contain information needed to establish a connection between your RealAudio Server and your listener's RealAudio Player and to initiate playback.

To create a link between two of your Web pages, you might add the following text to an HTML document:

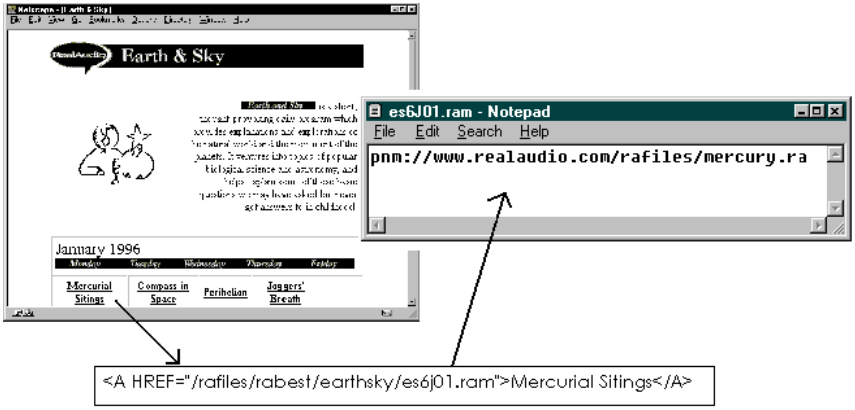
```
<A HREF="sect2.htm">Continue to Section 2</A>
```

A visitor to your site could click the text, and your Web server would then deliver the appropriate section of your document.

If you employed the same syntax to create a link to a RealAudio file, your visitor's click would prompt your Web server to deliver your RealAudio data. But, your Web server cannot stream RealAudio for real-time playback. Only your RealAudio Server can do that.

Your Web server can, however, convey information to a user's RealAudio Player that enables that Player to establish a direct connection to your RealAudio Server. Once in place, this direct connection is used to stream audio to the Player and to carry commands (such as seek or pause) back to your RealAudio Server.

Instead of pointing to an audio file, your Web page is set up to point to a metafile. This metafile, in turn, contains the URL (Uniform Resource Locator) of the audio file (or files) you want associated with the hyperlink. The user's browser passes the URLs to the RealAudio Player, which retrieves **`.ra`** files from your RealAudio Server.



HTML link to a metafile, pointing to RealAudio data

Creating Metafiles

Metafiles contain the addresses of RealAudio (.ra) files. These addresses are in the form of URLs. They begin with a locator type, followed by a specific address. The locator type identifies the protocol used to exchange information between client and server. Common locator types include http and ftp.

The locator type used by RealAudio software is pnm (Progressive Networks Metafile). Addresses you put into a metafile begin with **pnm://**

To create a metafile:

1. Use a text editor (such as Notepad) to create a file containing a RealAudio URL. The contents of your file should be in the following form:

   pnm://hostname/path

   For example, to provide access to a RealAudio file called **hello.ra**, the text of your metafile would be:

   pnm://*www.server1.com***/hello.ra**

   where *www.server1.com* is the DNS name of the machine running your RealAudio Server, on which you store your RealAudio files.

   If you want more than one file to play when the user clicks your link, create a metafile containing several URLs (on separate lines with no intervening blank lines). For example, if your metafile contains:

   ```
   pnm://www.server1.com/hello.ra
   pnm://www.server1.com/welcome.ra
   pnm://www.server1.com/coolstuff.ra
   ```

   the Player automatically play your three files in sequence. A listener can use the Clip menu on the Player to move forward and backward between clips (.ra files).

2. Save your metafile in the "Text Only with Line Breaks" format, using a .ram filename extension.

   For example, you could save the three lines shown above in a file named 3track.ram on your Web server.

3. In your HTML document, reference the metafile in a hyperlink, followed by a reference to the RealAudio icon (so that the RealAudio icon is displayed to the left of the file) as follows:

```
<A HREF="http://www.realaudio.com/welcome.ram">
<IMG
SRC="http://www.realaudio.com/pics/rafile.gif"
align=left border=0> Welcome!</A>
```

where welcome.ram is the directory containing the metafile. The welcome file would display on your Web site as follows:

Filename Extensions

Each metafile that you create must be saved with (or renamed to have) a filename extension. This extension tells your Web server what the metafile is, to ensure that the enclosed URL is handled properly.

The RealAudio System uses two metafile types: .ram and .rpm. These different filename extensions are passed on by your Web server and, ultimately, tell the user's Web browser which application to launch to play the referenced file:

.ram file – Browser launches the **RealAudio Player**
.rpm file – Browser launches the **RealAudio Plug-in** (see below)

Note You must configure your Web server to understand that the extension .ram refers to the MIME type **x-pn-realaudio** (detailed instructions for configuring a variety of Web servers are available in the "Compatible Web Servers" on page 20).

Customizing Calls to Audio Content

Optional arguments may be added to metafiles to finesse what will be seen and heard by users when they click your RealAudio link. You may alter the point in a clip at which play starts or ends or the Title, Author, and Copyright information displayed by RealAudio Players.

Add the options to your metafile, following the URL to which they apply. Options must be preceded by a ? (question mark) and separated from each other by an & (ampersand). The syntax is as follows:

```
pnm://www.realaudio.com/test.ra?[opt1]&[opt2]
```

Changing Start and Stop Times

To create a link that starts playing a clip from a point other than the beginning of the file, use the **start** command. Specify the time into the clip at which play should begin. For example:

```
pnm://www.realaudio.com/test.ra?start="30"
```

would result in playback starting thirty seconds into the audio file.

The format for the start time is as follows:

```
start="dd:hh:mm:ss.ss"
```

Tenths of seconds are separated from seconds by a decimal point; the other units of time are separated by colons. The time is interpreted from right to left, and it is not necessary to specify days, hours, or minutes if these are not relevant.

Similar to the **start** option is the **end** option. For example, the metafile text:

```
pnm://www.realaudio.com/test.ra?end="5:30"
```

is used to provide for playback of test.ra that terminates five minutes and thirty seconds from the start of the clip.

Note The end time is always measured from the actual start of the audio data in the file, even in the case where playback begins elsewhere. For example, the line:

```
pnm://www.realaudio.com/test.ra?start="30"&end="
5:30"
```

is used to start play of test.ra from the thirty-second mark and to stop play at the point five minutes later.

Changing Title, Author, or Copyright Information

The following options exist to change RealAudio descriptive information from the metafile:

```
title="new title"
author="new author"
copyright="new copyright"
```

Strings can be changed independently or in combination.

Changing information in this manner does not change what is stored in your RealAudio file—only what is displayed when it is accessed through this particular metafile. This functionality is especially useful if, for example, you have one large .ra file that contains your band's entire CD, and you want to credit the author of each song as it plays. You could create a multi-clip .ram file as follows:

```
pnm://www.server/band.ra?end="5:30"&title="Song1"
pnm://www.server/band.ra?start="5:31"&end="7:45"&
title="song2"&author="Joe Smith"
pnm://www.server/band.ra?start="7:46"&end="15:01"
&title="song3"&author="Jane Smith"&copyright="My
Music, 1996"
```

HTTP Streaming

HTTP streaming enables audio content providers to stream RealAudio sound from a World Wide Web server. While this method is not as robust, it provides a reasonable method for providing short RealAudio content to a limited number of users.

Before you can stream RealAudio clips through HTTP, you must define the following MIME types for your World Wide Web server:

audio/x-pn-realaudio (files with a .ra or .ram file extension)
audio/x-pn-realaudio-plugin (files with a .rpm file extension)

Some World Wide Web servers are pre-configured with these MIME types.

Note If you are running a web page off an ISP server, send mail to the ISP administrator asking them to setup the RealAudio mime type.

To stream RealAudio content using HTTP:

1. Copy your encoded RealAudio files (files with the .ra extension) to your World Wide Web server.

2. Use a text editor (such as Notepad) to create a metafile containing a RealAudio URL. For example, the contents of your file should be in the following form:

   ```
   http://hostname/path
   ```

   where *hostname* is the name of your World Wide Web server. For example: www.realaudio.com

   Note Refer to "Creating Metafiles" on page 251. This file works similarly, except it uses http as the protocol instead of pnm.

4. Save your metafile in as text using a .ram filename extension.

5. In your HTML document, reference the metafile in a hyperlink. For example:

   ```
   <A HREF="filename.ram">
   <A HREF="http://hostname/file.ram">
   ```

   You can use relative or complete paths. If you use complete paths, you must include both the hostname and the complete path. For example:

   ```
   <A HREF="http://www.ra.com/home/welcome.ram">
   ```

6. When a user clicks on the link, the audio file(s) begin to download. The RealAudio Player begins playing after a few seconds; it does not need to wait for the entire file to be downloaded.

Custom Controls for RealAudio

The RealAudio System enables seamless integration of RealAudio controls into your Web page layout. You can place individual interactive components, such as a play button or volume slider, anywhere on your page, just as you would place an image using the <IMG> tag in HTML.

RealAudio offers two products which, in conjunction with the most popular Web browsers, enable “in page” audio controls .

- RealAudio Plug-in provides Player-like features to browsers that support the Netscape Navigator Plug-in architecture and also works in Internet Explorer 3.0.
- RealAudio Control for ActiveX works with Internet Explorer 3.0 and Visual Basic applications to provide RealAudio playback capabilities.

Using the RealAudio Plug-in

The Plug-in runs as an adjunct to Web browsers that support Netscape’s Plug-in architecture. This RealAudio product is included in the Player installation.

The <EMBED> tag specifies Plug-in attributes in HTML pages in much the same way that the <IMG> tag specifies image attributes. The basic <EMBED> tag for RealAudio contains only the attributes SRC, WIDTH, and HEIGHT, as shown below:

```
<EMBED SRC=metafile.rpm WIDTH=width_value
HEIGHT=height_value>
```

For example:

```
<EMBED SRC="sample1.rpm" WIDTH=300 HEIGHT=134>
```

creates an in-page Player that is 300-pixels wide and 134-pixels high.

For the Plug-in, metafiles are stored with a .rpm filename extension.

Note Do not place the <EMBED> tag within a table.

Feature	Description
SRC Attribute	The SRC attribute specifies the RealAudio metafile to be accessed. The RealAudio Plug-in is associated with a .rpm filename extension. This extension tells the user's Web browser to load the RealAudio Plug-in rather than the stand-alone RealAudio Player. For the user's Web browser to correctly identify .rpm files, you or your system administrator must first configure the .rpm MIME type in your Web server. Users do not need to configure their Web browsers to recognize the .rpm MIME type. The plug-in architecture automatically sends .rpm files to the RealAudio Plug-in. Files with a .rpm extension are identical to .ram files, except for the extension.
WIDTH and HEIGHT Attributes	The WIDTH and HEIGHT attributes specify the size of the embedded RealAudio component. Unlike images, Plug-ins do not size automatically. The WIDTH and HEIGHT can be specified in pixels (the default) or as a percentage of the Web browser window (for example: WIDTH=100%). **Note** If the WIDTH and HEIGHT attributes are not included, the Plug-in may appear as a tiny (and useless) icon with some browsers. If you want your Plug-in component to maintain an absolute size, specify HEIGHT and WIDTH in pixels. If you want the Plug-in graphic to scale with the Web browser window, specify size as a percentage. For example, if you want to fit the entire width of the Web browser window, use WIDTH=100%.

Feature	Description
CONTROLS Attribute	The CONTROLS attribute of the <EMBED> tag allows you to place individual control elements within your page. You can use multiple <EMBED> statements to construct a custom interface, made up of individual controls. CONTROLS supports the following values: All, ControlPanel, InfoVolumePanel, InfoPanel, StatusBar, PlayButton, StopButton, VolumeSlider, PositionSlider, PositionField, StatusField.

Preparing HTML Page for Browsers that Cannot Use the Plug-in

Some Web browsers do not support Plug-ins. You can create HTML pages that are enhanced for Plug-ins but which also work for other browsers. Simply use the <NOEMBED> tag to include HTML statements for use by Web browsers that do not support Plug-ins.

The <NOEMBED> command should appear after an <EMBED> command and take the following syntax:

```
<NOEMBED> HTML to be ignored </NOEMBED>
```

For example, the command:

```
<EMBED SRC="sample1.rpm" WIDTH=300 HEIGHT=134>
<NOEMBED> <A HREF="sample1.ram"> Play the audio
using the stand-alone Player! </A></NOEMBED>
```

would show a page with the Plug-in if your page were accessed by a browser supporting Plug-ins, and would display the message “Play the audio using the stand-alone Player!” (and allow playback with the standard Player) otherwise.

Using the RealAudio Control for ActiveX

You can embed the RealAudio Control for ActiveX in HTML pages using the Object tag.

The following is an example of the RealAudio Control <OBJECT> in an HTML page.

```
<OBJECT
  ID=RAOCX
  CLASSID="clsid:CFCDAA03-8BE4-11cf-B84B-0020AFBBCCFA"
  HEIGHT=140
  WIDTH=312>
  <PARAM NAME="SRC"
     VALUE="pnm://audio.realaudio.com/file.ra">
  <PARAM NAME="CONTROLS" VALUE="all">
</OBJECT>
```

Note Directory names cannot have spaces.

Embedded Object Parameters

Feature	Description
OBJECT	Tag is used to embed the RealAudio ActiveX Control. There should be one <Object> tag per RealAudio control on the page.
CLASSID	Specifies the control's CLSID. This value is always “clsid:CFCDAA03-8BE4-11cf-B84B-0020AFBBCCFA” for the RealAudio Control for ActiveX.
HEIGHT	Specifies the control's height on the HTML page. A value of 0 will make the control invisible.
WIDTH	Specifies the control's width on the HTML page. A value of 0 will make the control invisible.
PARAM	Specially embedded tag for supplying parameters to the ActiveX object.

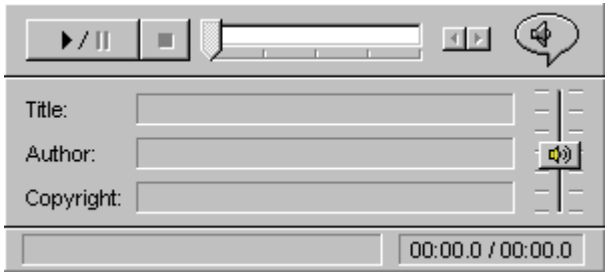
The following properties are available with the PARAM Parameter:

Parameter	Description
SRC	Sets the source of the RealAudio clip. The SRC location can be pnm, file or http protocol. This parameter is required.
CONTROLS	Sets the visible components of the control. Valid CONTROLS include All, ControlPanel, InfoVolumePanel, InfoPanel, StatusBar, PlayButton, StopButton, VolumeSlider, PositionSlider, PositionField, and StatusField.
CONSOLE	Sets a console name used to link multiple control instances. All controls with the same console name work together. For example, if you have multiple Play and Stop buttons on the same page, the console name would enable them to control the same RealAudio clip. Call this function once for each instance of the Play or Stop button you want to link. The console name. "_master" links to all instances. "_unique" links to no other instances.
AUTOSTART	Sets whether or not the control automatically starts playing once the source data is available. Valid values are TRUE or FALSE.
NOLABELS	Suppresses the Title, Author, and Copyright label text in the controls window. The text strings in the fields are still displayed.
RESET	Resets the RealAudio ActiveX Control playlist. Valid values are TRUE or FALSE.
AUTOGOTOURL	Specifies how a URL will be handled. Valid values are TRUE or FALSE. TRUE indicates that the RealAudio Control for ActiveX automatically forwards the URL event to the browser. FALSE indicates that the OnGotoURL VBScript event is used instead.

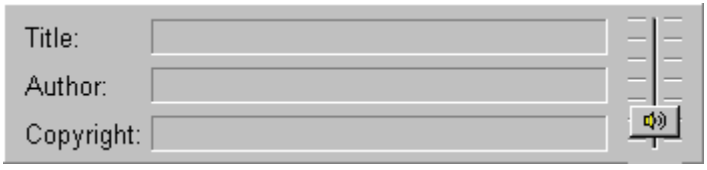
Specifying How the Control Should Look

The CONTROLS attribute allows you to place individual control elements within your page. The CONTROLS attributes for the Netscape Navigator Plug-in and the RealAudio ActiveX Control are the same. The following explains the output of each attribute:

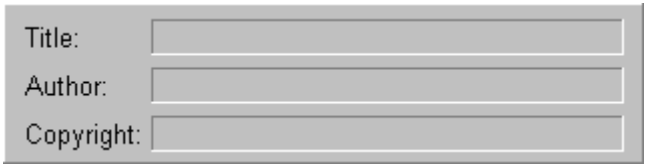
All - Displays a full Player view including the Control Panel, Information-and-Volume Panel and Status Bar.



InfoVolumePanel - Displays the Title, Author, and Copyright information panel and the volume slider.



InfoPanel - Displays the Title, Author, and Copyright information.



ControlPanel - Displays the play/pause button, the stop button and the position slider.

StatusBar - Displays the Status Bar showing informational messages, current time position, and clip length. If you do not embed a Status Bar in your page, error messages are displayed in the Web browser's status bar.

PlayButton - Displays the play/pause button.

StopButton - Displays the stop button.

VolumeSlider - Displays the volume slider.

PositionSlider - Displays the position slider.

PositionField - Displays the field of the Status Bar showing position and clip length.

StatusField - Displays the message text area of the Status Bar.

Advanced Control Attributes

The more exciting features of the RealAudio Plug-in and RealAudio Control for ActiveX may be utilized by specifying custom attributes within your HTML documents.

Removing Text Labels from Controls

If your Web page is in a language other than English, or if you want to use the RealAudio Description fields to display information other than Title, Author, and Copyright, you may remove the Title, Author, and Copyright Labels from the information area. Controls that display Title, Author, and Copyright information for a clip, support a NOLABELS=TRUE attribute.

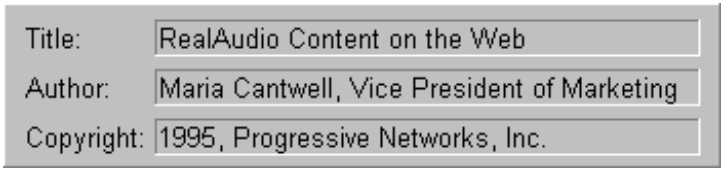
For example, allowing the default behavior

```
<EMBED SRC="use_lbl.rpm" WIDTH=350 HEIGHT=80
CONTROLS=InfoPanel>
```

or specifying NOLABELS=FALSE

```
<EMBED SRC="use_lbl.rpm" WIDTH=350 HEIGHT=80
CONTROLS=InfoPanel NOLABELS=FALSE>
```

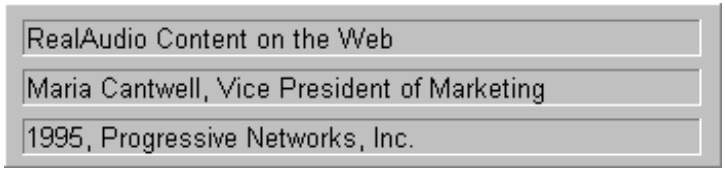
will result in the following display.



On the other hand, using NOLABELS=TRUE, for example:

```
<EMBED SRC="no_lbl.rpm" WIDTH=350 HEIGHT=80
CONTROLS=InfoPanel NOLABELS=TRUE>
```

produces the following InfoPanel:



Starting Audio Clips Automatically

Adding an AUTOSTART=TRUE attribute tells the user's browser to automatically begin playing your audio when the page is visited. You can use this feature to begin narration or to play background music.

Since only one clip can play at a time, if you specify AUTOSTART for more than one control instance, only the last control to load will continue playing. The order in which your files are delivered is dependent on the Web server and on the browser's cache size. This is not necessarily the order in which you put them within your HTML. Therefore, you should specify AUTOSTART for only one control instance per page.

Playing Audio with a Hidden Plug-in

If you want to play RealAudio clips without having a visible Plug-in control, you hide the control. By embedding a Plug-in in your page that has its size set to width=2 height=0, no image will appear on your web page. You can control the Plug-in with JavaScript.

For example:

```
<embed name=javaPlug1 width=2 height=0
controls=PlayButton src="amrec.rpm">
<A HREF="#"
onClick="document.javaPlug1.DoPlayPause()"><img
src="ar.jpg"></A>
```

Making Controls Work Together

The RealAudio System allows you to embed any number of RealAudio elements within a Web page. Normally, each tag instance refers to different audio content. Sometimes, however, you may want to link two or more controls together. For example, you can create a play button and a position slider that work as a pair.

To include multiple components that work together, specify a CONSOLE attribute for each control and assign this the same value in each instance. For example:

```
<EMBED SRC="sample1.rpm" WIDTH=30 HEIGHT=33
CONTROLS="PlayButton" CONSOLE="Clip1">
<EMBED SRC="empty1.rpm" WIDTH=300 HEIGHT=33
CONTROLS="PositionSlider" CONSOLE="Clip1">
```

Note Each <EMBED> tag must have a unique SRC attribute (if the same source is specified for two tags, one will be ignored). Create a dummy .rpm file (named, for example: empty1.rpm) for a second control accessing a clip. Put a hard carriage return (ASCII code 13) into the dummy file.

Specifying a **CONSOLE** value of "_master" links a particular control to all other RealAudio contols on the page. Use this value, for example, to add a Status Bar to display information for all audio clips, for example:

```
<EMBED SRC="sample1.rpm" WIDTH=300 HEIGHT=33
CONTROLS="StatusBar" CONSOLE="_master">
```

Because many platforms, including Windows, only support one volume setting, all volume sliders act on the same underlying value and affect all clips regardless of CONSOLE name. For this reason, you may want to include only one volume slider per page, with no reference to a .ra file in its associated .rpm file.

Synchronized Multimedia

In addition to basic audio content, the RealAudio system allows you to create real-time on-demand multimedia presentations using the Cevents utility (Windows or UNIX). These presentations can be as simple as a narrated slide show of your home page or as intricate as a multi-frame training program that the viewer controls.

The RealAudio System includes the ability to synchronize World Wide Web pages with audio. Thus the audio can be used as a “time line” to display new pages or frames in the Web browser or to update its content. This enables the creation of Internet slide shows, presentations, guided tours and site walk-throughs. A user can have full random access (fast forward and rewind), and the Web browser content is synchronized with the audio.

The RealAudio System stores the information for the synchronized events in a file with a .rae file extension. The audio file is located by the RealAudio Server when the listener opens the .ra file. The RealAudio Server streams audio and event information to the RealAudio Player. The event information is streamed to the RealAudio Player, and in turn the RealAudio Player sends Web page information to the Web browser telling it to update the page’s content.

Another way to create a synchronized multi-media presentation is using the RealAudio Plug-in. However, since sending the Web browser to a new URL unloads the RealAudio Plug-in when the HTML page is unloaded, it is best to create separate frames for the RealAudio controls and for the changing images For more information about frames, refer to “Frames: The Basics” on page 270.

Cevents

Creating a synchronized multimedia event using the Cevents command line tool is a three-step process:

1. Use a text editor to create an input file specifying the display time for each URL.

2. Use the Cevents command line tool to generate a binary file from the text input file.

3. Place the resulting .rae file in the same directory as the .ra audio file.

Creating the Input File

Begin by creating a list of the URLs that you want to be shown during your presentation and the times within the RealAudio clip when they should be displayed. The syntax for each entry should follow the format (with a space between each part of the command):

```
u starttime endtime EventURL
```

where:

u stands for URL event; each line starts with the letter **u**
starttime is the time into the audio clip when the new event is shown
endtime is the time into the audio clip when that event ends
EventURL (generally beginning with “http:” or “file:”) is the Internet address for that event (usually an HTML document)

The time for **starttime** and **endtime** is:

```
[[[days:]hours:]minutes:]seconds[.tenths]
```

The lines of the input file must be in ascending order of start time. The end time should be at least one tenth of a second before the start time of the next event. The following example shows how an input file might look:

```
u 00:00:10.0 00:00:59.9
http://www.RealAudio.com/
u 00:01:00.0 00:02:00.0 http://www.mysite.com/
page2/
```

This input file tells the RealAudio Player to send the Web browser to the RealAudio home page ten seconds into the audio clip. One minute into the audio clip, the Web browser displays a page from "www.mysite.com".

The input file may also contain comment lines beginning with the # symbol. These comment lines are ignored by the event creation tool and are a good way to document the date that the file was created and the type of information found on each page.

Generating an Event File

After creating the text version of the input file, you must convert the file to a RealAudio binary event file. This is done with the command line utility Cevents. It uses the following syntax:

```
cevents <input text file> <output event file>
```

where:

<input event file> is the file you just created
<output event file> is the same name as the audio file with which it will be associated.

For example, to a create synchronized multimedia presentation to accompany paradise.ra, you would generate paradise.rae using the following command:

```
cevents paradise.txt paradise.rae
```

Placing Event Files on Your Server

Copy the .rae file to the same directory as your .ra file. The .ra and .rae files must have the same name except for the file extension. The RealAudio Server automatically detects the file and send the event information to the RealAudio Player, which then sends it the Web browser.

Using Synchronized Multimedia from Local Files

The RealAudio Player can also read local .rae files just as the Server does. In order for the local presentation to work with multiple platforms and with both Internet Explorer and Netscape Navigator, without hardcoding the directory structure, you need to follow these steps.

To play a .rae file locally:

1. Place all .rpm/.ram, .ra, HTML and image files in one directory. The starting document should be named Index.html.

2. Do not use /'s in your file names. Use the following syntax:

   ```
   u 10.0 45.0 &&media&&test2.html
   ```

   Note You cannot use relative path commands like ../ if you want the presentation work on a Macintosh.

.TXT file - convert into .rae file using Cevents compiler

```
u 10.0 45.0 &&media&&test2.html
```

.RAM and .RPM

```
file:1shapfut.ra
```

IMAGES

```
<IMG src="1shapfut.gif">
```

HREFs

```
<a href="rasld011.htm">
```

EMBEDs

```
<EMBED SRC="lecture5.rpm">
```

Using Synchronized Multimedia with Bandwidth Negotiation

When you deliver a Synchronized Multimedia presentation using Bandwidth Negotiation, you can choose to deliver the same event for all encoding formats, or you can choose to deliver different events for each encoding format.

For general information about Bandwidth Negotiation, refer to “Bandwidth Negotiation” on page 241.

To create a single Synchronized Multimedia presentation for multiple encoding formats:

1. Encode the audio source in the required formats using RealAudio Encoder.
2. Create the directory and rename the files to match the Bandwidth Negotiation requirements.
3. Using any one of the encoded files, create the events (.rae) file using the RealAudio Cevents compiler.
4. Rename the events file with the same filename as the Bandwidth Negotiation directory name, keeping the .rae extension.
5. Copy the events file to the same directory as the Bandwidth Negotiation directory.

For example, if the name specified in the URL is **mozart.ra**, and you encode it in the RealAudio 2.0 - 14.4, RealAudio 2.0 - 28.8, and RealAudio 3.0 - ISDN Mono formats, you need to name the events file **mozart.rae** and create a directory structure like the following:

/rafiles
/mozart.rae
/mozart.ra/
14_4.18
28_8.36
dnet.50

To create a different Synchronized Multimedia presentation for each encoding format:

1. Encode the audio source in the required formats using RealAudio Encoder.
2. Create the directory and rename the files to match the Bandwidth Negotiation requirements.
3. Using each of the encoded files, create an events (.rae) file using the RealAudio Cevents compiler.
4. Rename the events file with the same filename as the encoded file it corresponds to, add an .rae extension.
5. Copy the events file to the Bandwidth Negotiation directory where the encoded file is located.

For example, if the name specified in the URL is **mozart.ra**, and you encode it in the RealAudio 2.0 - 14.4, RealAudio 2.0 - 28.8, and RealAudio 3.0 - ISDN Mono formats, you need to name the events files **14_4.18.rae**, **28_8.36.rae**, and **dnet.50.rae** and create a directory structure like the following:

/rafiles
/mozart.ra/
14_4.18
14_4.18.rae
28_8.36
28_8.36.rae
dnet.50
dnet.50.rae

Using Synchronized Multimedia with Live Broadcasts

You can deliver a Synchronized Multimedia presentation with a live broadcast. The events are delivered relative to the time a client begins playing the live broadcast, instead of relative to an absolute position in the broadcast.

The URL events must be defined before the broadcast, but you can change the content of the Web page the URL references during the broadcast.

To create a Synchronized Multimedia presentation for a live broadcast:

1. Create the input file that defines each event and the time that the event is sent. Remember that the times you specify are relative to when the client begins playing the live broadcast.

2. Run the **Cevents** tool to create the events (.rae) file.

3. Name the events file with the same filename you specify in the File Name box in RealAudio Encoder for the broadcast, except specify the .rae file extension for the events file.

4. Move the events file to the path specified in the **File Name** box in RealAudio Encoder.

   For example, if you set up RealAudio Encoder as follows:

   The events file must be named **concert.rae** and it must be located in the **/live** directory relative to the server's base path.

Frames: The Basics

Some Web browsers support a feature which allows the browser window to be divided into multiple regions. Each region is called a frame and can display a separate URL such as a graphic or document. For an introduction to frames visit Netscape's Web site at:

http://www.netscape.com

If you are unfamiliar with frames the following two sites provide a good introduction:

Understanding Frames

http://www.netscape.com/navigate/understanding_frames.html

Frames: An Introduction

http://www.netscape.com/assist/net_sites/frames.html

Frame Document

A frame document describes the sub-HTML documents or frames that will make up a window. The basic structure of a frame document is similar to that of a normal HTML document except that the FRAMESET tag replaces the BODY tag. Each frame is defined by the FRAME tag. In order to effectively use RealAudio each FRAME tag needs the SRC and NAME attributes. The SRC points to the URL to be displayed in the frame. The NAME attribute assigns a name to the frame so that it can be targeted by links in other documents. The example below show a simple frame document that would create two frames:

```
<HTML>
<FRAMESET ROWS="105,*">
   <FRAME SRC="banner.html" NAME="banner">
   <FRAME SRC="lyrics.html" NAME="Lyric">
</FRAMESET>
</HTML>
```

Synchronizing Frames and Audio

Frames and RealAudio content are synchronized in the same way that a regular Web page and RealAudio content are synchronized: a .rae file. The difference lies in the addition of the targeted frame name to the text file that is used to create the .rae file. The syntax for each entry should follow the format:

```
u starttime endtime &&framename&& EventURL
```

Where **u** stands for URL event (each line starts with the letter **u)**, **starttime** is the time into the audio clip when the new event is shown, **endtime** is the time into the audio clip when that event ends, **&&** is a delimiter, **framename** is the frame name as specified in your frame document, and **EventURL** (generally beginning with "http:" or "file:") is the URL for that event (usually an HTML document).

The time format is:

```
[[[days:]hours:]minutes:]seconds[.tenths]
```

The lines of the input file must be in ascending order of start time. The end time should be at least one tenth of a second before the start time for the next event.

The example below shows an .rae input file for a Web site that displays lyrics as a song plays. Each verse is displayed within a frame called Lyric.

```
u 00:00:10.0 00:00:35.0
&&Lyric&&http://www.songs.com/ver1.html
u 00:00:35.0 00:00:50.0
&&Lyric&&http://www.songs.com/ver2.html
```

Note You cannot use frames within a presentation using RealAudio Player. You can only use frames within a multimedia presentation using the Plug-in or ActiveX.

More Information on Frames

A complete discussion of frames is beyond the scope of this manual. For more information on frame attributes and syntax and on targeting windows consult the following Web pages:

Frames -- Syntax

http://www.netscape.com/assist/net_sites/frame_syntax.html

Targeting Windows

http://www.netscape.com/eng/mozilla/2.0/relnotes/demo/target.html

Glossary

audio-on-demand	Full random access to audio content, such as jumping in at any point, pausing the audio, and replaying.
client	A client is the application on the user's machine that connects to a server on another machine. Web browsers and RealAudio Player are examples of clients.
metafiles	Metafiles are text files that direct the RealAudio Player to the RealAudio file. The only information contained in the metafile is the address (URL) of the .ra file it refers to.
pnm	Progressive Networks Media. The protocol RealAudio Server uses to deliver stream data over a network.
.ra files	RealAudio files have the .ra filename extension.
.ram files	Metafiles for use with the RealAudio helper application have the .ram filename extension.
RealAudio files	RealAudio (.ra) files are audio files that have been encoded into the RealAudio format.
real-time audio	Continuously streaming audio without download delays.
.rpm	Metafiles for use with the RealAudio Plug-in have the .rpm filename extension.

streams

The number of users who can simultaneously listen to content sent from your Server is referred to as the number of streams. The number of streams a Server can deliver depends upon the following factors:

- The type of RealAudio Server you have licensed (your license key lets you use a given maximum number of streams).
- The bandwidth between your server and the client (the amount of bandwidth needed by each audio stream depends on the encoding algorithm).

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