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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.

New in Release 3.0

We have listened to feedback from RealAudio customers and made it easier to run RealAudio Server, added support for additional computer platforms, and simplified and enhanced live broadcasting. The new features in the version include:

New RealAudio Encoding Formats

In addition to the 14.4 and 28.8 encoding algorithms, RealAudio Server supports new algorithms that provide better sound quality, including stereo, at higher bandwidths. Other new algorithms use less bandwidth for audio, leaving more bandwidth available for multimedia content.

RealAudio Content Creation Guide explains everything you need to know to take advantage of these new algorithms.

Better Support For Live Broadcasts

- Continuous live broadcasts are now easier to manage. You can choose to archive content automatic or not save it at all.
- Live broadcasts now support bandwidth negotiation.
• Clusters of computers can receive live broadcasts from a single stream. For information, see “Running RealAudio Server” on page 50.
• 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 65.
• 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 68.

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 77 and “Appendix A - Access and Error Log Messages” on page 87.
• 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 “RealAudio Server Error Log” on page 94.
• 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 51.
• Domain control lets you specify which users can play audio from a RealAudio Server. For information, see “Restricting Access to Private Content” on page 53.
• 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 54.
• Bandwidth control lets you ensure quality performance for priority customers. For information, see “Controlling Traffic on Your Network” on page 53.
• A new performance monitor runs on Macintosh computers and can monitor any RealAudio Server. See “Monitoring Performance” on page 79.
Easier Installation

- New setup programs make installing RealAudio Server faster and easier. For information, see “Installing RealAudio Server” on page 22.

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.

Using this Guide

RealAudio Server Administrator's Guide is intended for people who are familiar with operating World Wide Web servers and with RealAudio technology. You do not need to have previous experience with 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 as follows:

Overview: Covers RealAudio features, an overview of RealAudio operations and system requirements.

Installing RealAudio Server: Tells you 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.
Typical users access the Internet using a 14.4 Kbps or 28.8 Kbps modem. This bandwidth limitation requires that audio be significantly compressed prior to being delivered over the Internet and played on a user’s computer. The RealAudio system consists of three programs that encode, deliver, and play audio:

- RealAudio Encoder compresses audio data from a number of input sources, such as a CD, DAT, or live feed, into the RealAudio format for transmission over the Internet.
• RealAudio Server streams data over the Internet to users.
• RealAudio Player decompresses audio data and plays it for users.

Here is how the RealAudio system works.

1. In a World Wide Web page, you click a link to a RealAudio metafile (.ram), which your browser converts into a request to the World Wide Web server for information. A link to a metafile has the syntax:

   `<a href="/usr/electro/ad01.ram">`

2. Upon receiving the request, the World Wide Web server returns to your browser the contents of the metafile. The metafile contains one or more URLs that point to RealAudio files and has the syntax:

   `pnm://server.com/jingle1.ra`

3. Based on the MIME type of the metafile, your browser starts the RealAudio Helper application and gives it the contents of the metafile. The MIME type for RealAudio metafiles is:

   `audio/x-pn-realaudio`

4. RealAudio Player sends the URLs contained in the metafile to the RealAudio Server using TCP.
5. RealAudio Server streams the compressed audio contented in the files identified by the URLs to your RealAudio Player using UDP, or TCP if RealAudio Player specifies.

6. RealAudio Player decompresses and plays the audio signal.

This guide focuses on using RealAudio Server to deliver audio to users on the Internet or an organization’s intranet. Whether you are part of a radio station, Internet music store, corporate training department, or any other organization that uses audio, RealAudio Server can make your communications more effective and enticing. For information on creating RealAudio files for delivery over the Internet, see the *RealAudio Content Creation Guide*.

## 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
- Enough memory and processor capacity

## Operating Systems

RealAudio Server works with the following architectures and operating systems:

<table>
<thead>
<tr>
<th>Architecture</th>
<th>Operating Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Macintosh (PowerPC)</td>
<td>System 7.5.1 or greater (7.5.5 recommended) with Macintosh Open Transport 1.1 or higher</td>
</tr>
</tbody>
</table>
### Architecture

<table>
<thead>
<tr>
<th>Architecture</th>
<th>Operating Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEC Alpha</td>
<td>Digital UNIX v3.2, Windows NT 3.51, Windows NT 4.0</td>
</tr>
<tr>
<td>Hewlett Packard PA/RISC</td>
<td>HP-UX 10.x</td>
</tr>
<tr>
<td>Intel 486/66 or Pentium</td>
<td>Microsoft Windows NT 3.51; Windows NT 4.0; FreeBSD 2.x; BSDI 2.0; and LINUX 1.2, 1.3, and 2.0, including ELF</td>
</tr>
<tr>
<td>IBM PowerPC</td>
<td>AIX 4.0</td>
</tr>
<tr>
<td>Sun SPARC</td>
<td>SunOS 4.1.x, Solaris 2.x</td>
</tr>
<tr>
<td>Silicon Graphics Indy</td>
<td>IRIX version 5.x</td>
</tr>
</tbody>
</table>

### Disk Space

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

You also need disk space for the content files you are serving. *RealAudio Content Creation Guide* 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` 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.

<table>
<thead>
<tr>
<th>Internet Connection</th>
<th>14.4 Streams</th>
<th>28.8 Streams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame Relay (56 Kbps)</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>ISDN (64 Kbps)</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>ISDN (128 Kbps)</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>T1 (1.5 Mbps)</td>
<td>150</td>
<td>90</td>
</tr>
<tr>
<td>Ethernet LAN (10 Mbps)</td>
<td>560</td>
<td>350</td>
</tr>
<tr>
<td>T3 (45 Mbps)</td>
<td>4,500</td>
<td>2,700</td>
</tr>
<tr>
<td>100BaseT (100 Mbps)</td>
<td>6,000</td>
<td>3,600</td>
</tr>
<tr>
<td>100BaseT/FDDI LAN (100 Mbps)</td>
<td>10,000</td>
<td>6,000</td>
</tr>
</tbody>
</table>

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 65.

1 Collisions limit the useful bandwidth to about 70%
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
- NCSA HTTPD (v1.3 or v1.4)
- Netscape Netsite and Netscape Enterprise Server
- O’Reilly Website NT
- Webstar and Webstar PS
- Spinner 1.0b12 - 1.0b15
- 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 3 MB of available RAM plus 20 KB RAM for each simultaneous stream. To support 100 simultaneous connections requires approximately 5 MB of available memory.
RealAudio Server also 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. Commercial firewall manufacturers who support RealAudio include:

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

**Additional Information about Firewalls**

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

<table>
<thead>
<tr>
<th>Information</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>For up-to-date information on RealAudio and firewalls</td>
<td><a href="http://www.realaudio.com/help">http://www.realaudio.com/help</a></td>
</tr>
<tr>
<td>Public firewall mailing list</td>
<td><a href="http://www.greatcircle.com">http://www.greatcircle.com</a></td>
</tr>
<tr>
<td>Public domain firewall toolkit</td>
<td><a href="http://www.tis.com">http://www.tis.com</a></td>
</tr>
<tr>
<td>Firewall Product Developers Consortium</td>
<td><a href="http://www.ncsa.com">http://www.ncsa.com</a></td>
</tr>
</tbody>
</table>
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 “Appendix C - Configuration Settings” on page 117.

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 recording of the interview available 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.

<table>
<thead>
<tr>
<th>Features of Interest</th>
<th>Additional Information</th>
<th>Configuration Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live broadcasting</td>
<td>RealAudio Content</td>
<td>EncoderPassword</td>
</tr>
<tr>
<td></td>
<td>Creation Guide</td>
<td>EncoderTimeout</td>
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<td></td>
<td></td>
<td>LiveFileSize</td>
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<td></td>
<td></td>
<td>LiveFileTarget</td>
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<td></td>
<td></td>
<td>LiveFileTime</td>
</tr>
</tbody>
</table>
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 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 bandwidth used by RealAudio.

<table>
<thead>
<tr>
<th>Features of Interest</th>
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<th>Configuration Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Splitting audio streams</td>
<td>“Splitting an Audio Stream Among Computers” on page 65</td>
<td>SplitterBufferDelay</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SourceControlList</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SplitterControlList</td>
</tr>
<tr>
<td>Clustering computers</td>
<td>“Clustering Computers into a Single RealAudio Server” on page 50</td>
<td>AudioConnections</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ClusterHost</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ClusterPassword</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ClusterPort</td>
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</tbody>
</table>

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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.
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 guide 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.

<table>
<thead>
<tr>
<th>Features of Interest</th>
<th>Additional Information</th>
<th>Configuration Settings</th>
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</thead>
<tbody>
<tr>
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<td>EncoderPassword</td>
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<tr>
<td></td>
<td></td>
<td>EncoderTimeout</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LiveFileSize</td>
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<tr>
<td></td>
<td></td>
<td>LiveFileTarget</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LiveFileTime</td>
</tr>
<tr>
<td>Synchronized Multimedia</td>
<td>RealAudio Content Creation Guide</td>
<td></td>
</tr>
</tbody>
</table>

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.
<table>
<thead>
<tr>
<th>Features of Interest</th>
<th>Additional Information</th>
<th>Configuration Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain control</td>
<td>“Restricting Access to Private Content” on page 53</td>
<td>ConnectControlList</td>
</tr>
<tr>
<td>Hosting</td>
<td>“Creating Accounts on RealAudio Server” on page 54</td>
<td>UserList</td>
</tr>
<tr>
<td>Splitting</td>
<td>“Splitting an Audio Stream Among Computers” on page 65</td>
<td>SplitterBufferDelay SourceControlList SplitterControlList</td>
</tr>
<tr>
<td>Firewall compatibility</td>
<td>“Maintaining Firewall Security” on page 14</td>
<td>N/A</td>
</tr>
<tr>
<td>Bandwidth control</td>
<td>“Controlling Traffic on Your Network” on page 53</td>
<td>MaxBandwidth MaxAudioConnections</td>
</tr>
<tr>
<td>Remote licensing</td>
<td>“Sharing a Stream License Among Computers” on page 51</td>
<td>LicenseClients RemoteLicenseHost RemoteLicensePort</td>
</tr>
<tr>
<td>Live broadcasting</td>
<td><em>RealAudio Content Creation Guide</em></td>
<td>EncoderPassword LiveFileSize LiveFileTarget LiveFileTime</td>
</tr>
<tr>
<td>Synchronized Multimedia</td>
<td><em>RealAudio Content Creation Guide</em></td>
<td>N/A</td>
</tr>
<tr>
<td>Multicast Delivery</td>
<td>“Reducing Bandwidth Congestion using Multicast Delivery” on page 68</td>
<td>MulticastAddressRange MulticastTTL MulticastControlList</td>
</tr>
</tbody>
</table>
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 the following line to your server.cfg file:

   PnaPort 7071

   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:
Installing RealAudio Server

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:

   \texttt{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 “Appendix C - Configuration Settings” on page 117 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 30.

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

![RealAudio Server Installer](image)

5. Enter your **Customer Name** and **License Key** exactly as they are shown in the e-mail you received from Progressive Networks. 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 user ID you use to install it. This user ID has administrator privileges. If you want to run RealAudio Server under a different user ID, enter it in the following dialog box and click **Save Changes**. Note that you must first create the user ID using Windows NT. To install under the default user ID, click **Use Default**.

To install RealAudio Live Encoder, run **lencinst.exe**.

You have now installed the RealAudio files. Go to “RealAudio Server Files” on page 34.
Installing RealAudio Server

Download 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 “Appendix C - Configuration Settings” on page 117.

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

   ```
tar -xvf <filename>
   
   where filename is the name of a distribution file.
   ```

5. Run the installation script `setup.sh` in the `pnserver` directory.

You have now installed the RealAudio files. Go to “RealAudio Server Files” on page 34.
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 your screen to complete installation.

   You have now installed the RealAudio files. Go to “RealAudio Server Files” on page 34.

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.

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 system.
3. Double-click setup.exe and follow the directions on your screen.

To install RealAudio Encoder:

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 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:

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun SunOS</td>
<td><code>mount -rt hsfs /dev/sr0 /cdrom</code></td>
</tr>
<tr>
<td>DEC UNIX</td>
<td><code>mount -t cdfs -o noversion /dev/rz3c/cdrom</code></td>
</tr>
<tr>
<td>SGI IRIX</td>
<td><code>mount -rt iso9660 /dev/scsi/sc0d7l0/cdrom</code></td>
</tr>
<tr>
<td>IBM AIX</td>
<td><code>mount -rv cdrfs /dev/cd0 /cdrom</code></td>
</tr>
<tr>
<td>Hewlett-Packard HP-UX</td>
<td><code>mount -rF cdfs /dev/dsk/c0t2d0 /cdrom</code></td>
</tr>
<tr>
<td>FreeBSD</td>
<td><code>mount -rt cd9660 /dev/cd0a /cdrom</code></td>
</tr>
<tr>
<td>BSDI</td>
<td><code>mount -rt cd9660 /dev/sdl /cdrom</code></td>
</tr>
<tr>
<td>Linux</td>
<td><code>mount -rt iso9660 /dev/hdc /cdrom</code></td>
</tr>
</tbody>
</table>

Note  Because HP-UX does not support the ISO 9660 CD-ROM format, all file and directory names appear in upper case only. Please see the README.TXT;1 file in the server/hpux directory on the CD-ROM for further information. To view this file enter:

   `vi README.TXT\;1.```
Installing RealAudio Server

To install RealAudio software:

1. In the drive where you want to install RealAudio Server create a pnserver directory:
   
   `mkdir pnserver`

2. Change directory to the CD-ROM:
   
   `cd /cdrom`

   **Sun Solaris only:** Change directory to the `pn_server` directory:
   
   `cd /pn_server`

3. Change directory to the server directory:
   
   `cd server`

4. Change directory into the platform you want to install:
   
   `cd <platform>`

   where `<platform>` is the operating system of your computer.

5. Run the setup program:
   
   `setup.sh`

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. On the CD-ROM open the folder containing the software that supports your platform (68000 or Power PC) and networking protocol (TCP or Open Transport).

3. Double-click **PNServer Installer** and follow the directions on your screen.
To install RealAudio Encoder:

1. Insert the CD-ROM into the drive.

2. On the CD-ROM open the folder containing the software that supports your platform (68000 or Power PC) and networking protocol (TCP or Open Transport).

3. 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:

<table>
<thead>
<tr>
<th>Subdirectory</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>bin</strong></td>
<td>Executable files for RealAudio Server (located in installation directory for Macintosh)</td>
</tr>
<tr>
<td><strong>logs</strong></td>
<td>Access and error log files</td>
</tr>
<tr>
<td><strong>rafiles</strong></td>
<td>Directory for your RealAudio content files</td>
</tr>
</tbody>
</table>

### Testing RealAudio Server

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

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 “Appendix A - Access and Error Log Messages” on page 87.

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 “Appendix A - Access and Error Log Messages” on page 87.
Starting RealAudio Server on Macintosh

To start RealAudio Server manually:

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


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 “Appendix A - Access and Error Log Messages” on page 87.
Installing RealAudio Server

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:

   \[ \text{pnm: //<my.pnserver>:<port>/sound1.ra} \]

   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 85 for information to help you diagnose and correct the problem. Also check your log files for clues. To learn about log files, see “Appendix A - Access and Error Log Messages” on page 87.

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 105.
- 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:

\texttt{RAM}

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

\texttt{audio/x-pn-realaudio}

5. Click \texttt{OK}.

6. Repeat steps 3 and 4, using:

\texttt{RPM}

as the filename extension and:

\texttt{audio/x-pn-realaudio-plugin}

as the MIME type.

7. Reinitialize the Web server.

\section*{Mac HTTP and HTTPD4Mac Servers}

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

\begin{verbatim}
Action: TEXT
File Suffix: .ram
File Type: *
MIME Type: audio/x-pn-realaudio
Creator: *
\end{verbatim}

2. Repeat with:

\begin{verbatim}
.rpm
\end{verbatim}

as File Suffix and:

\texttt{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.
Installing RealAudio Server

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

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.

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 45 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:

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ClusterHost</td>
<td>Matisse</td>
</tr>
<tr>
<td>ClusterPassword</td>
<td>fauvist</td>
</tr>
<tr>
<td>ConnectionTimeout</td>
<td>180</td>
</tr>
</tbody>
</table>
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 22.

If you purchased RealAudio Server on CD-ROM follow the directions in “Installing RealAudio Server from CD-ROM” on page 30.

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:

<table>
<thead>
<tr>
<th>Text box</th>
<th>Enter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection Name</td>
<td>A name for the connection.</td>
</tr>
</tbody>
</table>
### 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 47.

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 “Appendix C - Configuration Settings” on page 117.

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.

<table>
<thead>
<tr>
<th>Text box</th>
<th>Enter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine Name</td>
<td>The name of the machine running the Server you want to reconfigure.</td>
</tr>
<tr>
<td>Machine Port</td>
<td>The port number for System Manager to use to reach RealAudio Server. This is the port specified in the <code>PnaPort</code> setting for RealAudio Server and the default is 7070.</td>
</tr>
<tr>
<td>Password</td>
<td>The password that you entered as the value for the <code>MonitorPassword</code> setting in the RealAudio Server configuration file.</td>
</tr>
</tbody>
</table>

System Manager automatically saves the connection information for all of the RealAudio Servers you enter.
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 111.

The UNIX command-line version of System Manager also gives you the option of changing configuration options by editing the configuration file directly.

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 “Appendix C - Configuration Settings” on page 117.
3. Save the file as text.
4. To force reloading of the new configuration settings, use the command:

   ```bash
   kill -HUP
   ```

   For information on using the `kill` command, see “kill” on page 105.
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. However, 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 “Appendix C - Configuration Settings” on page 117.

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. This is especially useful for clustered computers.

The ability to share allotted streams is an optional feature controlled by the license you purchase from Progressive Networks and is available on servers of 100 streams or more. 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 number of the port the license client has connected to the remote license server.
- **streams** is the number of streams to allocate to the license client. This value should match the `count` value on the client’s `AudioConnections` parameter.

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 number of licenses that can be allocated to this client. This value should be the same as the `streams` value on the LicenseClients parameter of the remote license server. This value is used for load balancing between the servers in the cluster.
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:

```
ConnectControlList [{100.71.12.0, 255.255.255.0}]
```

To limit the number of simultaneous connections served by RealAudio Server, use the `AudioConnections` configuration setting. The default value for `AudioConnections` is 10.

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 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. The default value for `AudioConnections` is 10.

### 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.
**RealAudio Server 3.0 Beta Administration Guide**

**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 then 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 then 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.

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:

```
```

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.

**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. See RealAudio Content Creation Guide for more information on encoding and naming file to support Bandwidth Negotiation.

File organization is the key to bandwidth negotiation. The figure on the previous page 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 encoding 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:

<table>
<thead>
<tr>
<th>Encoding Algorithm</th>
<th>Filename</th>
</tr>
</thead>
<tbody>
<tr>
<td>RealAudio 14.4</td>
<td>14_4.18</td>
</tr>
<tr>
<td>RealAudio 28.8 Voice</td>
<td>dnet.20</td>
</tr>
<tr>
<td>RealAudio 28.8 Pop</td>
<td></td>
</tr>
<tr>
<td>RealAudio 28.8 Instrumental</td>
<td></td>
</tr>
<tr>
<td>RealAudio 28.8 Stereo</td>
<td>dnet.25</td>
</tr>
<tr>
<td>RealAudio 28.8</td>
<td>28_8.36</td>
</tr>
<tr>
<td>RealAudio ISDN Mono</td>
<td>dnet.50</td>
</tr>
<tr>
<td>RealAudio ISDN Stereo</td>
<td></td>
</tr>
<tr>
<td>RealAudio Dual ISDN Stereo</td>
<td>dnet.100</td>
</tr>
</tbody>
</table>

Note that several encoding algorithms have the same filename. That means that you can deliver only one of those formats for any given URL.

**Bandwidth Negotiation Example**

In this example, you deliver one of three RealAudio formats depending on the connection speed and Player version. First, encode the source file in the following formats:

- RealAudio 14.4
- RealAudio 28.8 Stereo
• RealAudio ISDN Stereo

Create a metafile named mozart.ram containing a URL such as:

```
pnm://audio.realaudio.com/music/mozart34.ra
```

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>
```

On the RealAudio Server computer, create a directory named mozart34.ra in the /music directory. 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 ISDN Stereo format (dnet.50)
• 28.8 Kbps connection with RealAudio Player 3.0 or later: RealAudio 28.8 Stereo format (dnet.25)
• 14.4 Kbps connection with RealAudio Player 3.0 or later: RealAudio 14.4 format (14_4.18)
• 14.4 Kbps or faster connection with RealAudio Player version 2.1 and earlier: RealAudio 14.4 format (14_4.18)

**Note 1** If you do not supply a RealAudio 14.4 or RealAudio 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 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 28.8 Voice and RealAudio 28.8 Pop 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. Enter the command:

   raconv <InputFileName> <ContentDirectory>

   Where InputFileName is the file to be turned into a directory and underlying RealAudio file and ContentDirectory is the directory in which you want to create the content directories.

4. Repeat the command for each RealAudio format you encoded.

   For example:

   raconv /28_836files/mozart34.ra /music

   This command 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:

```
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 does not create or overwrite a directory if it already exists. This enables you to 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.

## 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 28.8 and RealAudio 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 the *RealAudio Content Creation Guide*. 
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.

Creating Files from Live Broadcasts

You can choose to create files of a live broadcast for playback later. The **rafile** command creates files from a live broadcast stream. 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** setting in the server’s configuration file, **rafile** starts automatically whenever a live audio stream arrives at the server. Be sure you have enough available disk space to store the files generated from a live broadcast. Because **rafile** 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.

**Rafile** can name the files it creates following the conventions used for bandwidth negotiation. If you specify bandwidth negotiation for recording live audio, **rafile** detects the format of the live audio stream and saves the file with the appropriate format and name.

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

If you start **rafile** with the same destination path and file name used for a previous event, **rafile** overwrites the .ra file from the previous event. 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 events, either copy an .ra file elsewhere before it is overwritten or use unique file names when you start rafile.

For information on bandwidth negotiation, see “Delivering Highest Quality Supported by Client Using Bandwidth Negotiation” on page 57. For additional information on the rafile command and its settings, see “rafile” on page 109.

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:
  
  \[\text{pnm://<splitter>:<port>/pnm://<server>/<stream>}\]

  where:

  \textit{pnm} (Progressive Networks Media) is the protocol RealAudio Server uses to play audio

  \textit{splitter} is the name of a RealAudio Server licensed for splitting

  \textit{port} is the number of the port it is using to communicate with the other server

  \textit{server} is the name of the RealAudio Server supplying the audio stream

  \textit{stream} is the name of the audio stream

  For example, a server named \texttt{source.com} is receiving a live audio stream named \texttt{live1.ra} from RealAudio Encoder. Another server, named \texttt{split.com}, is licensed to split audio streams and is connected to \texttt{source.com} on port 7075. In a Web page is a link to the URL

  \[\text{pnm://split.com:7075/pnm://source.com/live1.ra}\]

  Once a user clicks on this link, \texttt{split.com} makes a connection to \texttt{source.com} and requests the \texttt{live1.ra} stream. It then feeds this stream back to RealAudio Player running on the user's computer.

**Controlling Splitter Source**

You can limit a splitter to specified source servers or streams. If you do not control the splitter source, any user of your splitter can request any available source stream.

The \texttt{SourceControlList} configuration parameter specifies the URLs of sources your splitter accepts. You can specify full or partial URLs; a partial URL works like a wildcard.

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

See “SourceControlList” on page 149.
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 150.

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 single transatlantic connection.
A RealAudio Server acting as a splitter receives its license information dynamically from the computer supplying it with the live audio stream. The **AudioConnections** configuration parameter on the servers in a cluster enables load balancing between the cluster servers. For more information on clustering computers, see “Clustering Computers into a Single RealAudio Server” on page 50.

**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
- 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 the clients’ intranet.

**To enable multicast delivery:**

1. Verify with your network administrator that the routers in your network have enabled multicast UDP support.

2. Specify the addresses of the client computers or networks that can receive multicast delivery using the **MulticastControlList** configuration parameter. See “MulticastControlList” on page 141.

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 “MulticastTTL” on page 143.

4. Specify the range of multicast addresses available to RealAudio Server using the MulticastAddressRange configuration parameter. See “MulticastAddressRange” on page 141.

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 specify the password required for connecting to the RealAudio Server 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
```

If you don’t include these in the command line, slta uses the values for the ServerPassword, InputFile, and OutputFile settings. For more information on simulating a live event, see “slta” on page 115 and “Appendix C - Configuration Settings” on page 117.

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 “Appendix A - Access and Error Log Messages” on page 87.
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 in 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 “Appendix A - Access and Error Log Messages” on page 87.

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. 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 “Appendix A - Access and Error Log Messages” on page 87.

**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.

**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 to 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 to 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 79.

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 **RealAudio Server**.

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 error.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 any 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 “Appendix A - Access and Error Log Messages” on page 87.

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 45.

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, you wanted to change your access log file named pnaccess.log. Simply 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 contains three windows that display clients currently connected, files being played, and a graphical interpretation 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 patterns to 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:

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>The type of client connected: Player, Monitor (System Manager), Splitter, or Encoder.</td>
</tr>
<tr>
<td><strong>Note</strong></td>
<td>For live broadcasts, Server clusters and forks are listed as Splitters.</td>
</tr>
<tr>
<td>File Being Played</td>
<td>Name of the file being played from your RealAudio Server.</td>
</tr>
<tr>
<td>Domain Name</td>
<td>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.</td>
</tr>
</tbody>
</table>
Maintaining and Tuning RealAudio Server

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elapsed Time</td>
<td>The length of time that the client has been connected to that file since the System Manager has been attached to the Server. This is the only place where you can find out the length of time that clients are connecting to files.</td>
</tr>
</tbody>
</table>

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.

If you want the Clients window to update continuously, check the Update Continuously box on the Client View tab of the Preferences window.

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.

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>File</td>
<td>Name of the file currently being played.</td>
</tr>
<tr>
<td>Current</td>
<td>Number of clients currently connected to that file.</td>
</tr>
<tr>
<td>Total</td>
<td>Total number of connections made to this file since the System Manager was started.</td>
</tr>
</tbody>
</table>

To set the window to update continuously, check the Update Continuously box on the File View tab of the Preferences window.

Graph Window

The Graph window gives a graphical interpretation of selected connections made to your Server in the past two minutes. You can control what information appears on the graph 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.

<table>
<thead>
<tr>
<th>Type</th>
<th>Domain Name</th>
<th>File</th>
</tr>
</thead>
<tbody>
<tr>
<td>Player</td>
<td>204.225.154.188</td>
<td>webmaster.ri</td>
</tr>
<tr>
<td>Player</td>
<td>204.225.154.188</td>
<td>webmaster.ri</td>
</tr>
<tr>
<td>Monitor</td>
<td>204.225.154.188</td>
<td></td>
</tr>
</tbody>
</table>

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, you can also 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 make an Internet connection to the links on your Web page. When the connection is made, open the Statistics window for RealAudio Player to monitor the percentage of packet loss that is occurring. If the audio quality is poor, it is likely that your users are experiencing the same.

If you determine that there is a level of high 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 77.

The following questions can help diagnose and isolate 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 14.
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, see RealAudio Content Creation Guide.

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 38.

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

http://www.realaudio.com/help
Appendix A - Access and Error Log Messages

RealAudio Server writes important status information to the access and server log files. This appendix 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 77.

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:

\[
<\text{IP_address}> \quad \leftarrow \rightarrow \quad <\text{timestamp}> \quad <\text{GET filename}> \quad <\text{protocol}> \quad <\text{return_code}> \quad <\text{bytes_sent}> \\
[<\text{client_ID_string}>] \quad <\text{stat1}> \quad <\text{stat2}> \quad <\text{file_size}> \quad <\text{file_time}> \quad <\text{sent_time}> \quad <\text{resends}> \quad <\text{failed_resends}>
\]

Where:

\[
<\text{IP_address}> \quad \text{IP address of Client.}
\]
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:


<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:

\[ <\text{platform}>_<\text{version}>_<\text{player}>_<\text{type}>_<\text{dist}>_<\text{language}>_<\text{CPU}> \]

Where:

- \(<\text{platform}>\) is the operating system that RealAudio Player is running on—Win16, WinNT, Mac, and so on.
- \(<\text{version}>\) is the operating system version number.
- \(<\text{player}>\) is the version number of RealAudio Player.
- \(<\text{type}>\) is the type of RealAudio Player.
- \(<\text{dist}>\) is the distribution code of RealAudio Player.
- \(<\text{language}>\) is the code of RealAudio Player. EN is US English.
- \(<\text{CPU}>\) 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:

\[ \text{Win95}_4.0.0.19_{-}\text{play32}_{-}\text{PN01}_{-}\text{EN}_{-}586 \]

\textbf{Note 1} RealAudio Player version 1 uses a different ID string in the following format:

\[ <\text{platform}>_{<}\text{player}>\]

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

\[ \text{Win1.0.0} \]

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

\[ \text{splitter} \]

\(<\text{stat1}>\) Connection statistics sent by the Client when it completes playing a clip. These optional fields are sent only when the \textbf{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 information, see “Network Performance Considerations” on page 84.

<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 0 0 0] [Stat2: 15234 15552 0 0 0 0 0 0] 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 0 0 220 28.8 590976 310 310 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 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) : [ErrorMessage]
```

A sample error message looks like this:

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

Note: You can also have RealAudio Server send error messages to your e-mail address. If you did not configure RealAudio to do this during setup, you can do so by editing the following configuration options in the server.cfg file:

- `MailMessageUser`
- `MailMessageSMTPHost`
- `MailUsageThreshold`
- `MailUsagePeriod`
- `MailMessageLimit`
- `MailMessageLevel`

For more information about these configuration settings, see “Appendix C - Configuration Settings” on page 117.

Common Error Messages

The following list of errors are some 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 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.

## 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**
Appendix A - Access and Error Log Messages

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
Appendix A - Access and Error Log Messages

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
Appendix A - Access and Error Log Messages

<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
Appendix B - Command Reference

This appendix 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

RealAudio Content Creation Guide
Appendix B - Command Reference

**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:

<table>
<thead>
<tr>
<th>UNIX platform</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSDI, FreeBSD, LINUX, and SunOS</td>
<td>`ps -aux</td>
</tr>
<tr>
<td>AIX, HP-UX, DEC UNIX, IRIX, and SOLARIS</td>
<td>`ps -ef</td>
</tr>
</tbody>
</table>
**pnserver**

**Name**

*pnserver* - RealAudio Server

**Syntax**

```
```

**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` 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 “Appendix C - Configuration Settings” on page 117.
raconv

Name
raconv - RealAudio bandwidth negotiation file converter

Syntax
raconv [-v] <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.

See Also
“Delivering Highest Quality Supported by Client Using Bandwidth Negotiation” on page 57.
**rafile**

**Name**

*rafile* - RealAudio Live File Creation Utility

**Syntax**

```
```

**Description**

**Rafile** 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 57.

- **-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 57. The default value is set by 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:

```bash
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:

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

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

See Also

RealAudio Content Creation Guide
rasm

Name

rasm - RealAudio command-line System Monitor

Syntax


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 than 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.

\(<\text{time}>\) \(<\text{event}>\) \(<\text{name}>\) \(<\text{filename}>\)

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

### Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>c</td>
<td>Displays the current configuration after it has been gotten using the t command.</td>
</tr>
<tr>
<td>e</td>
<td>Reset peak usage value</td>
</tr>
<tr>
<td>f</td>
<td>Shows count information servers running multiple processes.</td>
</tr>
<tr>
<td>h or ?</td>
<td>Prints a list of commands.</td>
</tr>
<tr>
<td>k</td>
<td>Begins collating hostname information for connected clients by doing reverse DNS lookups on the IP</td>
</tr>
<tr>
<td>Command</td>
<td>Function</td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
</tr>
<tr>
<td>l</td>
<td>Provides the current list of connected clients.</td>
</tr>
<tr>
<td>n</td>
<td>Modify configuration variables.</td>
</tr>
<tr>
<td>o</td>
<td>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.</td>
</tr>
<tr>
<td>r</td>
<td>Forces the Server to reload configuration.</td>
</tr>
<tr>
<td>s</td>
<td>Prints a single line of summarized status information.</td>
</tr>
<tr>
<td>t</td>
<td>Requests configuration information from RealAudio Server.</td>
</tr>
<tr>
<td>u</td>
<td>Continuous display. Updates whenever a client status changes.</td>
</tr>
<tr>
<td>w</td>
<td>Provides information on clustered Servers.</td>
</tr>
<tr>
<td>x</td>
<td>Exit the program.</td>
</tr>
</tbody>
</table>

**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:

\[
\langle\text{client}\rangle \quad \langle\text{name}\rangle
\]

where \(\langle\text{client}\rangle\) is the type of client connected (Monitor or Player), and
\(\langle\text{name}\rangle\) is the domain name or IP address of that client. For example, a
typical display might look like:

\[
\begin{align*}
\text{monitor} & \quad 204.71.154.93 \\
\text{Player} & \quad 204.71.153.24
\end{align*}
\]

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:

\[
\text{rasm} \quad -l<\text{seconds}> \quad <\text{hostname}>[:\text{port}] \quad >> \quad \text{monitor.txt}
\]

where \(\langle\text{seconds}\rangle\) is the number of seconds between reports, \(\langle\text{hostname}\rangle\)
is the host name where your report is located, and \text{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:

\[
\text{rasm} \quad -l 20 \quad -k \quad -i \quad \text{yourServer:7070}
\]
slta

Name

slta - RealAudio simulated live transfer agent

Syntax

slta [-v] [-f config] 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 the 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 needs to connect to RealAudio Server to broadcast the file.

- **inputfile**　The RealAudio file to be converted to a live RealAudio file.

- **URL**　　Specifies the address of the output. Use pnm://host:port to send the output to a RealAudio Server. If you do not include a port number, slta uses port 7070.

- **output**　　Specifies the name of the live stream created by slta.
Example

To play the file \texttt{ford01.ra} as a live file, enter:

\texttt{slta -p fakeit ford01.ra pnm://server.com/car.ra}
Appendix C - Configuration Settings

This appendix 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 44.

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

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<th>Program</th>
<th>Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>pnserver</td>
<td>AudioConnections</td>
</tr>
<tr>
<td></td>
<td>BasePath</td>
</tr>
<tr>
<td></td>
<td>ClusterHost</td>
</tr>
<tr>
<td></td>
<td>ClusterPassword</td>
</tr>
<tr>
<td></td>
<td>ClusterPort</td>
</tr>
<tr>
<td></td>
<td>ConnectControlList</td>
</tr>
<tr>
<td></td>
<td>CustomerName</td>
</tr>
<tr>
<td></td>
<td>DefaultErrorFile</td>
</tr>
<tr>
<td></td>
<td>EncoderPassword</td>
</tr>
<tr>
<td></td>
<td>EncoderTimeout</td>
</tr>
<tr>
<td></td>
<td>ErrorLogPath</td>
</tr>
<tr>
<td></td>
<td>Group</td>
</tr>
<tr>
<td></td>
<td>LicenseKey</td>
</tr>
<tr>
<td></td>
<td>LicenseClients</td>
</tr>
<tr>
<td></td>
<td>LiveFileBandwidthNegotiation</td>
</tr>
<tr>
<td></td>
<td>LiveFilePassword</td>
</tr>
<tr>
<td></td>
<td>LocalHost</td>
</tr>
<tr>
<td></td>
<td>LogPath</td>
</tr>
<tr>
<td></td>
<td>LoggingStyle</td>
</tr>
<tr>
<td></td>
<td>MailMessageLevel</td>
</tr>
<tr>
<td></td>
<td>MailMessageLimit</td>
</tr>
<tr>
<td></td>
<td>MailMessageSMTPHost</td>
</tr>
<tr>
<td>Program</td>
<td>Settings</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td></td>
<td>MailMessageUser</td>
</tr>
<tr>
<td></td>
<td>MailUsageCC</td>
</tr>
<tr>
<td></td>
<td>MailUsagePeriod</td>
</tr>
<tr>
<td></td>
<td>MailUsageThreshold</td>
</tr>
<tr>
<td></td>
<td>MaxBandwidth</td>
</tr>
<tr>
<td></td>
<td>MaxThreads</td>
</tr>
<tr>
<td></td>
<td>MinPlayerProtocol</td>
</tr>
<tr>
<td></td>
<td>MonitorConnections</td>
</tr>
<tr>
<td></td>
<td>MonitorPassword</td>
</tr>
<tr>
<td></td>
<td>MulticastAddressList</td>
</tr>
<tr>
<td></td>
<td>MulticastControlList</td>
</tr>
<tr>
<td></td>
<td>MulticastTTL</td>
</tr>
<tr>
<td></td>
<td>PnaPort</td>
</tr>
<tr>
<td></td>
<td>PidPath</td>
</tr>
<tr>
<td></td>
<td>RemoteLicenseHost</td>
</tr>
<tr>
<td></td>
<td>RemoteLicensePort</td>
</tr>
<tr>
<td></td>
<td>ResolverPort</td>
</tr>
<tr>
<td></td>
<td>SourceControlList</td>
</tr>
<tr>
<td></td>
<td>SplitterBufferDelay</td>
</tr>
<tr>
<td></td>
<td>SplitterControlList</td>
</tr>
<tr>
<td></td>
<td>StatsMask</td>
</tr>
<tr>
<td></td>
<td>Timeout</td>
</tr>
<tr>
<td></td>
<td>UserDir</td>
</tr>
<tr>
<td></td>
<td>UserList</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>slta</td>
<td>InputFile</td>
</tr>
<tr>
<td></td>
<td>OutputFile</td>
</tr>
<tr>
<td></td>
<td>ServerHost</td>
</tr>
<tr>
<td></td>
<td>ServerPassword</td>
</tr>
<tr>
<td></td>
<td>ServerPort</td>
</tr>
<tr>
<td></td>
<td>User</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>rafile</td>
<td>BandwidthEncoding</td>
</tr>
<tr>
<td></td>
<td>LiveFileBandwidthNegotiation</td>
</tr>
<tr>
<td></td>
<td>LiveFileSize</td>
</tr>
<tr>
<td></td>
<td>LiveFileTarget</td>
</tr>
<tr>
<td></td>
<td>LiveFileTime</td>
</tr>
<tr>
<td></td>
<td>URL</td>
</tr>
</tbody>
</table>
### Appendix C - Configuration Settings

<table>
<thead>
<tr>
<th>Program</th>
<th>Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>rasm</td>
<td>MonitorPassword</td>
</tr>
</tbody>
</table>
AudioConnections

Maximum number of simultaneous audio connections.

For Servers in a cluster, the AudioConnections parameter enables load balancing within the cluster. See “Clustering Computers into a Single RealAudio Server” on page 50.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>Licensed number of streams</td>
</tr>
<tr>
<td>Range of values</td>
<td>0, 1 to licensed number of streams</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The maximum number of simultaneous audio connections your RealAudio Server can support is determined by the license you purchase. This entry lets you set a limit less than or equal to this number. To specify a lower 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 Internet connection supports. If the AudioConnections entry is missing, RealAudio Server allows 10 connections or the number of streams you purchased, whichever is less.

The special value 0 means the maximum number of streams allowed by your license.

**Examples:**

```
AudioConnections 20
```

Allows no more than 20 simultaneous connections.

```
AudioConnections 0
```

Allows the maximum number of simultaneous connections.
BandwidthEncoding

Specifies the default bandwidth for archive files of live broadcasts.

<table>
<thead>
<tr>
<th>Used by</th>
<th>rafile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>None</td>
</tr>
<tr>
<td>Range of values</td>
<td>14_4.18, dnet.20, dnet.25, 28_8.36, dnet.50, dnet.100</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

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

```
BandwidthEncoding <value>
```

For more information, see “rafile” on page 109.

**Example**

```
BandwidthEncoding dnet.20
```

BasePath

Path to root directory of your RealAudio files.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>rafiles</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid directory names</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

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 please see “Delivering Highest Quality Supported by Client Using Bandwidth Negotiation” on page 57 and RealAudio Content Creation Guide.

Example

```
BasePath /pnserver/rafiles
```

ClusterHost

Name of computer controlling the cluster of RealAudio Servers.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid computer names</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid alpha-numeric strings</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>
Appendix C - Configuration Settings

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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnservice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid port numbers</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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

Example

ClusterPort 7072

ConnectControlList

List of domain names that are allowed to access RealAudio Server. To use this setting, you must purchase domain control as part of your RealAudio Server license.

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.
<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid DNS names and IP addresses</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

**ConnectControlList** `{{<address>, <net mask>}, ...}`

where

- **address** is the domain address of the 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 **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 or your organization’s name.
For your RealAudio Server to function, you must enter this setting and the LicenseKey setting. You must enter the exact information or RealAudio Server will not operate.

CustomerName <licensename>

If you downloaded your software, licensename is in the e-mail that gives you access to the download URL. If you purchased your software on CD-ROM, licensename is provided. If you purchase a new or upgraded license you must re-enter this information for the new license to take effect.

Example

CustomerName WorldJam, Inc.

DefaultErrorFile

Audio file to play when a file is inaccessible.

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 needed by a RealAudio Encoder to connect to RealAudio Server.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Alpha-numeric string without spaces</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>30</td>
</tr>
</tbody>
</table>
Appendix C - Configuration Settings

<table>
<thead>
<tr>
<th>Range of values</th>
<th>1 - 32767 seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>pnerror.log</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid file name</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

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
```

**InputFile**

The path of a file to convert to a live file.
By default, slta uses this setting unless overridden by a filename on the command line. The file can be located on any computer accessible on the network.

**InputFile <filename>**

For more information, see “slta” on page 115.

**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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>N/A</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

**LicenseClients** [{<host>:<port>,<streams>},...]

where

- **host** is the name of a license client
- **port** is the number of the port the license client has connected to the remote license server
**Appendix C - Configuration Settings**

*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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>Default license allows two streams</td>
</tr>
<tr>
<td>Range of values</td>
<td>N/A</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>yes</td>
</tr>
</tbody>
</table>

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.
By default, `rafie` uses this setting unless overridden with the `-b` option.

```
LiveFileBandwidthNegotiation <value>
```

For more information, see “rafie” on page 109.

**Example**

```
LiveFileBandwidthNegotiation TRUE
```

### LiveFilePassword

Password used by `rafie` applications to connect to RealAudio Server.

<table>
<thead>
<tr>
<th>Used by</th>
<th><code>rafie</code></th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>alpha-numeric string without spaces</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>no</td>
</tr>
</tbody>
</table>

```
LiveFilePassword <password>
```

For information on `rafie`, see “rafie” on page 109.

**Example**

```
LiveFilePassword raBroadcast1
```
Appendix C - Configuration Settings

LiveFileSize

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

<table>
<thead>
<tr>
<th>Used by</th>
<th><code>rafile</code></th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>0</td>
</tr>
<tr>
<td>Range of values</td>
<td>Whole numbers greater than or equal to zero</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

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

```
LiveFileSize <value>
```

For information on `rafile`, see “`rafile`” on page 109.

**Example**

```
LiveFileSize 5
```

LiveFileTarget

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

<table>
<thead>
<tr>
<th>Used by</th>
<th><code>rafile</code></th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid file name</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

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 listed in the URL setting to name files. If it is a filename, it creates files in the directory named in the
URL setting. In either case, it appends numbers to the archive files, starting at 0. For information on `rafile`, see “rafile” on page 109.

**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.

<table>
<thead>
<tr>
<th>Used by</th>
<th><code>rafile</code></th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>0</td>
</tr>
<tr>
<td>Range of values</td>
<td>Whole numbers greater than or equal to zero and letters d, h, and m.</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

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

```
LiveFileTime <value>
```

Specify time as a number and letter--1m for one minute, 1h for one hour, and 1d for one day. For information on `rafile`, see “rafile” on page 109.

**Example**

```
LiveFileTime 1h
```

## LocalHost

Fully-qualified domain name that overrides the system default domain name.
LocalHost

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.mycompany.com
```

LogPath

Path and file name of the access log file.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default</td>
<td>access.log</td>
</tr>
<tr>
<td>Range of</td>
<td>Valid filename</td>
</tr>
<tr>
<td>values</td>
<td></td>
</tr>
<tr>
<td>Restart</td>
<td>No</td>
</tr>
<tr>
<td>Server</td>
<td>after</td>
</tr>
<tr>
<td>change</td>
<td></td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>0</td>
</tr>
<tr>
<td>Range of values</td>
<td>0, 1</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

```
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 77 and “Appendix A - Access and Error Log Messages” on page 87.

**Example**

```
LoggingStyle 1
```

Appendix C - Configuration Settings

**MailMessageLevel**

Specifies the severity of error messages that are e-mailed to the system administrator.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Info, warning, error</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

`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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>5</td>
</tr>
<tr>
<td>Range of values</td>
<td>Whole numbers greater than or equal to 0</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

`MailMessageLimit number`
Example

MailMessageLimit 3

MailMessageSMTPHost

The e-mail server that RealAudio Server uses to send system error messages.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid DNS name or IP address</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

MailMessageSMTPHost <address>

Example

MailMessageSMTPHost mail.mycorp.com

MailMessageUser

The e-mail address of the system administrator to receive system error messages.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid e-mail address</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

MailMessageUser <address>

Example

MailMessageUser sysadmin@mycorp.com
Appendix C - Configuration Settings

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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td><a href="mailto:sales@prognet.com">sales@prognet.com</a></td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid e-mail address</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>24</td>
</tr>
<tr>
<td>Range of values</td>
<td>Positive whole numbers</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>80</td>
</tr>
<tr>
<td>Range of values</td>
<td>1 to 100</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>no</td>
</tr>
</tbody>
</table>

MailUsageThreshold <percent>

Example

MailUsageThreshold 85

MaxBandwidth

Maximum bandwidth, in Kbps, that a RealAudio Server can use.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>0</td>
</tr>
<tr>
<td>Range of values</td>
<td>Positive whole numbers</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

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.
Appendix C - Configuration Settings

MaxThreads

Maximum number of threads, or processes, used by RealAudio Server.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>1</td>
</tr>
<tr>
<td>Range of values</td>
<td>Whole numbers greater than zero</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>0</td>
</tr>
<tr>
<td>Range of values</td>
<td>4 or higher</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

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>
```
The default value of 0 means all players can connect.

**Example**

```
MinPlayerProtocol 2
```

### MonitorConnections

Maximum number of System Manager sessions that can connect to RealAudio Server.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>4</td>
</tr>
<tr>
<td>Range of values</td>
<td>Whole number greater than or equal to zero</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver, rasm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnsrv</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid IP addresses</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnservice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid DNS names and IP addresses</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

**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}]
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.

The following are the standard TTL values and their meanings:

<table>
<thead>
<tr>
<th>TTL Value</th>
<th>Keep Packets Within</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 or 1</td>
<td>Local host</td>
</tr>
<tr>
<td>16</td>
<td>Site</td>
</tr>
<tr>
<td>63</td>
<td>Region</td>
</tr>
<tr>
<td>127-255</td>
<td>World</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>16</td>
</tr>
<tr>
<td>Range of values</td>
<td>0 - 255</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>slta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid RealAudio file name</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

**slta** uses this setting unless overridden by a filename on the command line.

**OutputFile** `<filename>`

For more information, see “slta” on page 115.

**Example**

```
OutputFile broadcast.ra
```

**PnaPort**

Number of the TCP port the RealAudio Server uses for receiving requests from clients.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pns<strong>erver</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>7070</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid port number</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**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.
Appendix C - Configuration Settings

Example

**PnaPort** 7074

### PidPath (UNIX Only)

File used by RealAudio Server for UNIX to record its process ID.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>pnserver.pid</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid file name</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid host name</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>Yes</td>
</tr>
</tbody>
</table>
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
RemoteLicenseHost 100.62

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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>7071</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid port number</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
</table>
Appendix C - Configuration Settings

### ResolverPort

<table>
<thead>
<tr>
<th>Default value</th>
<th>8080</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range of values</td>
<td>Valid port number</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

**Example**

```
ResolverPort 8081
```

### ServerHost

Name of a RealAudio Server to receive the live file.

<table>
<thead>
<tr>
<th>Used by</th>
<th>slta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid DNS name</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>N/A</td>
</tr>
</tbody>
</table>

The `slta` utility uses this setting unless overridden by a host name on the command line.

**Example**

```
ServerHost /usr/cnfn/show1.ra
```

### ServerPassword

Password that `slta` must use to connect to RealAudio Server.

<table>
<thead>
<tr>
<th>Used by</th>
<th>slta</th>
</tr>
</thead>
</table>
**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.

```
ServerPassword <password>
```

For more information, see “slta” on page 115 and *RealAudio Content Creation Guide*.

**Example**

```
ServerPassword StreamKey1
```

**ServerPort**

Number of port on the RealAudio Server to receive the live file from **slta**.

<table>
<thead>
<tr>
<th>Used by</th>
<th><strong>slta</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid port number</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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 115.

**Example**

```
ServerPort 8081
```
SourceControlList

List of source servers and streams accepted by RealAudio Server acting as a splitter. Full and partial URLs are accepted; partial URLs act as wildcards.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>If not specified, all sources are accepted</td>
</tr>
<tr>
<td>Range of values</td>
<td>URLs separated by commas</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>no</td>
</tr>
</tbody>
</table>

If you specify any value, then only the specified URLs are accepted.

SourceControlList [ <URL>, <URL>, ... ]

Example


SplitterBufferDelay

Amount of audio, in seconds, to store in the TCP buffer. To use this setting, you must purchase splitting as part of your RealAudio Server license.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>0</td>
</tr>
<tr>
<td>Range of values</td>
<td>positive whole numbers</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>no</td>
</tr>
</tbody>
</table>

If you are experiencing problems with a splitter connection, try specifying a splitter buffer. Buffering helps smooth out packets loses over a splitter connection.
\texttt{SplitterBufferDelay <time>}

**Example**

\texttt{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 \texttt{SplitterControlList} to enable splitters on your intranet to access your RealAudio Server.

<table>
<thead>
<tr>
<th>Used by</th>
<th>\texttt{pnserver}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid DNS names and IP</td>
</tr>
<tr>
<td></td>
<td>addresses</td>
</tr>
<tr>
<td>Restart Server after</td>
<td>No</td>
</tr>
<tr>
<td>change</td>
<td></td>
</tr>
</tbody>
</table>

\texttt{SplitterControlList [{<address>, <net mask>}, ...]}

where:

\texttt{address} is the domain address of the splitter computer allowed to access RealAudio Server.

\texttt{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:

```bash
SplitterControlList [(0.0.0.0, 255.255.255.255)]
```

**Example**

```bash
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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>0</td>
</tr>
<tr>
<td>Range of values</td>
<td>0 - 3</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

**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 77 and “Appendix A - Access and Error Log Messages” on page 87.

**Example:**

```
StatsMask 3
```

## Timeout

Number of seconds to wait before disconnecting an inactive RealAudio Player.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>300 seconds</td>
</tr>
<tr>
<td>Range of values</td>
<td>120-900</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>rafile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
</tbody>
</table>
Appendix C - Configuration Settings

### 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 109.

**Example**

```
URL pnm://server:7071/live1.ra
```

### User

**Group**

Default user and group ID for RealAudio Server for UNIX.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid user and group names</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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.

**Example**

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

```
Example
User DanW
Group CorpComm
```
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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>Valid path name</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>No</td>
</tr>
</tbody>
</table>

**UserDir <string>**

If no UserDir is specified then RealAudio Server looks for RealAudio files in the path specified in the UserList entry.

**Example**

```plaintext
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.

<table>
<thead>
<tr>
<th>Used by</th>
<th>pnserver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default value</td>
<td>(none)</td>
</tr>
<tr>
<td>Range of values</td>
<td>N/A</td>
</tr>
<tr>
<td>Restart Server after change</td>
<td>no</td>
</tr>
</tbody>
</table>
This field is used to create RealAudio Server Hosting.

**UserList**

```
[ {Accnt1, privateRApath, minStreams, maxStreams},
  {Accnt2, privateRApath, minStreams, maxStreams},
  {Accnt1, 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 54.

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 56.

**Example**

```
UserList
[{"~*, /usr/persacct/, 1, 2},
 {ElectroMotors, /usr/electro/ra, 2, 5},
 {CityWeld, /usr/cityweld/ra, 1, 3}]```
Glossary

Here are some terms used in this manual, along with their definitions:

- **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. Metafiles are described in further detail in RealAudio Content Creation Guide.
- **pnm**: Progressive Networks Media. The protocol RealAudio Server uses to deliver stream data over a network.
- **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.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>streams</td>
<td>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:</td>
</tr>
<tr>
<td></td>
<td>• The type of RealAudio Server you have licensed (your license key lets you use a given maximum number of streams).</td>
</tr>
<tr>
<td></td>
<td>• The bandwidth between your server and the client (the amount of bandwidth needed by each audio stream depends on the encoding algorithm).</td>
</tr>
<tr>
<td>.ra files</td>
<td>RealAudio files have the .ra filename extension.</td>
</tr>
<tr>
<td>.ram files</td>
<td>Metafiles for use with the RealAudio helper application have the .ram filename extension.</td>
</tr>
<tr>
<td>.rpm</td>
<td>Metafiles for use with the RealAudio Plug-in have the .rpm filename extension.</td>
</tr>
</tbody>
</table>
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<td></td>
</tr>
<tr>
<td>installing RealAudio Server from Internet, 20</td>
<td></td>
</tr>
</tbody>
</table>