

**RealAudio<sup>®</sup> and RealVideo<sup>®</sup>**  
**Content Creation**  
**Guide**  
**Version 5.0**

RealNetworks, Inc.

Information in this document is subject to change without notice. Companies, names, and data used in examples herein are fictitious unless otherwise noted. No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without the express written permission of RealNetworks, Inc.

© 1995-1997 RealNetworks, Inc. All rights reserved.

RealAudio and RealAudio logo are registered trademarks of RealNetworks, Inc.

RealVideo and the Real logo are trademarks of RealNetworks, Inc.

PowerPC is a trademark of IBM Corporation.

Adobe Premiere is a trademark of Adobe Systems, Inc.

Apple and Macintosh are trademarks of Apple Computer, Inc.

DolbyNet is a trademark of Dolby Laboratories, Inc.

Dolby Digital AC-3 audio system manufactured under license from Dolby Laboratories Licensing Corporation.

Macromedia is a registered trademark and Shockwave is a trademark of Macromedia, Inc.

Netscape Netsite is a trademark of Netscape Communications Corp.

O'Reilly Website NT is a trademark of O'Reilly Associates, Inc.

Sonic Foundry and Sound Forge are trademarks of Sonic Foundry, Inc.

SunOS and Solaris are trademarks of Sun Microsystems, Inc.

UNIX is a registered trade mark of X/Open Company Limited.

Windows and Windows NT are trademarks of Microsoft Corp.

SE100 is a trademark of Creative Labs

Wakeboard Multimedia Pro is a trademark of Digital Video Arts

CD30 is a trademark of Miro

Bravado 1000 is a trademark of Truevision

Osprey 100 and Osprey 1000 are trademarks of Multimedia Access

Seagate AV drives is a trademark of Seagate

Sipro is a trademark of Sipro Lab Telecom, Inc.

RealNetworks, Inc.  
1111 Third Avenue, Suite 2900  
Seattle, WA 98101 USA  
[www.real.com](http://www.real.com)

Printed in the United States of America.

# Contents

Introduction .....	5
Streaming and Real-Time Delivery.....	5
Performance Range .....	5
Content Sources .....	6
Web Page Creation and Publishing.....	6
Using this Guide .....	7
Overview .....	9
RealAudio and RealVideo Clips .....	9
Components of a RealAudio and RealVideo System .....	9
RealAudio and RealVideo Files and Metafiles .....	11
Delivering Synchronized Multimedia .....	14
Static Encoding.....	15
Modifying RealAudio and RealVideo Clips .....	15
Live Encoding and Live Broadcasting .....	16
Title, Author, and Copyright .....	16
Installing RealEncoder and RealPublisher on Windows Platform.....	17
System Requirements.....	21
Windows 95 and Windows NT System Requirements.....	22
Macintosh Requirements .....	26
Using RealEncoder and RealPublisher .....	27
Bandwidth.....	28
Encoding Templates.....	28
Source Files for Static Encoding.....	28
Using Templates .....	39
RealEncoder Plug-in for Adobe Premiere .....	44
Encoding RealAudio or RealVideo Files.....	45
Creating Templates .....	50
Synchronized Multimedia .....	55
Creating a RealVideo Events File .....	55
Using Synchronized Multimedia with Bandwidth Negotiation.....	58
Frames: The Basics .....	58
Editing Video Files .....	59
Editing Input Files .....	59

Editing RealVideo Files in Windows .....	59
Command Line Editing of RealVideo Files.....	64
Image Maps .....	73
Modifying RealVideo File Descriptions .....	77
Bandwidth Negotiation .....	78
Creating Files with the Bandwidth Negotiation Option.....	78
Bandwidth File Organization .....	79
Bandwidth Negotiation Example .....	89
Publishing Your Pages to the Web .....	91
Creating Web Pages (HTML) .....	91
Automatic creation of metafiles .....	93
Publishing your files.....	93
Live Broadcasting .....	98
Advertising Your Event.....	99
Delivering Live Content.....	101
Setting Up RealServer .....	101
EncoderPassword .....	102
EncoderTimeout.....	103
RealAudio and RealVideo Live Broadcasts.....	104
Simulating a Live Broadcast .....	112
Simulated Live Broadcast.....	112
Configuring Your Web Site .....	113
Making the Most of Your Content .....	113
Metafiles .....	114
HTTP Streaming .....	117
Custom Controls for RealAudio and RealVideo.....	119
Synchronized Multimedia .....	136
Creating a RealVideo Events File .....	136
Creating a RealAudio Events File.....	138
Using Synchronized Multimedia with Bandwidth Negotiation.....	141
Frames: The Basics .....	141
RealAudio and RealVideo Content Creation for Internet Appliances and Set-top Boxes ....	143
Index .....	145

# Introduction

Real System is today's most powerful solution for streaming real-time live and on-demand audio and video over the Internet and corporate intranets. This guide explains how to create and manage content for a RealAudio® and RealVideo® System using either RealEncoder or RealPublisher.

## Streaming and Real-Time Delivery

RealSystem enables streaming audio and video for reliable transmission under real-life conditions. Streaming is the latest technology for audio and video available and allows the audio or video clip to play as soon as it starts being received by your computer. Real-time delivery means that you do not have to wait while a file downloads; the clip plays as soon as your computer starts to receive it. You also have complete control over the clip; you can pause, move forward and back, and start or stop at any time.

## Performance Range

With RealEncoder and RealPublisher you can choose to deliver a range of performance through ordinary modem connections all the way to corporate Intranet LANs. You can also maximize the available bandwidth to meet the demands of the content, for example, a music video requires different emphasis than a simple speech.

RealAudio and RealVideo formats are optimized for low-to-high speed connections including 14.4 and 28.8 Kbps modems, ISDN, T1 and LAN. You can also listen or view RealAudio and RealVideo files stored locally on your computer.

## Content Sources

You can acquire content from a variety of sources:

- pre-existing audio and video files, for example, .wav for audio and .avi and .mov for video
- pre-recorded or live content from audio and video devices, such as cameras, microphones, audiotape, videotape, or satellite feeds.

RealEncoder and RealPublisher create on-demand content that users can access whenever they choose and can be created in all screen sizes. It can be played from standard web servers or from RealServer streaming media servers for higher reliability. Live audio and video require a RealServer streaming media server.

## Web Page Creation and Publishing

In addition to the features found in RealEncoder, RealPublisher offers new web publishing features:

- automatic HTML page creation
- easy uploading of HTML pages to your web server with the click of a few buttons

Web page creation and publishing can be accomplished using the step-by-step wizards included in Real Publisher. RealPublisher also provides options for display of your RealAudio or RealVideo clip on your web page.

## Using this Guide

*ReaAudio and RealVideo Content Creation Guide* is intended for people who are familiar with operating World Wide Web servers and with RealNetworks technology. You do not need previous experience using RealEncoder or RealPublisher, but you do need to know how to create directories or folders, copy files, and open text files.

## Organization

This manual is organized in two sections:

### Section 1: Overview

Explains the components and features of a RealAudio and RealVideo System. Diagrams show the relationships between client and server for video and multimedia delivery.

### Section 2: Content Creation

Explains how to create and manage video and multimedia content for delivery by RealServer and a Web server. The chapters are:

**Installing RealEncoder/RealPublisher :** Explains how to install RealEncoder/RealPublisher .

**Using RealAudio and RealVideo Files:** Information about how to prepare files for encoding, which encoding setting to use and how to encode static and live files using RealEncoder, RealPublisher or Adobe Premiere.

**Delivering Live Content:** Explains how to deliver live video, including setting up RealServer streaming media server and advertising your event on the Timecase Web site.

**Synchronized Multimedia:** Discusses how to create a synchronized multimedia presentation.

**Editing RealAudio and RealVideo Files:** Explains how to use editing tools to change the static information in a file, alter the data, and examine the contents of a file.

**Publishing Your Files to the Web:** Discusses how to generate HTML pages and publish your web page and RealAudio and RealVideo files to a standard HTTP Web server or a RealServer.

**Managing Content on RealServer:** Detailed instructions and examples of how to use bandwidth negotiation.

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

## Conventions

This manual uses the following conventions:

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



# Overview

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

## RealAudio and RealVideo Clips

A RealAudio or RealVideo clip is a file or live broadcast containing sound and video encoded in RealAudio and RealVideo formats. These formats are highly compressed to deliver the best possible sound and video over a limited-bandwidth connection. Your audio and video can be stored for later use, broadcast live over a network, or simultaneously stored as a file for later use while it's being broadcast live.

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

## Components of a RealAudio and RealVideo System

**RealAudio and RealVideo** use a client-server system. The server provides the content to the client over a network. The basic components of a RealAudio and RealVideo System are:

**RealPlayer** - The client program that enables users to see and listen to RealAudio and RealVideo clips. Special purpose player components enable ActiveX and Netscape Plug-in capabilities.

**RealEncoder/RealPublisher** - The program that creates RealAudio and RealVideo clips. The input to this program can be a digitized audio clip, a live audio signal, a digitized video clip or a live video signal.

**RealMedia Tools** - The tools programs that can be used to modify RealAudio and Video clips, including RMTTools, RMMerge, RMCut, RMEdit, RMPaste and RM Dump.

**RealServer** - The server program that delivers RealAudio and RealVideo clips over a network. One RealServerstreaming media streamer can deliver clips to many Players at the same time.

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

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

## RealAudio and RealVideo Files and Metafiles

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

**RealAudio (.ra) clip** - Audio encoded clip. This file is created with the RealAudio Encoder.

**RealMedia clip (.rm)** - Audio or video encoded to RealAudio and RealVideo formats. Files created with RealEncoder or RealPublisher and delivered by the RealServer can contain multiple streams, including audio, video, image maps, and events. Video files can contain audio and video or video only and can be played with RealPlayer .. Audio only files can be played by RealPlayer.

**RealMedia metafile (.ram)** -. The metafile contains the URL of one or more RealAudio (.ra) and RealVideo (.rm) files located on a RealServer streaming media server. The file that is used as an alias or pointer on a Web page to one or more RealAudio or RealVideo clips. The metafile is typically located on a Web server and is linked on a Web page.

**RealPlayer Plug-in metafile (.rpm)** - The same as a metafile, but used with RealPlayer Plug-in for Netscape Navigator and Internet Explorer 3.0 and later. **RealAudio Event (.rae)** The event file is used in synchronized multimedia. It is created with one of several event compiler utilities which comes bundled with the RealAudio and RealVideo Encoders.

### Windows

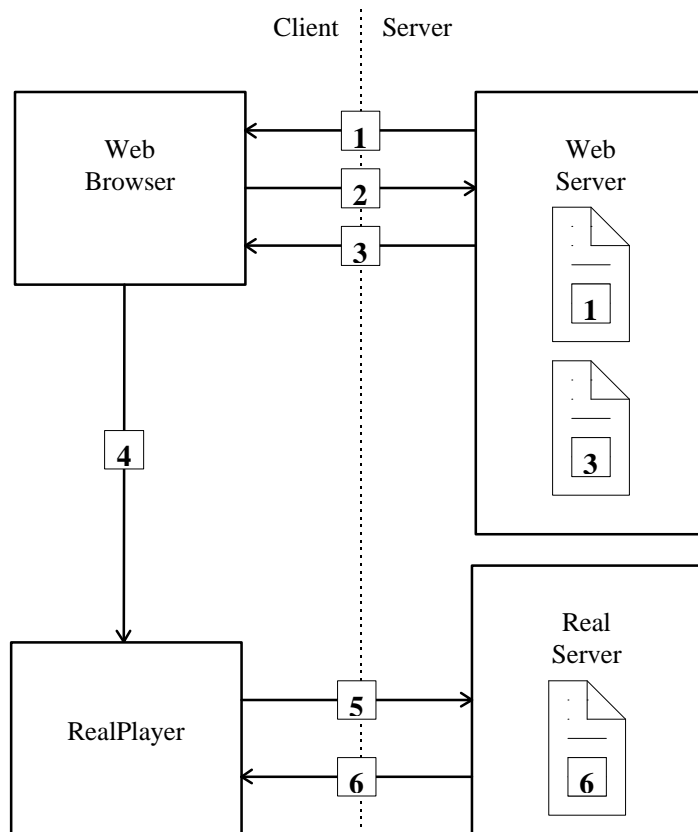
The 3.0 Encoder events compiler is "Cevent32.exe." The 4.0 and 5.0 RealVideo Encoder's compiler is built into the Rmmerge utility.

### Macintosh

The 3.0 RealAudio Static Encoder Events Compiler is "Ra Event Compiler."  
The 4.0 and 5.0 RealVideo Encoder

Delivering a RealAudio or RealVideo Clip

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



RealAudio and RealVideo Delivery System

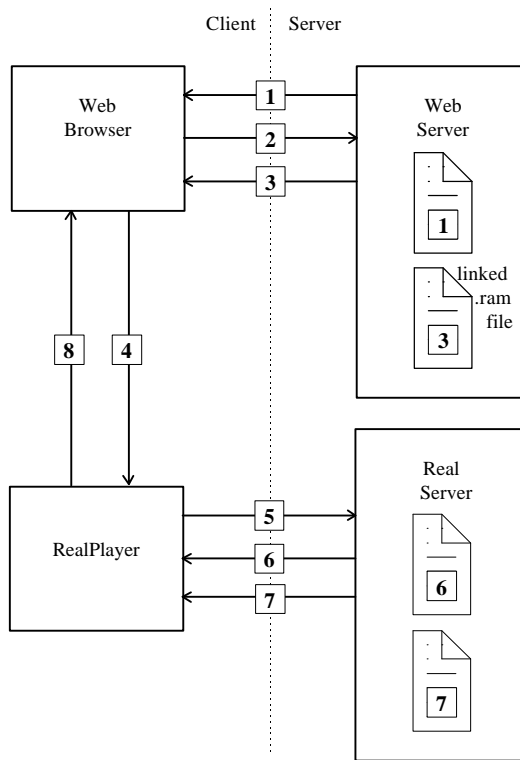
1. The Web browser displays a Web page that contains a link to a metafile.
2. The user clicks the link. The Web browser requests the metafile from the Web Server.
3. The Web server delivers a metafile to the Web browser.
4. The Web browser looks up the MIME type of metafile. Based on the MIME type, the Web browser starts RealPlayer as a helper application and passes it the metafile.
5. RealPlayer reads the first URL from the metafile and requests it from RealServer streaming media server.
6. RealServer begins streaming the requested RealAudio or RealVideo clip to RealPlayer.

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

## Delivering Synchronized Multimedia

Synchronized Multimedia delivery works like regular RealAudio or RealVideo delivery, with one extra step between RealPlayer and the Web browser.

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



Media Delivery System

1. The Web browser displays a Web page that contains a link to a metafile.
2. The user clicks on the link. The Web browser requests the metafile from the Web Server.

3. The Web server delivers a metafile to the Web browser.
4. The Web browser looks up the MIME type of metafile. Based on the MIME type, the Web browser starts RealPlayer as a helper application and passes it the metafile.
5. RealPlayer reads the first URL from the metafile and requests it from RealServer.
6. RealServer begins streaming the requested RealAudio or RealVideo clip to RealPlayer.
7. RealServer concurrently notifies RealPlayer via an event file (.rae) when an event should occur. For more information see the chapter on “Synchronized Multimedia”.
8. RealPlayer sends the URL for the event to the default Web browser for viewing.

## Static Encoding

RealAudio and RealVideo clips may be created from previously captured digital audio or video files. With static encoding, these files are compressed and are converted to RealAudio and RealVideo formats.

## Modifying RealAudio and RealVideo Clips

When you encode a RealAudio or RealVideo clip, both RealEncoder and RealPublisher create a new file with a .rm file extension. The original file is not modified. Encoding a RealAudio or RealVideo clip is a one-way process; you cannot convert a RealAudio and RealVideo file back into the original source format. If you want to be able to encode other formats in the future, you need to archive the original source.

It is possible to modify some attributes of RealAudio and RealVideo clips without re-encoding them, such as Title, Author and Copyright and enabling or disabling PerfectPlay and Selective Record

## Live Encoding and Live Broadcasting

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

RealEncoder and RealPublisher for Windows can encode a live input source. RealEncoder for the Macintosh cannot encode a live input source, and RealPublisher does not support Macintosh.

Live broadcasting requires a license and a RealServer streaming media server.

## Title, Author, and Copyright

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

You enter the title, author, and copyright text when encoding a clip. You can change this text after encoding by using the metafile. For information on metafiles, refer to the “Configuring Your Web Site” chapter. You can also change the text by using RMEdit and RMTTools.



# Installing RealEncoder and RealPublisher on Windows Platform

Installing RealEncoder and RealPublisher is quick and easy. You can download the RealEncoder or RealPublisher from the RealNetworks Web site or install it from the RealServerCD-ROM. The installation procedure below is for the Windows platform.

## **To download the install program from the Internet:**

1. With a Web browser, download the installer from the RealNetworks Web site:

**<http://www.real.com>**

2. Go to audio and video encoder download pages.
3. When prompted, click the **Save to Disk** button and specify the temporary directory for the installation program. Note where you saved it.
4. In File Manager or Explorer, double-click the icon to activate the automated installation process.

## **To install RealEncoder setup program from CD-ROM:**

1. Insert the CD-ROM into the drive
2. In File Manager or Explorer, double-click **instenc50.exe** in the **\video\encoder\intele-nt** directory of the RealServerCD-ROM to activate the automated installation process.

## **To install RealPublisher setup program from CD-ROM:**

1. Insert the CD-ROM into the drive

2. In File Manager or Explorer, double-click on **instenc50.exe** or **instpub50.exe** in the `\video\encoder\intel-nt` directory of the RealServerCD-ROM to activate the automated installation process.

**To complete the installation of RealEncoder or RealPublisher:**

1. Close any other applications that may be open and click the **Next** button.
2. To accept the terms and conditions for installing RealEncoder or RealPublisher, click the **Next** button.
3. Enter your name, company or organization name, and e-mail address. Then click the **Next** button.
4. To install the encoder into the default directory, click **Next**. If you wish to install the encoder in a different location, click **Browse** and select the directory into which you want to it.
5. If you are installing over an existing RealVideo or RealAudio Encoder for which you have defined custom styles (templates), select **Keep Existing Templates** if you want to preserve the custom styles.
6. To finish the installation, click **Finish**.
7. Click **OK**.

The following files are installed in the RealEncoder/RealPublisher directory (**\\Real\\RVEncode** by default):

<b>File</b>	<b>Description</b>
<b>enclie</b>	An ASCII text file that contains the license agreement for the encoder.
<b>EX-RM.prm</b>	Adobe Premiere plug-in.
<b>graphic.gif</b>	Real logo.
<b>pninet.dll</b>	A dynamic link library used for Internet functions.
<b>pntouch.dll</b>	A dynamic link library used for registration.
<b>pnwebpub.dll</b>	A dynamic link library used for web publishing.
<b>Readme.htm</b>	Information about Encoder installation and operation.
<b>rmcut.exe</b>	A utility that returns a copy of the stream from start to endtime without modifying the original source.
<b>rmdump.exe</b>	A utility used to examine the contents of a RealAudio or RealVideo file.
<b>rmedit.exe</b>	A utility used to modify the title, author, copyright, comment, mime type, or stream name of a RealAudio or RealVideo file.
<b>rmevents.dll</b>	A dynamic link library used by the rmmerge utility.
<b>rmimap.dll</b>	A dynamic link library used by the rmmerge utility.
<b>rmmerge.exe</b>	A utility used to create a Synchronized Multimedia presentation.
<b>rmpaste.exe</b>	A utility used to re-sort from bandwidth to timestamp order.

<b>File</b>	<b>Description</b>
<b>RMTools.exe</b>	GUI for showing stream number and name, mime type, start and endtime of source and destination files.
<b>rvbatch.exe</b>	Lets you run the encoder from a batch file as a command-line tool.
<b>rvencode.exe</b>	The RealEncoder/RealPublisher executable.
<b>rvslta</b>	Simulated Live Transfer Agent.

# System Requirements

This section outlines the basic hardware and software requirements to create RealAudio and RealVideo content. It contains information about the technical specifications for static encoding, used for creating on-demand content and about live encoding which enables real-time live broadcasting.

Real Encoder and RealPublisher compresses high-bandwidth video signals to a low-bandwidth signal. This compression allows for the real-time transmission of clips via the Internet, even over a connection as slow as a 14.4 Kbps modem.

RealAudio content consists of audio only while RealVideo content can consist of audio and video or video only.

RealEncoder is available for:

- Windows 95 and Windows NT (static and live content)
- Macintosh (static content)

RealPublisher is available for:

- Windows 95 and Windows NT (static and live content)

## Windows 95 and Windows NT System Requirements

### Static and Live Encoding RealAudio for Windows 95/NT

Different hardware is required for encoding an audio file and encoding a live audio stream.

<b>Requirement</b>	<b>Minimum</b>	<b>Recommended</b>
CPU	486/66 DX	Pentium 586, 75MHz
RAM	8 MB	8 MB required, 16 MB recommended
Hard Disk space (software)	1 MB	1 MB
Sound Card	Depends on audio codec chosen. See table on p.38 for sampling rates required.	

## Static Encoding RealVideo for Windows 95/NT

<b>Requirement</b>	<b>Minimum</b>	<b>Recommended</b>
CPU	486/66 DX	Pentium 120
RAM	16 MB	64 MB
Hard Disk space (software)	4MB	4 MB
Hard Disk space (data)	500 MB	1 GB
Color Display	16-bit	24 bit (TrueColor)
Video Capture Card	Any quality card	
Sound Card	16-bit sound card	

\*Video and sound cards are needed only for capture-to-file encoding and are not necessary for encoding of pre-existing AVI or QuickTime files. See more information in the “Live Capture-to-File” section of the “Using RealEncoder and RealPublisher” chapter.

## Live Encoding RealVideo for Windows 95/NT

High quality live encoding takes longer and requires greater computing resources than lower quality. Here are the requirements for encoding at low and high frame rates. Slower machines also give reasonable results in Slide Show mode at 1fps or less.

<b>Requirement</b>	<b>Low Frame Rate (less than 2 fps)</b>	<b>High Frame Rate (more than 2 fps)</b>
OS	Windows 95	Windows NT
CPU	Pentium 166 MHz	Dual Pentium 200 MHz
RAM	32 MB	64 MB
Hard Drive	1 GB	1 GB
Color Display	16-bit	24-bit (TrueColor)
Video Capture Card	Any native VFW-capable capture card	Osprey 100, Osprey 1000
Sound card	Any quality audio card	

Capturing video puts a burden on your computer's ability to write to your hard drive. Seagate manufactures special hard drives for capturing video called AV drives. If you do not use one of these special drives, frames may be dropped during the capture process when the hard drive re-calibrates itself periodically. If you experience dropped frames with a standard drive, you can re-capture the video.



The following lists the recommended settings for a variety of different live content types:

<b>Content Type</b>	<b>Total Bit rate</b>	<b>Audio codec</b>	<b>Frames/sec</b>	<b>Quality Setting</b>
General	20 Kbps	6.5 Kbps	2	100
General	20 Kbps	6.5 Kbps	7.5	70
Newscast	20 Kbps	6.5 Kbps	4	100
Newscast	45 Kbps	8.5 Kbps	10	1
Music	20 Kbps	12 Kbps	5	100
Music	45 Kbps	16 Kbps	5	70

**Note:** If you are not getting the desired frame rate, lower the quality setting.

## Macintosh Requirements

For Macintosh users, RealEncoder supports only static encoding for video and audio. It does not support live video or audio encoding. 68K Macintosh computers are also not supported. RealPublisher is not available for Macintosh users.

### Static Encoding RealAudio and RealVideo for the Macintosh

Requirement	Minimum	Recommended
CPU	Any Power PC	604 Power PC
RAM	16 MB	32 MB
Hard Disk space (software)	4 MB	4 MB
Hard Disk space (data)	500 MB	1 GB
Operating System	7.5.5	8.0

**Note:** RAM requirements may be slightly less for RealAudio.

# Using RealEncoder and RealPublisher

This chapter details RealEncoder and RealPublisher operations, including supported input formats, output options, and how to achieve the best possible audio and video quality.

RealEncoder allows two types of encoding:

- static encoding for pre-existing audio and video files (Windows and Macintosh)
- live encoding, for live broadcasting and archival purposes (Windows only)

RealPublisher allows two types of encoding:

- static encoding for pre-existing audio and video files (Windows only)
- live encoding, for live broadcasting and archival purposes (Windows only)

RealEncoder and RealPublisher enable you to compress video files or input from a video device into one or more RealAudio or RealVideo formats. Output can be sent to a file or directly to a RealServer streaming media server for live broadcasting.

You can select input files by browsing from within RealEncoder or RealPublisher, or you can drag-and-drop files for automated processing. The Encoder window displays information about input and output file formats and has fields for entering descriptive information. You can specify options such as the compression type and copyright string to be included in the output file.

Some video editing programs can encode and write files in RealVideo format. For example, a RealEncoder Plug-in is available for Adobe Premiere.

There is a difference between encoding from a live source and broadcasting a live event. Broadcasting from a live source requires a special license purchased with your RealServer streaming media server. For information about serving a live stream refer to the chapter on “Delivering Live Content”.

## Bandwidth

Bandwidth, also known as bit-rate, is the amount of data that can be received by your modem during a set period of time. Bandwidth is measured in kilobits per second (Kbps). Standard modems are commonly referred to by the bit-rate they are able to receive, for example, 14.4, 28.8, and 56K. These designations may already be familiar to you.

In addition to standard bandwidths, you can encode clips for bit-rates up to 500 Kbps. These higher bandwidths, however, are generally more typical of corporate intranets or entertainment-based web sites.

## Encoding Templates

You can select a pre-defined encoding template or design a template specifically for the type of audio or video you are encoding. An encoding template allows you to specify bandwidth options for your content, whether for audio only, video only, or audio and video.

RealEncoder and RealPublisher come with pre-defined templates that enable you to encode your content specifically for your target audience.

## Source Files for Static Encoding

RealAudio and RealVideo clips may be created from previously captured digital audio or video files.

## Video Formats supported by RealEncoder:

### For **Windows**:

- Video for Windows (.avi). RealEncoder accepts compressed or uncompressed formats, although it is recommended you use uncompressed formats whenever possible.
- QuickTime for Windows (.mov) Only uncompressed files are supported.

### For **Macintosh**:

- Quicktime for Macintosh (.mov). Uncompressed files and some compressed files are supported. Compressed files supported are Cinepak files and Apple's Video Compressor. It is recommended, however, you use uncompressed formats whenever possible.

## Audio Formats supported by RealEncoder:

It is recommended that you use uncompressed files whenever possible.

### For **Windows**:

- Waveform (.wav). RealEncoder accept compressed or uncompressed formats, although it is recommended you use uncompressed files.
- QuickTime for Windows (.mov)
- Audio (.au)
- Sound (.snd)

### For **Macintosh**:

- Audio Interchange File (.aif)
- Waveform (.wav)
- QuickTime for Macintosh (.mov)
- Audio (.au)

- Sound (.snd)

## Video formats supported for RealPublisher:

- Video for Windows (.avi). RealPublisher accepts compressed or uncompressed formats, although it is recommended you use uncompressed formats whenever possible.
- QuickTime for Windows (.mov).

The following audio formats are supported by RealPublisher. It is recommended that you use uncompressed files whenever possible:

## Audio formats supported for RealPublisher:

- Waveform (.wav). RealPublisher accepts compressed or uncompressed formats, although it is recommended you use uncompressed files.
- QuickTime for Windows (.mov)
- Audio (.au)
- Sound (.snd)

## AVI Requirements:

- AVI files should have a color depth of 24-bits.
- The standard video frame size for the Internet is 176 x 144, however height and width must both be divisible by 16. Height and width can also be 160 x 120.
- File should be uncompressed for best results.
- Indeo drivers must be installed on your machine for the encoder to be able to open .avi files created with the YUV9 format. The Indeo drivers are available from the Intel web site at [www.indeo.com](http://www.indeo.com). However, if you

captured an AVI on the same machine as RealEncoder and RealPublisher, the encoder typically has no problem opening it.

### **To determine if you have the AVI video codec for a particular AVI file:**

1. Right-click the file name.
2. Click **Properties**.
3. Click **Details** tab. Look at the Video Format field.

If the Video Format field says "Unknown format" most likely the corresponding AVI video codec is not installed.

4. If the Video Format field lists a format, click **Preview** tab. You should be able to view the video in the preview window.

If you can preview the video, and still receive an error when encoding the AVI file, the file may not be in 24-bit color. You can convert the file to 24-bit file using a third-party video editing tool.

### **QuickTime requirements:**

- 24-bit RGB QuickTime video files
- 8- 16-bit mono and stereo audio
- On **Windows** platforms for RealEncoder and RealPublisher, files must be uncompressed.
- On **Macintosh** platforms for RealEncoder only, files can be uncompressed or compressed (Cinepak, Apple's Video Compressor, or Raw), but it is recommended you use compressed files whenever possible.

## Image Size

RealEncoder and RealPublisher support any size image that is divisible by 16. The most common size is 176 x 144 pixels or 320 x 240 pixels. An image size of 160 x 120 is also supported.

## Image cropping

1. To encode only part of the screen, select **Crop Enabled** from the Options menu. To edit the image cropping settings, select **Crop Settings** from the Options menu. The Image Cropping window displays. Notice the crop lines around the image. These lines show the portion of the image that will be encoded. Use **Left**, **Top**, **Width**, and **Height** to adjust the size and location of crop lines.
2. If you need to edit the crop settings, select **Crop Settings** from the Options menu.
3. Click the **Start** button to start the encoding process. When file encoding is complete, an Encoding Complete message appears indicating the bit rate the file was encoded at.

If RealPublisher is unable to encode the file of the selected bit rate, you need to re-encode the file with a different template.

4. View the encoded file with RealPlayer.

## Volume Control

1. Select **Volume Control** from the Options menu. The Volume Control window displays.
2. Select **Properties** from the Options menu. The Properties window displays.
3. Click **Recording** to adjust the input recording volume. (Playback adjusts the level of the volume you hear while you are encoding, not the volume the end-user hears.)



4. Select from the list of volume controls the type of inputs you will be using and click **OK**. The Volume Control window will display the volume controls you select.
5. Select which recording inputs to use by clicking and checking the Select box for each input.
6. Adjust the sound level by moving the sliders up or down. Remember, if the volume is too high, the encoded sound may be clipped and appear distorted. If the volume is too low, it will be difficult to hear. Use the audio level meter in the RealEncoder window to monitor the level during encoding.
7. Close the Recording Control window and return to the RealPublisher or RealEncoder.

Follow previous steps 10-16 only if the audio meter in the RealEncoder or RealPublisher window indicates the input signal is too low.

8. Close the Recording Control window.

## Using the audio level meter

While you encode RealAudio or RealVideo you can monitor the audio input level to be sure you are encoding the optimal dynamic range. Green indicates a normal reading. Red warns that you are close to an over-modulated input. The best sound quality will occur when the top red bar is often lit but the clipping indicator never goes off.

## Producing High Quality Video

To create the best possible streaming audio and video, you must start with the best possible source material. Different video formats yield different qualities when captured or “digitized.” Because RealAudio and RealVideo compression algorithms are lossy, some of the information contained in your original input is not included in the reconstructed signal sent to RealPlayer.

In particular, different video formats yield different qualities when digitized. Additionally, video playback devices commonly have two types of video outputs, S-video and composite. S-video produces better results.

The common video formats in order of quality are:

1. Betacam-sp, also known simply as Beta. This format is common among video production professionals.
2. Laserdisc
3. S-VHS or Super-VHS
4. VHS

Satellite television services (e.g. Direct TV) have extremely high quality video. Their feed quality typically exceeds that of Laserdisc.

## Live Capture-to-File

If you have a real-time capture station, you can use it to capture and compress directly into RealAudio and RealVideo formats. To do this, use the output of a video player and set the encoder to capture-to-file instead of capture-to-a-live-server feed. This has the advantage of eliminating the need to create and store intermediate AVI files which are very large and take considerable disk space. It is also the fastest way to capture content like breaking news clips when time-to-post is important.

## Editing

Limited video editing tools are available with RealEncoder and RealPublisher. You can edit files using the RMTTools utility. Operations include stream cutting, copying, and pasting. You can also edit Title, Author, and Copyright information. For more information, refer to the chapter on “Editing Video Files”. For more advanced editing features the following programs are recommended:

- Adobe Premiere
- In:sync Kohesion

RealEncoder and RealPublisher install an Adobe Premiere plug-in, allowing you to encode directly from Premiere.

## Encoding with Adobe Premiere 4.2

### To encode audio and video files in Adobe Premiere 4.2:

1. Start Adobe Premiere 4.2.
2. Click **Open** from the File menu.
3. Select one of the supported file types. The file appears in the Clip window.
4. Select the Clip window.
5. Click **Export** from the File menu and select **RealEncoder**. The RealEncoder Options window appears (Windows version):
6. In the media options pane, select one of the pre-installed templates. These templates are guidelines for creating content containing both audio and video. You can save your own templates, or delete templates that you do not use. If you delete a template you created yourself, it will be permanently deleted. If you delete a template which was installed by RealEncoder, you can get it back by reinstalling RealEncoder.
7. Once you have selected a template, you can change any of the audio codecs, any of the video codec settings, or the total bit rate.
8. Click **Optimized Frame Rate** or **Fixed Frame Rate**.

For all pre-defined templates, the default setting is Optimized Frame Rate.

- You can select Optimized Frame Rate when using the RealVideo Standard video codec. Optimized Frame Rate provides constant image clarity, or sharpness, and variable frame rates. When this option is selected, the encoder automatically selects the frame rate.

For example, if a person who is talking begins to gesture or move around quickly, the frame rate increases as the motion speeds up and decreases as the motion slows down. The image sharpness remains constant throughout.

- You can select Fixed Frame Rate when using the RealVideo Standard video codec or the RealVideo Fractal video codec. Fixed Frame Rate is adjusted by moving the slider. Fixed Frame Rate gives you the option of choosing to emphasize image clarity or motion smoothness.

For example, if your content contains a lot of motion, set the slider closer to the 15fps setting. The resulting video image will be less clear but will exhibit smoother motion, i.e., more frames per second.

However, if your content has less motion, set the slider closer to the .050fps setting. The resulting video images will be more clear but will exhibit less smooth motion, i.e. fewer frames per second.

9. Click **Save** to save the template.
10. Click **Close** to close the Advanced Settings window.
11. Click **Save** to save the template.
12. Click **Close** to close the Advanced Settings window.
13. In the properties pane, enter the Title, Author, and Copyright information for your output file. These fields are optional.
14. RealPlayer users with low bandwidth modems can experience files encoded for a higher bandwidth by partially downloading audio and video data before beginning playback. If you want to allow this, click **Allow PerfectPlay**. This is the default setting.
15. If you want to allow RealPlayer Plus users to save your clip to disk, click **Allow Selective Record**.
16. In the Marker Options frame, click the appropriate option. Refer to Marker Options for more information.
17. In the destination pane, click **Select** and enter the name of the output file.
18. Click **Encode**. Adobe Premiere begins encoding the file.
19. When the file is encoded, a Status dialog box appears, providing details about the encoded file. Click **OK**.
20. Play the encoded file using RealPlayer.

## Marker Options

Marker options allow you to take advantage of the Marker feature in Adobe Premiere.

- Click **Off** to encode the entire clip regardless of markers. Choosing this option means that you don't have control over which frames get encoded.
- Click **Key Frames** to encode a marked file. Choosing this option will ensure that all frames that are marked are encoded.
- Click **Slide Show Frames** to encode only the marked frames. Choosing this option allows you to create slide shows out of video files and gives you control over exactly which frames you want to use.

To set and clear numbered and unnumbered markers, first activate the “clip”

- You can add unnumbered markers by pressing "+" or "=" while in the clip window.
- You can remove any marker by pressing "c" or "v".

**Note:** The plug-in recognizes both Premiere's numbered (up to 10 available) and unnumbered markers (up to 1000 available).

## Producing High Quality Audio

- Use high quality source files or recording input device.
- If you are not doing a live broadcast, capture or “digitize” the sound to a supported file format such as a .wav, mov, or .aif whenever possible.
- Digitizing the sound before encoding the file allows you to use a sound editor to adjust the amplitude of your signal to maximize the available dynamic range. If you do not adjust the signal, the resulting RealAudio and RealVideo files may sound flat.
- If your original audio file signal exceeds the acceptable amplitude range, the file may “clip.” Clipping can give rise to clicks or pops on playback. If your source file contains a clipped signal, your final RealAudio or RealVideo file will have high-frequency background noise or static.

- Eliminate any DC offset either while recording or later with an audio editor. This removes low frequency noise.
- When encoding live-source audio, you have less opportunity to manipulate your input signal. Be sure that volume levels are prepared and tested.
- Cut any unnecessarily long silences from the beginning or end of the output file to conserve space.

## Encoding with Multiple Audio Codecs

Use a CD quality sampling rate (44.1 kHz), sampling width (16-bit) and two channels when creating an input file that you intend to encode using multiple audio codecs.

## Synchronizing Audio with Video and Preventing Pitch Shifting

To ensure that the audio stays synchronized with video or other time critical media and to prevent pitch shifting in audio resampling, the following sample rates need to be used with the following codecs

<b>Codec</b>	<b>Sampling Rate</b>
14.4	8, 16 or 32 kHz
5 Kbps voice	8, 16, 32 kHz
6.5 Kbps voice	8, 16 or 32 kHz
8.5 Kbps voice	8, 16 or 32 kHz
15.2 Kbps voice	8, 16 or 32 kHz
16 Kbps voice	16 or 32 kHz
8 Kbps music	8, 16 or 32 kHz
12 Kbps music	8, 16 or 32 kHz
16 Kbps music High response	11.025, 22.05 or 44.1 kHz
16 Kbps music Med response	11.025, 22.05 or 44.1 kHz
16 Kbps music Low response	8, 16 or 32 kHz
20 Kbps music stereo	8, 16 or 32 kHz

Codec	Sampling Rate
40 Kbps music mono	11.025*, 22.05 or 44.1 kHz
40 Kbps music stereo	8*, 16 or 32 kHz
80 Kbps music mono	11.025*, 22.05* or 44.1 kHz
80 Kbps music stereo	8*, 16* or 32 kHz

\* The sample rates are lower than the default input rates of the encoder. For fuller sound, it is recommended you use the higher sampling rates.

## Using Templates

Before you begin encoding, you must make decisions about the appropriate settings for different types of audio and video input. RealNetworks has supplied several pre-defined encoding templates to assist users in making those decisions. For a list of these templates, refer to the chapter “Using RealEncoder and RealPublisher.”

You can adjust these templates or define a new one to optimize the type of audio and video you are encoding. For information about creating templates, refer to the “Using RealEncoder and RealPublisher” chapter.

Each template is optimized for a particular type of audio and video content as well as for bandwidth. You can select one or more templates that best suit your needs, and RealServer streaming media server can deliver clips encoded using these multiple templates. In this way, you can reach the widest possible audience while still providing high-bandwidth users with the best listening experience.

Taking it a step further, by using **Bandwidth Negotiation** you can configure your site to automatically serve the appropriately encoded file. For more information about Bandwidth Negotiation, refer to the “Bandwidth Negotiation” chapter .

## Pre-defined Templates

Each template is optimized for a particular type of audio and video content as well as for bandwidth. Select a template that best suit your needs. RealEncoder and RealPublisher also allow you to use more than one template.

Notice that the total bit rate is a combination of the audio codec and the video bit rate. The total bit rate for each template is about 30% less than the total bit rate of the bandwidth of the connection to compensate for connection and packet overhead.



<b>Template Name</b>	<b>Audio Codec</b>	<b>Video Bit Rate (Kbps)</b>	<b>Total Bit Rate (Kbps)</b>	<b>Encoding Speed</b>	<b>Video Frame Rate</b>
Audio 14.4, Voice	8.5Kbps Voice	0.0	8.5	Normal	
Audio 28.8, Music – Mono	16Kbps Music - High Response	0.0	16	Normal	
Audio 28.8, Voice	16Kbps Voice - Wideband	0.0	16	Normal	
Audio 28.8, Music – Stereo	20Kbps Music Stereo	0.0	20	Normal	
Video 28.8, High Action	6.5Kbps Voice	13.5	20	Normal	Optimal Smooth
Video 28.8, Music Video – Emphasize Audio	12Kbps Music	8.0	20	Normal	0.25
Video 28.8, Music Video – Emphasize Video	6.5Kbps Voice	13.5	20	Normal	Optimal Sharp
Video 28.8, Talking Heads	5Kbps Voice	13.5	20	Normal	Optimal sharp
Audio 56K Dial-Up Modem, Music - Mono	32Kbps Music Mono	0.0	32	Normal	

<b>Template Name</b>	<b>Audio Codec</b>	<b>Video Bit Rate (Kbps)</b>	<b>Total Bit Rate (Kbps)</b>	<b>Encoding Speed</b>	<b>Video Frame Rate</b>
Audio 56K Dial-Up Modem, Music - Stereo	32Kbps Music Stereo	0.0	32	Normal	
Video 56K Dial-Up Modem, Music	12Kbps Music	22.0	34	Normal	Optimal Sharp
Video 56K Dial-Up Modem, Voice	6.5Kbps Voice	27.5	34	Normal	Optimal Sharp
Audio 56K ISDN, Music – Mono	40Kbps Music Mono	0.0	45	Normal	-
Audio 56K ISDN, Music – Stereo	40Kbps Music Stereo	0.0	45	Normal	-
Video 56K ISDN, Music	16Kbps Music - High Response	29.0	45	Normal	Optimal Sharp
Video 56K ISDN, Voice	8.5Kbps Voice	36.5	45	Normal	Optimal Sharp
Audio High-Bite Rate 80K, Music - Mono	80Kbps Music Mono	0.0	80	Normal	-
Audio High-Bite Rate 80K, Music - Stereo	80Kbps Music Stereo	0.0	80	Normal	-

<b>Video High-Bite Rate 100K, Music</b>	<b>16Kbps Music - High Response</b>	<b>84.0</b>	<b>100</b>	<b>Normal</b>	<b>Optimal Average</b>
Video High-Bite Rate 100K, Voice	16Kbps Voice - Wideband	84.0	100	Normal	Optimal Average
Video High-Bite Rate 200K, Music	16Kbps Music - High Response	160.0	200	Normal	Optimal Average
Video High-Bite Rate 200K, Voice	16Kbps Voice - Wideband	184.0	200	Normal	Optimal Average
Video High-Bite Rate 400K, Music	16Kbps Music - High Response	360.0	400	Normal	Optimal Average
Video High-Bite Rate 400K, Voice	16Kbps Voice - Wideband	384.0	400	Normal	Optimal Average

## Multiple Templates

RealServer streaming media server can deliver clips encoded using multiple templates. In this way, you can reach the widest possible audience while still providing high-bandwidth users with the best viewing and listening experience. If you are not using bandwidth negotiation to provide content in multiple formats, your web site must have separate hypertext links and metafiles for each format.

## RealEncoder Plug-in for Adobe Premiere

RealEncoder Plug-in for Adobe Premiere 4.2 exists for both Windows and Macintosh platforms. Currently, the Windows version is installed by RealEncoder and RealPublisher. The Windows Adobe Premiere plug-in is installed in the /Premiere/plugins directory. The Macintosh Adobe Premiere plug-in must be copied to the plug-in directory in the Premiere folder.

The Real Encoder Adobe Premiere plug-in does not work with Adobe Premiere LE because Premiere LE does not support third party plug-ins.

### Supported File Formats

RealEncoder Plug-in for Adobe Premiere supports all of the file types supported by Adobe Premiere.

Supported Movie File formats are:

- Video for Windows (.avi)
- QuickTime for Windows and Macintosh (.mov)
- FilmStrip (.flm)

**Note:** It is strongly recommended you use uncompressed files only

Supported audio formats are:

- Audio Interchange (.aif)
- Windows Waveform (.wav)

**Note:** Audio source files must be sampled at 11.025, 22.05, or 44.1 kHz. 8-bit and 16-bit mono and stereo audio files are supported.

## Encoding RealAudio or RealVideo Files

**To create a RealAudio or RealVideo file from an existing audio or video file using RealEncoder or RealPublisher for Windows:**

1. Start **RealPublisher** or **RealEncoder**. The RealPublisher or RealEncoder window opens:
2. Click **Open Session** from the File menu. The Open Session window appears.
3. In the source pane, verify that **File** is selected.
4. Click **Add**. The Add Source File dialog box appears.
5. Select the file you want to encode. Click **Open**.
6. In the destination pane, verify **RealMedia File** is checked.
7. Click **Save As**. The Select Destination File dialog box appears.
8. Choose a directory to store the file and enter the destination file name.
9. Click **Save**.
10. Click **OK**. The Open Session window closes.
11. In the properties pane, you can enter the Title, Author, and Copyright information for your output file. These fields are optional.
12. Click **PerfectPlay** if you wish RealPlayers with low bandwidth modems to be able to play RealVideo files encoded for a higher bandwidth. To play these file, the files must partially download audio and video data before beginning playback.
13. If you wish RealPlayer and RealPlayer Plus users to be able to save your RealVideo or RealAudio signal to disk, click **Selective Record**.
14. In the encoding templates list box, select the template for the target audience you want your file to play for.

15. Click **Start** to begin the encoding process. When encoding is complete, an Encoding Complete message appears indicating the bit rate the file was encoded at.

If RealPublisher is unable to encode the file at the selected bit rate, you may need to re-encode the file with a different template. To edit your template settings, click **Advanced** and re-encode your file with the updated template.

16. View the encoded file with RealPlayer.

## Drag-and-Drop Encoding for Windows

RealEncoder and RealPublisher for Windows support drag-and-drop encoding:

- Click an input-video-file icon and drag it onto an open Publisher or Encoder window. This enters path and file name information into the appropriate Encoder fields.
- Then, you only need to enter the descriptive information and settings and click **Start** to begin the encoding process.

## Multi-Template Encoding

You can encode more than one RealAudio or RealVideo file at the same time using multi-template encoding. This allows you to encode your files with different compression rates based on the bandwidth capability of the user.

Encoding a single file using multiple templates generates multiple output files and can be used for testing or allow the user to choose to stream the best file for the user's bandwidth. If used without bandwidth negotiation, your web site must have a separate hypertext link and web page for each format or template.

Using bandwidth negotiation with multi-template encoding requires only one link on your web site to a particular clip, regardless of the number of files and enables the server to automatically stream the best file for the user's stated bandwidth.

**To encode a file with multiple templates:**

1. Start **RealPublisher** from your desktop and follow steps 1-13 for encoding audio and video files. Refer to the “Encoding Audio or Video Files” section of this chapter.
2. In the templates pane, select a template, then depress Control key and select any other desired number of template/bandwidth options.
3. Click **Start** to begin multiple template encoding.
4. The Multiple Template Encoding dialog box appears.

Each template should be a different data rate, for example a 28Kbps template, a 56 Kbps template and a 112 Kbps template.

5. Follow steps 15-16 for encoding audio and video files. For more information, see the “Encoding a RealAudio or RealVideo File” section of the “Using RealEncoder and RealPublisher” chapter.
6. Click **Begin**. The encoding process starts.  
  
The Multiple Template dialog box will remain visible during encoding, and you will be able to monitor audio levels.
7. Click **OK** when the “Encoding Complete message” appears.
8. View the encoded file with RealPlayer.

## Command Line Encoding for Windows

In some situations you may find it convenient to encode live or on-demand content within the DOS command line. The following syntax is used:

```
RVBatch RVEncode.exe <options>
```

where `options` are any of RealEncoder or RealPublisher options described below.

Option	Description ( defaults in parenthesis )
/I	Use this option to specify an Input File
/O	Use this option to specify an outfile or dir - Output File Name or Directory (infile.rm or dir\YYYYMMDDHHMMSS.rm)
/L	Use this option to specify Use Live Input
/S	Use this option to specify "server[:port]/file" - Server Name, Port and File. (Port 7070)
/W	Use this option to specify password - Server Password
/D	Use this option to specify hhh:mm:ss - Maximum Encoding Duration (continuous)
/A	Use this option to specify an Audio Codec (0)
/V	Use this option to specify a Video Codec (0)
/F	Use this option to specify a framerate - Frame Rate. (Optimal)
/B	Use this option to specify Total Kbps for clip. (100)
/Q	Use this option to specify Quality 1-100. (100)
/T	Use this option to specify a Clip Title
/U	Use this option to specify a Clip Author
/C	Use this option to specify a Clip Copyright
/P	Use this option to Enable Perfect Play. Valid options are: 0 Disabled 1 Enabled (1)



Option	Description ( defaults in parenthesis )
/R	Use this option to Enable Selective Record. Valid options are: 0 Disabled 1 Enabled (0)
/X	Use this option to Enable Audio Encoding. Valid options are: 0 Disabled 1 Enabled (1)
/Y	Use this option to Enable Video Encoding. Valid options are: 0 Disabled 1 Enabled (1)
/?	Use this option to Display the HELP information

## Batch Encoding on Macintosh

Batch encoding on the Macintosh uses AppleScript. For more information, refer to:

**[www.real.com](http://www.real.com)**

## Creating Templates

Each template is comprised of an audio codec, video bit rate, total bit rate, quality and frame rate. The quality of encoding is affected by these settings and by the actual content.

### Content Elements that Affect Video Quality

Below are content elements that can affect the quality of a video encoding at 20 Kbps:

Content Type	Expected Encoding Results
Fixed camera shot, low motion	Clean frames, with high frame rates
Fixed camera shot, medium motion	Clean frames, somewhat lower frame rates
Multiple camera shots, low motion	Clean frames with 1 fps or less
Zoom with low motion	Clean frames with moderate frame rate
Fixed camera shot, high motion	Clean frames with moderate frame rate
Multiple camera shots, high motion	Clean frames with less than 1 fps

**Note:** RealEncoder and RealPublisher produce significantly better frames with higher frame rates when used with bandwidths higher than 28.8 Kbps.

### RealVideo Total Bit Rates

RealVideo parameters that can be adjusted to obtain the preferred total bit rate are as follows:

- audio codec
- video bit rate
- frame rate

When deciding which parameters to set, the total bit rate must be considered. The total bit rate is the actual bit rate at which the video or audio file is encoded. If the target bit rate is 28.8 Kbps, then the total bit rate should be 20 Kbps. The following are the recommended total bit rates for common bandwidths.

Target Bit Rate	Total Bit Rate
28.8 Kbps	20 Kbps
56.0 Kbps (analog)	34 Kbps
56.0 Kbps (ISDN)	45 Kbps
64.0 Kbps (ISDN)	56 Kbps
128.0 Kbps (Dual ISDN)	105 Kbps

For a video file, select the total bit rate according to the table above, and then choose an audio codec if you are using video with audio. For an audio only file, choose a bit rate from the audio codec list only.

Command Line Parameter	Bandwidth	Audio Codec
0	6.5 Kbps	6.5 Kbps voice
1	8.5 Kbps	8.5 Kbps voice
2	16 Kbps	16 Kbps music Low response
3	16 Kbps	16 Kbps music Medium response
4	16 Kbps	16 Kbps music High response
5	20 Kbps	20 Kbps music stereo
6	40 Kbps	40 Kbps mono
7	4 Kbps	40 Kbps stereo
8	80 Kbps	80 Kbps mono
9	80 Kbps	80 Kbps stereo
10	8 Kbps	8 Kbps music
11	12 Kbps	12 Kbps music
12	15.2 Kbps	15.2 Kbps voice
13	32 Kbps	32 Kbps mono
14	15.2 Kbps	15.2 Kbps stereo

Since RealAudio codecs have discreet bandwidths, the video bit rate is the difference between the total bit rate and the bit rate of the chosen audio codec:

$$\text{Video Bit Rate} = (\text{Total Bit Rate}) - (\text{Bit Rate of Audio Codec})$$

In RealEncoder and RealPublisher, the video bit rate is calculated automatically. There are two video codecs:

Parameter	Video Codec
0	RealVideo (Standard)
1	RealVideo (Fractal)

Next choose a frame rate. Not all content types support high frame rates for a given bandwidth. The highest frame rate that can be achieved at 20 Kbps is 7.5 frames per second (fps) for Talking Head type content. Different content types require different frame rates. For example, while Talking Heads at 20 Kbps might support 7.5 fps, music videos only support 1 fps or less.

**Note** If you are getting high levels of latency, you are exceeding the bounds of your content type. To solve high latency:

- Choose **Optimize Frame Rate**. This lets the encoder adjust the frame rate.

You can select Optimized Frame Rate when using the RealVideo Standard video codec. Optimized Frame Rate provides constant image clarity, or sharpness, and variable frame rates. When this option is selected, the encoder automatically selects the frame rate.

For example, if a person who is talking begins to gesture or move around quickly, the frame rate increases as the motion speeds up and decreases as the motion slows down. The image sharpness remains constant throughout.

- Reduce the screen size (176 x 144 is recommended). Use numbers divisible by 16 in setting frame size.
- Lower the frame rate.

**Fixed Frame Rate** is adjusted by moving the slider. Fixed Frame Rate gives you the option of choosing to emphasize image clarity or motion smoothness.

For example, if your content contains a lot of motion, set the slider closer to the 15 fps setting. The resulting video image will be less clear but will exhibit smoother motion, i.e., more frames per second.

However, if your content has less motion, set the slider closer to the .050 fps setting. The resulting video images will be more clear but will exhibit less smooth motion, i.e. fewer frames per second.

## Creating New Templates

Each audio-only template is comprised of an audio codec. Each video template is comprised of an audio codec, video bit rate, total bit rate, frame rate, and encoding speed. The quality of encoded output is affected by these and by the actual media contents, such as fixed camera shots, more or less motion, and multiple camera shots. If one of the templates does not achieve the effect you are looking for, try creating a new template by basing it on a pre-defined template and then modifying the settings.

### To create a new template:

1. In the templates pane, click **Advanced**. The Advanced Setting window appears:
2. Enter the name of the new template in the Template Name field and click **Save**.

You should not modify the pre-defined templates. If you want to change some of the settings, save the template as a new template by giving it a new name. This way you don't overwrite the pre-defined templates.

3. Select an audio codec. They are arranged by data rate and type of content.
4. Select a Video codec. RealPublisher has two video codecs available, RealVideo (Standard) and RealVideo (Fractal).
5. Select the total bit rate for the entire encoded file. The video bit rate will be total bit rate less the audio bit rate.

You should reduce the expected total bit rate by 25% to compensate for connection and packet overhead. For example, choose 20 Kbps for a 28.8 Kbps modem.

6. Click **Optimized Frame Rate** or **Fixed Frame Rate**.

- You can select **Optimized Frame Rate** when using the RealVideo Standard video codec. **Optimized Frame Rate** provides constant image clarity, or sharpness, and variable frame rates. When this option is selected, the encoder automatically selects the frame rate.

For example, if a person who is talking begins to gesture or move around quickly, the frame rate increases as the motion speeds up and decreases as the motion slows down. The image sharpness remains constant throughout.

- You can select **Fixed Frame Rate** when using the RealVideo Standard video codec or the RealVideo Fractal video codec. **Fixed Frame Rate** is adjusted by moving the slider. **Fixed Frame Rate** gives you the option of choosing to emphasize image clarity or motion smoothness.

For example, if your content contains a lot of motion, set the slider closer to the 15 fps setting. The resulting video image will be less clear but will exhibit smoother motion, i.e., more frames per second.

However, if your content has less motion, set the slider closer to the .050 fps setting. The resulting video images will be more clear but will exhibit less smooth motion, i.e. fewer frames per second.

7. Click **Save** to save the template.
8. Click **Close** to close the Advanced Settings window.

# Synchronized Multimedia

In addition to basic audio and video content, RealAudio and RealVideo System allows you to create real-time on-demand multimedia presentations using the RMMerge tool (Windows only). These presentations can be as simple as a narrated slide show of your home page or as intricate as a multi-frame training program that the viewer controls.

RealAudio and RealVideo includes the ability to synchronize World Wide Web pages with audio. Thus the audio can be used as a “time line” to display new pages or frames in the Web browser or to update its content. This enables the creation of Internet slide shows, presentations, guided tours and site walk-throughs. A user can have full random access (fast forward and rewind), and the Web browser content is synchronized with the audio.

RealAudio and RealVideo System stores the information for the synchronized events in a file with a .rm file extension. RealServer streams audio and event information to RealPlayer. The event information is streamed to RealPlayer, and in turn RealPlayer sends Web page information to the Web browser telling it to update the page's content.

Another way to create a synchronized multi-media presentation is using RealPlayer Plug-in. However, since sending the Web browser to a new URL unloads RealPlayer Plug-in when the HTML page is unloaded, it is best to create separate frames for RealPlayer Controls and for the changing images. For more information about frames, refer to the “Frames: The Basics” section of the “Synchronized Multimedia” chapter.

## Creating a RealVideo Events File

Creating a synchronized multimedia event using .rm files use the RMMerge tool. This is a three-step process:

1. Use a text editor to create an input file specifying the display time for each URL, title, author or copyright event.

2. Use the RMMerge tool to generate a binary file from the text input file by typing the following command:

```
rmmmerge -f rmevents.dll events.txt audio_video.rm
outfile.rm
```

This command uses the user's events.txt file as input to the rmevents.dll. It makes a temporary .rm file that no one sees and merges that with the audio\_video.rm file to create outfile.rm. The last filename on the command line is always the final output file. You can also do the following:

```
rmmmerge -f rmevents.dll events.txt audio.ra video.rm
outfile.rm
```

where:

event is the text file created in step 1

output is the .rm file that contains these events

3. Merge your new events .rm file with an audio or video file using the following command:

```
rmmmerge <event file> <audio or video file> <output
file>
```

where:

event file is the .rm file created in the previous step

audio/video is the file merged with the event file

output file is the file resulting from the merge

For example:

```
rmmmerge event.rm audio_video.rm output.rm
```

## Creating the Input File

Begin by creating a list of the URLs, titles, authors, or copyrights that you want to be shown during your presentation and the times within RealAudio or RealVideo clip when they should be displayed. The syntax for each entry should follow the format (with a space between each part of the command):

```
u starttime endtime EventURL
i starttime endtime Title
a starttime endtime Author
```



```
c starttime endtime Copyright
```

where:

u stands for URL event; each line starts with the letter u

i stands for title; each line starts with the letter i

a stands for author; each line starts with the letter a

c stands for copyright; each line starts with the letter c

starttime is the time into the clip when the new event is shown

endtime is the time into the clip when that event ends

EventURL (generally beginning with "http:" or "file:") is the Internet address for that event (usually an HTML document)

The time for starttime and endtime is:

```
[ [days:]hours:]minutes:]seconds[.tenths]
```

The lines of the input file must be in ascending order of start time. The end time should be at least one tenth of a second before the start time of the next event. The following example shows how an input file might look:

```
u 00:00:10.0 00:00:59.9 http://www.real.com/  
u 00:01:00.0 00:02:00.0 http://www.mysite.com/ page2/
```

This input file tells RealPlayer to send the Web browser to the RealNetworks home page ten seconds into the audio clip. One minute into the audio clip, the Web browser displays a page from "www.mysite.com".

The input file may also contain comment lines beginning with the # symbol. These comment lines are ignored by the event creation tool and are a good way to document the date that the file was created and the type of information found on each page.

## Using Synchronized Multimedia with Bandwidth Negotiation

When you deliver a Synchronized Multimedia presentation using Bandwidth Negotiation, you can choose to deliver the same event for all encoding formats, or you can choose to deliver different events for each encoding format.

You can create a single synchronized multimedia presentation for multiple formats, or you can create a different multimedia presentation for each encoding format. If you are working with previously created content, you can continue to use the previous method to create presentations. For new content, refer to the “Synchronized Multimedia” chapter.

For general information about Bandwidth Negotiation, refer to the “Bandwidth Negotiation” chapter.

## Frames: The Basics

Some Web browsers support a feature which allows the browser window to be divided into multiple regions. Each region is called a frame and can display a separate URL such as a graphic or document. For an introduction to frames visit Netscape’s Web site at:

**<http://www.netscape.com>**

If you are unfamiliar with frames the following two sites provide a good introduction:

Understanding Frames

**[http://www.netscape.com/navigate/understanding\\_frames.html](http://www.netscape.com/navigate/understanding_frames.html)**

Frames: An Introduction

**[http://www.netscape.com/assist/net\\_sites/frames.html](http://www.netscape.com/assist/net_sites/frames.html)**

# Editing Video Files

If you want to edit your video files, you have two options—you can edit your .rm files, or you can edit your original source files.

## Editing Input Files

Editing the original source files is the editing method of choice. Encoded video is stored in indivisible clips of varying duration depending on the encoding algorithm and the video bit rate. This limits how precisely encoded video can be cut and pasted.

RealEncoder and RealPublisher are distributed with a Windows editing utility, RMTTools, and DOS: RMEdit, RMPaste and RMDump which enable simple editing of RealVideo files.

## Editing RealVideo Files in Windows

RMTTools, the Windows 95 and Windows NT editing utility, is installed with RealEncoder and RealPublisher. This utility enables you to perform three basic editing tasks:

- Edit the file properties
- Examine the contents of a file
- Edit the data of a file.

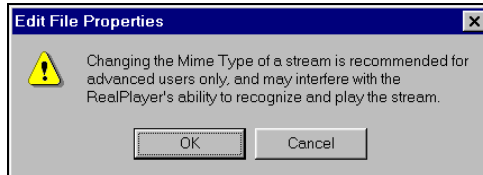
## Editing File Properties

RMTTools allows you to edit the static information about the file: title, author, copyright, and comment; and the stream name and mime type for each individual stream. You can also enable or disable PerfectPlay or Selective Record. Editing the file properties does not affect the data.

### To edit file properties of RealVideo files using RMTTools:

1. Click **Start**. From **Programs**, select **Real**.
2. Select **RealMedia Tools**. The RealMedia Tools window appears. Notice the window is divided into two panes, the source file pane on top and the destination file pane on the bottom.
3. Select **Open Source** from the File menu. The Open File dialog box displays. Select the file you want to edit. The file properties information is displayed in the source file window.
4. To sort by the stream attribute, click the column. You can also resize the columns by placing the cursor over the column border and then clicking-and-dragging.
5. Select **File Properties** from the Edit menu. The File Properties dialog box appears. The file name is displayed in the source box and in the destination box. New file names can be selected by clicking **Browse** and selecting a new file from the dialog box.
6. To save changes to the existing file, do not change the destination file name. To save the changes to a new file, click **Browse** to select or enter a different name in the destination box.
7. Type the new title name, author, copyright information, and any comment in the appropriate boxes. (You can also type a new title, author, copyright, or comment directly in the fields on the source and destination panes.)
8. The total number of streams is listed in the Stream Properties box. If you want to change the name or the mime type of one stream, select the stream to be changed by clicking the up or down arrow.
9. If you want to change the stream name, type the new name in the Stream Name box.

10. Changing the mime type is recommended for advanced users only. If you are certain you wish to change the mime type, type the new mime type in the Mime Type box. If you change the mime type, the following warning will appear after you have applied the changes.



9. Click **PerfectPlay** to allow RealPlayer users with low bandwidth modems to experience files encoded for a higher bandwidth. Selecting PerfectPlay will partially download video data before beginning playback.
10. If you want to allow RealPlayer Plus users to save your clip to disk, click **Selective Record**.
11. Click **Apply**. The changes are applied to the file and displayed in the source file pane of the RealMedia Tools window.

## Examining the Contents of a RealVideo File

RMTTools enables you to view the contents of an .rm file by dumping the contents to a text file. You can then edit or print the file as you would any other text file.

### To examine the contents of a RealVideo file:

1. Select **New Session** from the **File** menu.
2. Open the Source file from the File menu. The file information is displayed in the source pane.
3. Select **Dump** from the File menu. The Dump As dialog box appears. The default name is the same as the source file name, with the extension changed to .txt. You may also select or enter another dump file name.

4. Click **Save**. When prompted to view the file now, click **Yes**.
5. The following error message may appear. If so, click **Yes**. The Notepad or WordPad window displays the contents of the file. For an example of an .rm text file, refer to “Command Line Editing of RealVideo Files” of the “Editing Video Files” chapter.
6. You can view, edit, and print the file just as you would any other text file.

### Editing RealVideo Data

RMTools allows simple editing of .rm files. You can put multiple clips in one file; you can shorten the length of a clip; and you can take a video stream from one file and add the audio stream from another file. When working with more than one file, streams of the same mime type must have the same encoding parameters if they are going to be pasted together.

#### To place two RealVideo clips in one file:

1. Select **New Session** from the File menu.
2. Select **Open Source** from the File menu. The Open File dialog box appears.
3. Select the file you want to edit. Click **Open**. The source file pane displays the stream number, the stream name, mime type, and the start and end times.
4. Select **Copy** from the Edit menu. The Copy dialog box appears.
5. In the Stream Number box, accept the default, **All Streams**.
6. Do not change the start and end times. Click **Copy**.
7. Select **Paste** from the Edit menu. The Paste dialog box appears.
8. Click **Paste**. The destination pane displays the stream number, source file, mime type, start time and end time.
9. Right-click the source pane. A shortcut menu appears. Click **Open Source**. Choose a second clip to be added at the end of the first clip. (Both clips must have the same encoding parameters.)

10. Click **Open**. The source pane displays the information from the new file while the destination pane displays the information from the streams that were previously pasted.
11. Select **Copy** from the Edit menu.
12. Accept the default, **All Streams**, and the start and end times. Click **Apply**.
13. Right-click the destination pane. A shortcut menu appears. Click **Paste**. The Paste dialog box appears. The previous end time displays as the new start time.
14. Click **Paste**. The second clip is listed below the first clip.
15. If the following warning displays, you must select a different clip or re-encode the clip so that the encoding parameters are the same.
16. Select **Save As** from the File menu. The Save As dialog box appears.
17. Type the new file name. Click **Save**.
18. Use RealPlayer to view the new file.

### **To put the video stream of one file with the audio stream of another:**

1. Select **New Session** from the **File** menu.
2. Select **Open Source** from the **File** menu. The Open File dialog box appears.
3. Select the first file you want to edit. Click **Open**. The source file pane displays the information from the file.
4. Select **Copy** from the Edit menu. The Copy dialog box appears.
5. In the Stream Number box, select the stream that contains the video. Click **Copy**.
6. Select **Paste** from the Edit menu. The Paste dialog box appears.
7. Click **Paste**. The destination pane displays the information from the new file. Notice only the video stream has been pasted into the destination pane.
8. Right-click the source file pane. A shortcut menu appears. Click **Open Source**.

9. Choose a second file with the same encoding parameters as the first clip, and of approximately the same duration. Click **Open**. The source pane displays the information from the file.
10. Right-click the source pane. A shortcut menu appears. Click **Copy**. The Copy dialog box appears.
11. In the Stream Number box, select the stream that contains the audio. Do not change the start and end times.
12. Click **Copy**.
13. Right-click the destination pane. A shortcut menu appears. Click **Paste**. The Paste dialog box appears.
14. Click **Paste**. The audio stream is listed below the video stream. Notice both streams have the same start time, and should have similar end times.
15. Select **Save As** from the File menu. The Save As dialog box appears.
16. Type the new file name. Click **Save**.
17. Use RealPlayer to view the new file.

## Command Line Editing of RealVideo Files

The RealVideo file editing tools, RMCut, RMPaste, RMEdit, and RMDump are run from a DOS command line. The RMCut tool is used to cut a specific portion of a RealVideo file without changing the original source. The RMPaste tool is used to combine two or more RealVideo files. The RMEdit tool is used to modify the title, author, copyright, comment, mime type, or stream name. It can also be used to print the current values for the file or stream. The RMDump tool is used to examine the contents of a RealVideo file.

### Editing RealVideo Files

RMEdit has five separate forms. The first form modifies any or all of the title, author, copyright, and comment for the file.



```
rmedit -i <input> -o <output> [-t <title>]
      [-a <author>] [-c <copyright>] [-C <comment>]
```

The second form modifies any or all of mime type and stream name for the selected stream.

```
rmedit -i <input> -o <output> (-S <stream number>
      [-m <mimetype>] [-s <stream name>])
```

The third form prints out the current values for the file and for each stream that RMEdit is capable of modifying.

```
rmedit -i <input>
```

The fourth form sets or clears Perfect Play mode and Selective Record.

```
rmedit -i <input> -o <output> [-r [ON|OFF]] [-p
      [ON|OFF]]
```

The fifth form prints the RMDump version and copyright notice.

```
rmedit -v
```

where:

- <input> is the path and file name to the input file.
- <output> is the path to the output file that contains the edited file.
- <title> is the title text.
- <author> is the author text.
- <copyright> is the copyright text.
- <comment> is the comment text.
- <stream number> is the stream number for the following two parameters. (May be repeated for any number of streams.)
- <mimetype> is the mimetype for a specified stream.
- <stream name> is the stream name for a specified stream.
- v prints the RMDump version and copyright notice.
- p is the perfect play mode.
- r is the set/clears selective record.

**Note** Only valid mime types (those accepted by the player) should be entered in the mime type field.

**Note** Input and output file names must not be the same.

The following examples demonstrate the use of the RMEdit tool:

1. To create a new file modifying the title, enter:

```
rmedit -i original.rm -onewfile.rm -t "My New Title"
```

2. To change the stream name of stream 1, enter:

```
rmedit -i original.rm -onewfile.rm -S1 \  
-s "New Stream Name"
```

3. To display the current contents of the file, enter:

```
rmedit -i original.rm
```

**Note** Long file names are acceptable, but file names containing spaces must be contained in quotes.

## Cutting RealVideo Files

Use the RMCut tool to cut a specific portion of a RealAudio or RealVideo file without modifying the original source. A cut is made by setting the start and end times for individual streams. Not entering a start time defaults to the beginning of the file and likewise, not entering an end time defaults to the end of the file. RMCut can be used without RMPaste to remove the front or end of a file.

### To create a copy of a piece of a RealAudio or RealVideo file:

1. View your original RealAudio or RealVideo file to determine the start and end times of the segment you want to copy (you can read the times on the status bar of RealPlayer).
2. Create a copy by typing:

```
rncut -i <input> ([-S <stream>] [-s <start>] \  
[-e <end>]) -o <output> -v
```

where:

<input> is the path to the input file  
<stream> is the stream number. If not specified, all streams are used. It can be repeated to grab one or more streams.  
<start> is the start time in Days:Hours:Minutes:Seconds.Milliseconds format. If missing, this parameter defaults to the beginning of the file.  
<end> is the end time in Days:Hours:Minutes:Seconds.Milliseconds format. If missing, this parameter defaults to the end of the start+input length. (Multiple start end sequences can be used to cut discontinuous portions of the stream.)  
<output> is the path to the output file that contains the edited file.  
-v is the print version and copyright notice

**Note:** An image map stream's start and end times must go from the beginning to the end of the file. Use RMCut to strip out the image map before working with the RealAudio or RealVideo file. Then, to alter and re-merge the image map file with the video image, refer to "Image Maps" section in the "Editing Video Files" chapter.

The following examples demonstrate the use of the RMCut tool.

1. To create a new file with only stream zero, enter:

```
rmcut -i source.rm -o cutfile.rm -S0
```

2. To create a new file with the first 30 seconds of stream 0:

```
rmcut -i source.rm -o cutfile.rm -s0.0 -e30.0
```

3. To create a new file with the first 30 second of stream 0 and with the first 45 seconds of stream 1, enter:

```
rmcut -i source.rm -o cutfile.rm \  
-S0 -s0.0 -S1 -s0.0 -e45.0
```

## Examining the Contents of RealVideo Files

RMDump is used to examine the contents of a RealAudio or RealVideo file. RMDump accepts two input parameters: the input file and the output file.

To use RMDump, type:

```
rmddump -i <infile> -o <outfile>  
rmddump -v
```

Where:

<infile> is the input .rm extension file  
<outfile> is the output text file (use a text editor to view)  
<-v> prints the RMDump version and copyright notice.

An example of how to run RMDump is shown below:

### Example

```
>rmdump -i input.rm -o out.txt
dumping input.rm to out.txt . . .
dumping realmedia headers . . .
dumping stream packets
dumping stream 0 . . .
dumping stream 1 . . .
done
! Elapsed time = 556 milliseconds
```

The next step is to use an editor like Notepad on Windows NT/95 to examine the contents of the RMDump.

```
RealMedia File: input.rm
=====
RM_HEADER_OBJECT
... deleted to save space ...
=====
RM_PROPERTIES_OBJECT
... deleted to save space ...
=====
RM_CONTENT_OBJECT
... deleted to save space ...
=====
RM_MEDIA_PROPERTIES_OBJECT
object_id: 0x4D445052 (RPDM)
size: 155 bytes
object version: 0
stream_number: 0
max_bit_rate: 12062 bps
avg_bit_rate: 12062 bps
max_packet_size: 288 bytes
avg_packet_size: 288 bytes
start time: 0 milliseconds
preroll: 191 milliseconds
duration: 224898 milliseconds
stream_name: The Audio Stream
mime_type: audio/x-pn-realaudio
```

```
type_specific_length: 73
=====
RM_MEDIA_PROPERTIES_OBJECT
object_id: 0x4D445052 (RPDM)
size: 116 bytes
object version: 0
stream_number: 1
max_bit_rate: 7000 bps
avg_bit_rate: 7000 bps
max_packet_size: 668 bytes
avg_packet_size: 564 bytes
start time: 0 milliseconds
preroll: 3474 milliseconds
duration: 228000 milliseconds
stream_name: The Video Stream
mime_type: video/x-pn-realvideo
type_specific_length: 34
=====
RM_DATA_OBJECT
... deleted to save space ...
=====
Seek Time: 1 with reqtime = 0 and actualtime = 0
packet 0: stream 0 timestamp 0 size: 288 keyframe
packet 1: stream 1 timestamp 0 size: 639 keyframe
packet 2: stream 1 timestamp 0 size: 619 keyframe
packet 3: stream 1 timestamp 0 size: 599 keyframe
packet 4: stream 1 timestamp 0 size: 544 keyframe
packet 5: stream 1 timestamp 0 size: 639 keyframe
packet 6: stream 0 timestamp 192 size: 288 keyframe
packet 7: stream 0 timestamp 384 size: 288 keyframe
packet 8: stream 0 timestamp 575 size: 288 keyframe
packet 9: stream 0 timestamp 767 size: 288 keyframe
packet 10: stream 0 timestamp 958 size: 288 keyframe
packet 11: stream 0 timestamp 1150 size: 288 keyframe
packet 12: stream 0 timestamp 1341 size: 288 keyframe
packet 13: stream 0 timestamp 1533 size: 288 keyframe
packet 14: stream 0 timestamp 1724 size: 288 keyframe
packet 15: stream 0 timestamp 1916 size: 288 keyframe
packet 16: stream 0 timestamp 2108 size: 288 keyframe
packet 17: stream 0 timestamp 2299 size: 288 keyframe
packet 18: stream 0 timestamp 2491 size: 288 keyframe
```

The RM\_MEDIA\_PROPERTIES\_OBJECT sections describe the stream type and stream number for each stream.

- The keyframe field is used to identify the start of a series of related packets.

- Keyframes are sometimes too large to form a single packet. In this case multiple keyframes will be seen with the same timestamps.
- Some codecs produce packets with the keyframe flag always set. And others produce a mixture of keyframe and non keyframe packets.
- Packet sizes can be identical in size or vary in size within a single stream.
- The RM\_MEDIA\_PROPERTIES\_OBJECT sections contain attributes of each stream which include:
  1. The stream number.
  2. The stream type.
  3. The total stream type (audio or video).
  4. The total duration of the stream in milliseconds.
  5. The preroll which describes how long to load buffers into the player before playing the stream.

## Combining RealVideo Files

RMPaste assumes that streams on the input side are joined to streams on the output side based upon their mime types. Start and End times are specified to map the input file, which may contain one or more streams, to a new time range in the output file. Only one file can use default start and end times. Start and end times must not overlap. If streams overlap, packets from both streams are intermingled based upon timestamp.

```
rmpaste (-i <input> [-s <start>] [-e <end>]  
[-f <from stream> -t <to stream>]) -o <output> -v
```

where:

<input> is the path to the input file. There can be one or more -i -s -e parameters sequences.  
<start> is the start time in Days:Hours:Minutes:Seconds.Milliseconds format. If missing this parameter defaults to the beginning of the file.  
<end> is the end time in Days:Hours:Minutes:Seconds.Milliseconds format. If missing this parameter defaults to start+input length.  
<output> is the path to the output file that contains the edited file.  
<from stream> is the input stream number to be sent to the to stream.  
<to stream> is the output stream number.  
-v is the print version and copyright notice.

**Note** RMPaste can paste in additional streams and add to existing streams. When streams are pasted together, the timestamps must not overlap.

**Note** If multiple streams are in the input file and the timestamps of the streams do not start at the same time, the start time applies to the earliest stream in the file. The start time plus the difference between the streams first packet is used for the remaining streams. See first example.

The following examples demonstrate the use of the RMPaste tool:

1. If you cut three streams from a source file using:

```
rmcut -i source.rm -o cutfile1.rm \  
-S0 -s10.0 -S1 -s20.0 -S2 -s30.0
```

resulting in an output file like:

Times

Stream0:	0.3	1.1	....
Stream1:	10.4	12.4	....
Stream2:	22.0	32.0	....

and mapped it using:

```
rmpaste -i cutfile1.rm -s5.0 \
-i cutfile2.rm -e5.0 \
-o paste.rm
```

the new stream times for cutfile1.rm would be:

Times

Stream0:	5.3	6.1	....
Stream1:	15.4	17.4	....
Stream2:	27.0	37.0	....

with cutfile2.rm placed from the beginning of the file to 5 seconds into the file. (packets not shown)

2. To create a new file using the first 60 seconds of the source.rm file swapping the first 45 seconds with the next 15 seconds in the file enter:

```
rmcut -i source.rm -o cutfile1.rm -s0.0 -e45.0
rmcut -i source.rm -o cutfile2.rm -s45.0 -e60.0
rmpaste -onewfile.rm -icutfile2.rm -s0.0 -e15.0 \
-icutfile1.rm -s15.0 -e60.0
```

3. To add a new stream to an existing file:

```
rmpaste -ioriginal.rm -inewstream.rm -onewfile.rm
```



## Image Maps

"Click-able" image maps allow users to interact with the video content by adding image-specific video seeking and URL commands. Image maps are fully customizable; actions can be connected to rectangular, circular or polygonal content regions and can be varied over specific user-defined time intervals.

### To create Image Maps:

1. Create an Image Map File (text file).
2. Merge the Image Map file (with a .rm file).

## Creating an Image Map File

Image Map Files are text files that have HTML-like tags which specify the location and action of each image map. Image map files should be created in a text editor and saved as text only.

All tags shown below are required unless otherwise stated. Negative values for numbers are not allowed.

### DURATION Tag

This tag must be at the beginning of the file. The DURATION tag specifies the amount of time from the start time of the first map to the end time of the last map in the file. The format is as follows:

DURATION=x:x:x:x

Tag Name	Description
DURATION	Times are specified in the following format: Days:Hours:Minutes:Seconds:MilliSeconds. All of the these fields must be present. That means if you don't want to specify a particular setting, fill 0's in that space.

## MAP Tag

This line describes the overall properties of the image map. The format is as follows:

```
<MAP START=x:x:x:x END=x:x:x:x COORDS=x,y,x1,y1>
```

Tag Name	Description
START	Times are specified in the following format: Days:Hours:Minutes:Seconds:MilliSeconds. All of these fields must be present. That means if you don't want to specify a particular setting, fill 0's in that space. If START contains all 0's then the start of the clip is assumed.
END	Times are specified in the following format: Days:Hours:Minutes:Seconds:MilliSeconds. All of these fields must be present. That means if you don't want to specify a particular setting, fill 0's in that space. If END contains all 0's then the end of clip is assumed.
COORDS	Specifies the rectangle that this entire map is going to occupy. If you enter an area bigger than the entire display area, the entire area is active. Any area not located within this rectangle will be clipped.

You may have as many MAP tags in a file as you wish.

## AREA Tag

There can be 0 to 40 area lines in an image map. These lines describe the different regions that are active within an image map.

```
<AREA START=x:x:x:x END=x:x:x:x SHAPE=XXXX  
COORDS=x0,y0,x1,y1,x2,y2,...xn,yn action_tag ALT="" >
```

Tag Name	Description
START	<p>Specifies the start time of this area during the map. This field is optional; if you do not include a START time, the area begins at the beginning of the map time. Times are specified in the following format: Days:Hours:Minutes:Seconds:MilliSeconds. All of the these fields must be present. That means if you don't want to specify a particular setting, fill 0's in that space. If START contains all 0's then the start of the current map is assumed.</p>
END	<p>Specifies the end time of this area during the map. This field is optional; if you do not include an END time, the area ends at the end of the map time. Times are specified in the following format: Days:Hours:Minutes:Seconds:MilliSeconds. All of the these fields must be present. That means if you don't want to specify a particular setting, fill 0's in that space. If END contains all 0's then the end of map is assumed.</p> <p><b>Note</b> If the start and end times of an area are outside the start and end times of the map, then the start and end times of the map are used.</p>
SHAPE	<p>The XXXX for the SHAPE tag can be one of the following values: (CIRCLE, RECTANGLE, POLYGON).</p> <p>CIRCLE - COORDS tag should specify three values: centerX,centerY,radius</p> <p>RECTANGLE - COORDs tag should specify four values: left,top,right,bottom</p> <p>POLYGON - COORDs tag should specify at least 6 values (x and y coordinates for at least 3 points). These are the vertices for the polygon.</p>
action_tag	<p>The action_tag is one of the following: PLAYER, URL, SEEK.</p> <p>PLAYER - Used to specify a new stream to play with RealPlayer. For example:  <code>PLAYER="pnm://video.real.com/welcome.rm"</code></p> <p>URL - Used to specify a new URL to display in a browser. For example:  <code>URL="http://www.real.com"</code></p> <p>SEEK - Used to specify a time within the current clip to seek to. For example:  <code>SEEK=0:0:0:5:0.</code></p> <p>Note the format is just like the START and END tags.</p>
ALT	<p>The ALT tag contains text that appears in the status bar of the player when the mouse is over this AREA and it is active. If you want no text then use "" as shown above.</p>

## /MAP Tag

This line means you are done with the current image map.

### Example

```
DURATION=0:0:0:40:0
<MAP START=0:0:0:0:0 END=0:0:0:5:20 COORDS=0,0,100,100>
<AREA SHAPE=CIRCLE COORDS=50,50,10
    URL="http://www.real.com" ALT="Home Page">
</MAP>
<MAP START=0:0:0:5:20 END=0:0:0:20:3 COORDS=0,0,100,100>
<AREA SHAPE=RECTANGLE COORDS=0,0,50,50 SEEK=0:0:0:3:98
    ALT="Seek to a point in the clip">
</MAP>
<MAP START=0:0:0:20:3 END=0:0:0:40:0 COORDS=0,0,100,100>
<AREA END=0:0:0:30:0 SHAPE=POLYGON COORDS=0,50,50,0,100,50
    PLAYER="pnm://video.real.com/welcome.rm" ALT="">
<AREA START=0:0:0:31:0 SHAPE=POLYGON
    COORDS=0,25,25,0,100,50 SEEK=0:0:0:0:0 ALT="Rewind to
    Beginning">
</MAP>
```

## Merging an Image Map file with a Video Image

When you have finished creating the Image Map file, you convert the Image Map text file into a .rm file using the RMMerge tool that is installed with RealEncoder and RealPublisher . Then, you merge that .rm file with an encoded video (.rm) file.

### To convert the Image Map file into a .rm file:

1. From a DOS command line, change directories to the directory that RealEncoder or RealPublisher was installed, which by default is C:\REAL\RVENCODE
2. Enter the following command:  

```
rmmerge -f rmimap.dll image_map_text image_map_rm
```

Done..... appears when the image map text file has been converted to a .rm file.

**Note** If you receive the message Error Parsing file, verify that the Image Map file is saved as text only and the tags are used correctly.

3. Merge the Image Map .rm file with a video (.rm) file by typing the following command:

```
rmmerge image_map_rm video_rm final_rm
```

The final\_rm file contains your Image Map as well as the audio/video clip.

4. Verify the Image Map by playing the final\_rm file with RealPlayer.

## Modifying RealVideo File Descriptions

You can change the Title, Author, or Copyright text, and modify the Selective Record and PerfectPlay settings in a .rm file using several different methods:

Method	Description
RMTTools	The is the editing tool available for Windows 95 and Windows NT.  Refer to the “Editing File Properties” section of this chapter.
RMEdit Tool	This is a command line tool available for Windows.  Refer to the “Command Line Editing of RealVideo Files” section in the “Editing Video Files” chapter.
.ram File	Set the Title, Author, and Copyright text strings in the .ram file.

# Bandwidth Negotiation

You can encode your files with different compression rates based on the bandwidth capability of the user. You can choose to provide as many different data rates for each file as you want.

The Player gets the best quality the connection can handle without having to explicitly choose among multiple links and Web pages. You can choose to provide as many different data rates for each file as you want. The bandwidth negotiation process is transparent to users.

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

## Creating Files with the Bandwidth Negotiation Option

**To create a web page that uses the Bandwidth Negotiation option:**

1. Start **RealPublisher** from your desktop and follow steps 1-13 for encoding audio and video files. See the “Encoding an Audio or Video File” section in the chapter “Using RealEncoder and RealPublisher) for more information.
2. In the encoding templates listbox, select a template, then depress Control key and select any other desired number of templates.
3. Click **Start** to begin multi-template template encoding.
4. Typically, each template should be a different data rate. For example you might choose a 28Kbps template, a 56 Kbps template and a 112 Kbps template.

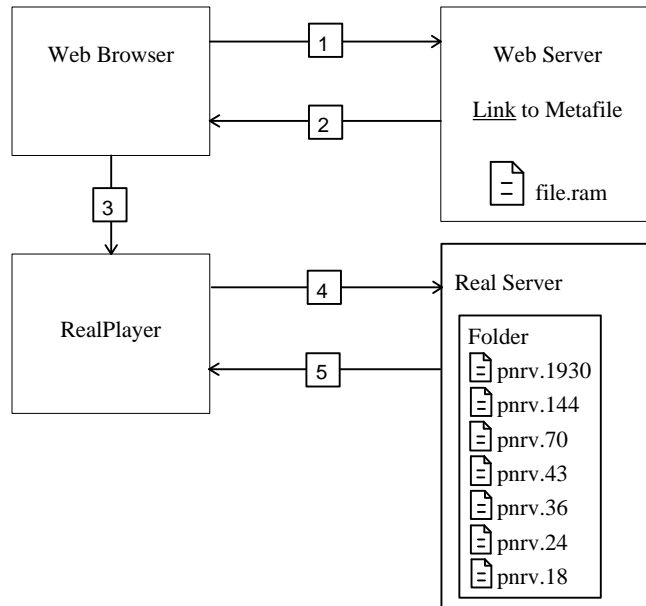
5. The Multiple Template Encoding dialog box appears. Verify that **Enable Bandwidth Negotiation** is selected. The files will automatically be named for the server.
6. Follow steps 15-16 for encoding audio and video files. See the “Encoding Audio or Video Files” section of the “Using RealEncoder and RealPublisher” chapter.
7. Click **Begin**. The encoding process starts.  
  
The Multi-Template dialog box will remain visible during encoding, and you will be able to monitor audio levels.
8. Click **OK** when the “Encoding Complete” message appears.
9. View the encoded file with RealPlayer.

## Bandwidth File Organization

File organization is the key to bandwidth negotiation. This figure shows a single link on a Web page, and seven available RealVideo files encoded using different algorithms.

The following steps correspond to the numbers in the figure:

1. The user clicks a link to a 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 RealPlayer as a helper application, and passes it the metafile.
4. RealPlayer reads the first URL from the metafile and requests it from RealServer. Based on its preference settings, RealPlayer also sends a list of RealVideo compression types it supports.
5. RealServer checks the directory specified by the URL and begins streaming the highest bandwidth file supported by RealPlayer.

The following table shows the metafile for each bandwidth and connection for RealVideo clips.



<b>Connection</b>	<b>Bandwidth (bps)</b>	<b>File Name</b>
T1	1544000	pnrv.1930
Dual ISDN	115200	pnrv.144
Single ISDN	56700	pnrv.70
56.6	56700	pnrv.43
28.8	28800	pnrv.36
19.2	19200	pnrv.24
14.4	14400	pnrv.18

The following table shows the file formats that RealAudio Player version 1.0 through 3.0 requests and order in which they are requested:

Player Version	Bandwidth Setting	Files Requested
1.0	All	14_4.18
2.0	14.4	14_4.18
2.0	28.8, ISDN, T1	28_8.36 14_4.18
2.1	14.4	14_4.18
2.1	28.8, ISDN, T1	28_8.36 14_4.18
3.0	14.4	14_4.18
3.0	28.8	dnet.25 dnet.20 28_8.36 14_4.18
3.0	ISDN	dnet.50 dnet.25 dnet.20 28_8.36 14_4.18
3.0	T1	dnet.100 dnet.50 28_8.36 dnet.25 dnet.20 14_4.18

**Note:** RealAudio Player 3.0 with a 28.8 Kbps connection always plays RealAudio 2.0 - 28.8 (28\_8.36) format if it is available. If you want to provide another 28.8 format such as 28.8 Stereo (dnet.25), do not also provide the 28\_8.36 format. If you do not provide any format supported by a Player, that Player receives a message to upgrade to the current Player release.

The following table shows the file formats that RealPlayer 4.0 and 5.0 requests and in what order they are requested.

<b>Player Version</b>	<b>Bandwidth Setting</b>	<b>Files Requested</b>
4.0	28.8	pnrv.36 dnet.25 pnrv.24 dnet.20 28_8.36 pnrv.18 dnet.15 sipr.12 14_4.18
4.0	ISDN	pnrv.1930 pnrv.144 dnet.100 pnrv.70 dnet.50 pnrv.36 dnet.25 pnrv.24 dnet.20 28_8.36 pnrv.18 dnet.15 sipr.12 dnet.10 sipr.10 14_4.18

Player Version	Bandwidth Setting	Files Requested
4.0	Dual ISDN	pnr.1930 pnr.144 dnet.100 pnr.70 dnet.50 pnr.36 dnet.25 pnr.24 dnet.20 28_8.36 pnr.18 dnet.15 sipr.12 dnet.10 sipr.10 14_4.18
4.0	T1	pnr.1930 pnr.144 dnet.100 pnr.70 dnet.50 pnr.36 dnet.25 pnr.24 dnet.20 28_8.36 pnr.18 dnet.15 sipr.12 dnet.10 sipr.10 14_4.18

<b>Player Version</b>	<b>Bandwidth Setting</b>	<b>Files Requested</b>
5.0	28.8	pnrv.36 dnet.25 pnrv.24 dnet.20 28_8.36 pnrv.18 dnet.15 sivr.12 14_4.18
5.0	56.6	pnrv.1930 pnrv.144 dnet.100 pnrv.70 dnet.50 pnrv.43 pnrv.36 dnet.25 pnrv.24 dnet.20 sivr.20 28_8.36 pnrv.18 dnet.15 sivr.20 sivr.12 sivr.6 14_4.18

Player Version	Bandwidth Setting	Files Requested
5.0	ISDN	pnr.1930 pnrv.144 dnet.100 pnrv.70 dnet.50 pnrv.43 pnrv.36 dnet.25 pnrv.24 dnet.20 sipr.20 28_8.36 pnrv.18 dnet.15 sipr.12 dnet.10 sipr.10 sipr.6 14_4.18
5.0	Dual ISDN	pnrv.1930 pnrv.144 dnet.100 pnrv.70 dnet.50 pnrv.43 pnrv.36 dnet.25 pnrv.24 dnet.20 sipr.20 28_8.36 pnrv.18 dnet.15 sipr.12 dnet.10 sipr.10 sipr.6 14_4.18

<b>Player Version</b>	<b>Bandwidth Setting</b>	<b>Files Requested</b>
5.0	T1	pnrv.1930 pnrv.144 dnet.100 pnrv.70 dnet.50 pnrv.43 pnrv.36 dnet.25 pnrv.24 dnet.20 sipr.20 28_8.36 pnrv.18 dnet.15 sipr.12 dnet.10 sipr.10 sipr.6 14_4.18

The following table shows the file formats that RealPlayer 4.0 requests from RealAudio servers 1.0 through 3.0, and RealServer in the order they are requested. The unshaded file formats can be played in real time. The file formats shaded in gray can be played, but the player will use a buffered playback mechanism to play the file.

<b>T1/LAN</b>	<b>Dual ISDN</b>	<b>ISDN</b>	<b>56.6</b>	<b>28.8</b>	<b>19.2</b>	<b>14.4</b>
pnrv.1930	pnrv.144	pnrv.70	pnrv.43	pnrv.36	pnrv.24	pnrv.18
pnrv.144	dnet.100	dnet.50	pnrv.36	dnet.25	dnet.20	dnet.15
dnet.100	pnrv.70	pnrv.43	dnet.25	pnrv.24	28_8.36	sipr.12
pnrv.70	dnet.50	pnrv.36	pnrv.24	dnet.20	pnrv.18	dnet10
dnet.50	pnrv.43	dnet.25	dnet.20	28_8.36	dnet.15	sipr.10
pnrv.43	pnrv.36	pnrv.24	sipr.20	pnrv.18	sipr.12	14_4.18
pnrv.36	dnet.25	dnet.20	28.8.36	dnet.15	dnet10	28_8.36
dnet.25	pnrv.24	sipr.20	pnrv.18	sipr.12	sipr.10	dnet.20
pnrv.24	dnet.20	28_8.36	dnet.15	dnet10	14_4.18	pnrv.24
dnet.20	sipr.20	pnrv.18	sipr.12	sipr.10	dnet.25	dnet.25
sipr.20	28_8.36	dnet.15	dnet.10	14_4.18	pnrv.36	pnrv.36
28_8.36	pnrv.18	sipr.12	sipr.10	dnet.50	dnet.50	dnet.50
pnrv.18	dnet.15	dnet10	sipr.6	pnrv.70	pnrv.70	pnrv.70
dnet.15	sipr.12	sipr.10	14_4.18	dnet.100	dnet.100	dnet.100
sipr.12	dnet10	sipr.6	dnet.50	pnrv.144	pnrv.144	pnrv.144
dnet10	sipr.10	14_4.18	pnrv.70	pnrv.1930	pnrv.1930	pnrv.1930
sipr.10	sipr.6	dnet.100	dnet100			
sipr.6	14_4.18	pnrv.144	pnrv144			
14_4.18	pnrv.1930	pnrv.1930	pnrv.1930			



## Bandwidth Negotiation Example

In this example, you deliver one of three RealVideo formats depending on the connection speed and RealPlayer version.

### To setup this example:

1. Encode the source file in the following formats:
  - RealMedia 20 Kbps Video - 6.5 Kbps Audio
  - 45 Kbps Video - 16 Kbps Audio
  - 100 Kbps Video - 40 Kbps Stereo
2. Create a metafile named **myvideo.rm** containing a URL such as:

```
prn://www.real.com/music/myvideo.rm
```
3. Create a link to the metafile in a Web page. The following HTML code is a typical link:

```
<A HREF="http://www.real.com/myvideo.rm">
Watch myvideo</A>
```
4. On RealServer computer, create a directory named **myvideo.rm** in the **/music** directory.
5. In this directory, store the three files, renamed **pnrv.24**, etc. as shown in the previous table.

The file that is played depends on the Player connection and version:

- ISDN or faster connection with RealPlayer 3.0 or later: RealAudio 3.0 - ISDN Stereo format (**dnet.50**)
- 28.8 Kbps connection with RealAudio Player 3.0 or later: RealAudio 3.0 - 28.8 Stereo format (**dnet.25**)
- 14.4 Kbps connection with RealPlayer 3.0 or later: RealAudio 2.0 - 14.4 format (**14\_4.18**)

- 14.4 Kbps or faster connection with RealAudio Player version 2.1 and earlier: RealAudio 2.0 - 14.4 format (**14\_4.18**)

# Publishing Your Pages to the Web

RealPublisher is an enhanced version of RealEncoder and offers Web publishing features including:

- automatic HTML page creation
- easy uploading of HTML pages to either a standard HTTP web server or a RealServer streaming media server

## Creating Web Pages (HTML)

A primary feature of RealPublisher is the HTML Generation Wizard. With it you can automatically create an HTML page that contains your encoded media file, and play back the media file through your Web browser.

The wizard leads you a series of prompts to help you create the HTML file and choose how your web page will look displayed either with a Pop-up Real Player Embedded RealPlayer. The wizard then allows you to preview the finished page.

The **Pop-up RealPlayer** application is launched and run from the browser and uses a standard display window and controls. The **Embedded RealPlayer** is a Netscape or Active X Plug-in that allows you to integrate components of RealPlayer within your web page. With it, you can also customize the controls and design of your web page.

**To create a web page displaying a pop-up RealPlayer (single audio or video data rate file):**

1. Start **RealPublisher**. The RealPublisher window opens.
2. Click **Create HTML**. The HTML Generation Wizard window appears.

3. Click **Next** to select a media file. The Media File page appears.
4. Click **Encoded File**.  
  
Please note: If you are creating a web page for bandwidth negotiated files click **Bandwidth Negotiation**.
5. The name of the last file encoded appears by default: If you wish to use the default file, click **Next**.
6. To select the name of a different file, click **Browse**. The Select File dialog box appears. Select the file and click **Open**.
7. The Playback Method page appears. Click **Next**.
8. Click **Pop-Up Player** and click **Next**.
9. The RealMedia caption name page appears. This name is what viewers will use to select this content.
10. Enter caption name and click **Next**.
11. The Filename page appears. Enter name of HTML file you want to create and click **Next**.
12. If you wish to preview your HTML page with a web browser, click **Preview HTML** on the Results page.
13. When preview is completed, click **Finish**.

**To create a web page displaying an embedded RealPlayer (single audio or video data rate file):**

1. Follow steps 1-6 for displaying pop-up RealPlayer
2. Click **Embedded RealPlayer** and click **Next**.
3. The Player Control page appears. Select player control layout from the available templates. Click **Next**.
4. Select player control layout from the available templates and click **Next**.
5. Click **Auto Start** if you wish the RealAudio or RealVideo file to automatically launch when web page is displayed.

6. The RealMedia caption appears. This name is that viewers will use to select this content.
7. Enter caption name and select caption placement by clicking **Place Caption Above Embedded Player** button or **Place Caption Below Embedded Player** button. Click **Next**.
8. The Filename page appears. Enter name of HTML file you want to create and click **Next**.
9. If you wish to preview your HTML page with a web browser, click **Preview HTML** on the Results page.
10. When preview is completed, click **Finish**.

## Automatic creation of metafiles

A metafile connects a web page to one or more RealAudio or RealVideo clips located on a remote server. The function of a metafile is to “point” to the location where your media file actually resides and it is required for your file to “stream”, not just download and play. Typically, a metafile is located on the web server and contains the URL where your RealAudio or RealVideo clips can be found.

Metafiles are automatically created and updated by RealPublisher during the web page creation and publishing steps.

## Publishing your files

Another primary feature of RealPublisher is the Publish to Server Wizard. This allows users to publish their RealAudio and RealVideo enabled web page to a remote server. The server can be either a RealServer streaming media server or a standard HTTP web server using a standard FTP protocol.

The wizard leads you through a series of prompts to help you specify the type of server and the directory where you will upload your page. You can also specify

the name of the web server and the URL path where your web page will be located. The wizard then allows you to preview the finished page.

To avoid confusion during the publishing process, two worksheets have been provided for you below: one for simple HTTP Streaming and the other for Streaming your media files from a RealServer. It is recommended you complete the appropriate worksheet before you begin. If you do not have the necessary information to complete these worksheets, you can obtain it from your Internet Service Provider (ISP) or your system administrator.

### **Web Publishing Worksheet for Standard HTTP Web Server**

If you are using a standard HTTP web server to stream RealAudio or RealVideo, you will need to obtain the following information from your system administrator or ISP. Please note that for simple HTTP streaming, your web page and media file will be copied to the same location.

1. **File Server:** Name or IP address of the file server that your web page will be uploaded to. For example: **ftp.server.com**. \_\_\_\_\_
2. **Directory:** Name of the directory on the file server where your web page will be uploaded to. For example, if the personal directory assigned to you by your system administrator is 'html', you would enter **html** as the directory name. \_\_\_\_\_
3. **Web Server:** Name or IP address of the web server that users will use to locate your web page. For example, if the full URL users will use to locate your web page on the Internet is <http://www.server.com/html/file.htm>: you would enter **www.server.com** as the web server name. \_\_\_\_\_
4. **URL Path:** The URL path on the web server that users will use to locate your web page. For example if the full URL that users will use to locate your web page on the Internet is <http://www.server.com/html/file.htm>, you would enter **html** as the URL path. \_\_\_\_\_

### Web Publishing Worksheet for Streaming from a RealServer

If you are using a RealServer to stream RealAudio or RealVideo, you will need to obtain the following information from your system administration or ISP. Please note that for streaming from a RealServer your web page will be copied to a standard HTTP web server, while your encoded media file may be copied to a separate RealServer.

1. **File Server:** Name or IP address of the file server that your web page will be uploaded to. For example: **ftp.server.com**. \_\_\_\_\_
2. **Directory:** Name of the directory on the file server where your web page will be uploaded to. For example, if the personal directory assigned to you by your system administrator is 'html', you would enter **html** as the directory name. \_\_\_\_\_
3. **RealServer:** Name or IP address of the RealServer that your encoded media file will be uploaded to. For example: **ftp.server.com**. \_\_\_\_\_
4. **Media Directory:** Name of the media directory on the RealServer where your encoded media file will be uploaded to. For example, if the media directory assigned to you by your system administrator is 'media', you would enter **media** as the directory name. \_\_\_\_\_
5. **RealServer Location:** Name or IP address of the RealServer that users will use to locate your media file. For example, if the full URL users will use to locate your media file on the Internet is `pnm://pnm.server.com/media/file.rm` you would enter **pnm.server.com** as the RealServer name. \_\_\_\_\_
4. **URL Path:** The URL path on the RealServer that users will use to locate your media file. For example if the full URL that users will use to locate your media file is `pnm://pnm.server.com/media/file.rm` you would enter **media** as the URL path.  
\_\_\_\_\_

**To publish a file to stream directly from a standard HTTP web server:**

1. Click **Publish**. The Publish to Server Wizard window appears.
2. Click **Next** to create a wizard. File Name page appears with the name of the last web page created using the wizard:
3. Click **Next** if you wish to publish this page.
4. Click **Browse** to select another file. Select File page appears. Enter name of file you wish to publish and click **Open**.
5. The Streaming Method page appears. Click **Stream Media File from a Standard HTTP Web Server** and click **Next**.
6. The Web Server Information Upload Location page appears. Type in the name or IP address of the remote server where you are uploading your files and the directory on the upload server where your page will be sent. Then type in your user name and password.
7. The Web Server Information Internet Location page appears. Type in the name or IP address of the web server and URL path that users will use to locate your web page on the Internet.
8. Please note that the Upload Location may be different than the one used to view your web page on the Internet. Contact your Internet service provider for this information.
9. The Upload Progress page appears. Click **Finish**. Your files automatically upload to your web server.

**To publish a file to stream directly from a RealServer streaming media server:**

1. Click **Publish**. The Publish to Server Wizard window appears.
2. Click **Next** to create a wizard. File Name page appears with the name of the last web page created using the wizard:
3. Click **Next** if you wish to publish this page.
4. Click **Browse** to select another file. The Select File page appears. Enter name of file you wish to publish and click **Open**.



5. The Streaming Method page appears. Click **Stream Media File from a RealServer**, then click **Next**.
6. The Web Server Information Upload Location page appears. Type in the name or IP address of the web server where you are uploading your files and the directory in the upload server where your page will be sent. Then type in your user name and password.
7. The RealServer Information Upload Location page appears. Enter the name or IP address of the RealServer where your media file will be sent. Enter the directory where your media file will be sent and click **Next**.
8. The RealServer Information Internet Location page appears. Type in the name or IP address of the RealServer and URL path that users will use to locate your media file on the Internet.

Please note that the Upload Location may be different than the one used to view your media file on the Internet. Contact your Internet service provider for this information. The Upload Progress page appears.

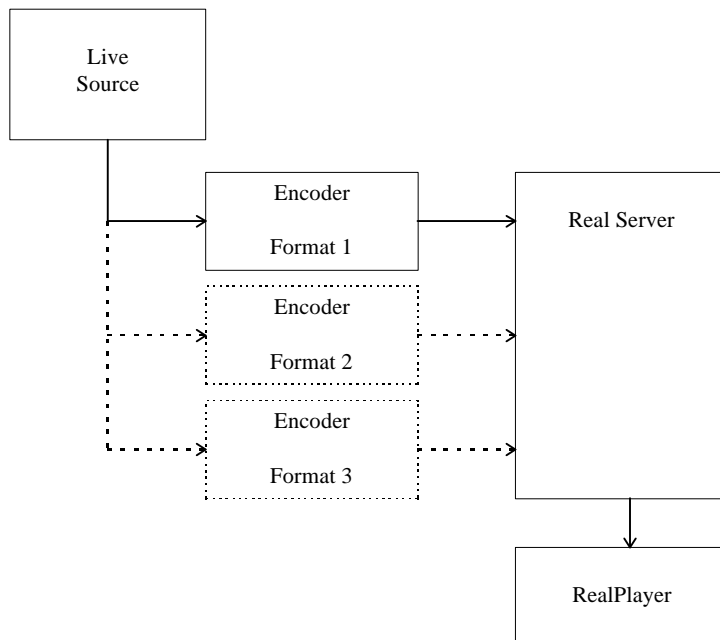
9. Click **Finish**. Your files automatically upload to your web server.

# Live Broadcasting

With a RealServer streaming media server, 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 and RealVideo to attract whole new audiences.

Broadcasting live requires using RealServer streaming media server with a RealEncoder or RealPublisher for transmission over the Internet. If you choose, you can save the event to disk while you are broadcasting.

For each encoding algorithm that you want to broadcast live, you need an Encoder. For example, to offer a live broadcast in both RealAudio 2.0 - 28.8 and RealAudio 3.0 - 28.8 Stereo, you need to run two copies of RealAudio Encoder sending their output to a RealServer streaming media server. The bandwidth negotiation feature of the RealServer automatically delivers the highest bandwidth signal supported by the Player.



## Advertising Your Event

If you want help advertising your site or live event, you can advertise in “Timecast: Your RealMedia Guide” (<http://www.timecast.com>), the RealNetworks online resource for RealAudio and RealVideo sites and live events.

Inform the Timecast staff of your site or event by completing an online form. After you submit the online form, the data is verified by a staff member of Timecast and posted on the Timecast site. Timecast strives to be a quality listing service and therefore maintains editorial control over all information submitted. If you have any questions or need to make changes to any submissions please email [Timecast@Timecast.com](mailto:Timecast@Timecast.com).

### **To advertise your site on Timecast:**

Use the Web form located at <http://cgi2.timecast.com/cgi-bin/addsite.cgi> to submit your newly completed site for inclusion in either Timecast’s Audio, Video, or Live Stations Guide. On the Web form, you enter basic information about the site such as the site name, URL, and description.

### **To advertise your event on Timecast:**

Use the Web form located at <http://cgi2.timecast.com/cgi-bin/addlive.cgi> to submit all your live events. On the Web form, you enter basic information about the event, such as name, complete URL, date and time of the event, and a short description. You can also indicate whether the event is recurring (occurs weekly) or non-recurring (one-time only).

## Place Special Tags in your HTML Code

If you have several different events, you can save time by inserting special “live tags” in your HTML code. The live tags are placed within comment lines in the source html, so that they are invisible to your users. A software robot reads the information in the live tags and automatically enters the event(s) in Timecast.

**To advertise your live event using special tags:**

1. On the web page with the link to your live event, insert the live tags using the following format:

```
<!--@Rastart event="Brief Event Description"  
start="Thu, 11 Apr 1996 20:30:00 EST" -->  
(some HTML that describes the event)  
<!--@RAend-->
```

**Note** For more information about the live tag, refer to:

**<http://www.real.com/help/content/livetags.html>**

2. Send e-mail to: *live\_event@prognnet.com*. Do not enter a subject. In the body of the e-mail, enter the complete URL for the page containing the live tags (for example: **<http://www.real.com/example/tags.html>**). A software Robot gathers the information in your live tags. The data is verified by a staff member of Timecast and posted.

**Note** It is VERY important that you include the full address, including the "http://" part. If you use frames, be sure to send the address for the event page that appears within a frame, not the HTML page that creates the frames.

# Delivering Live Content

RealEncoder or RealPublisher included with RealServer streaming media server can deliver live content for broadcasting live events.

To deliver live content, you need:

- A live source
- A computer running RealEncoder or RealPublisher
- A server running a RealServer

The computer running the encoder and the computer running RealServer can be on different platforms.

## Setting Up RealServer

To enable live delivery, be sure the following configuration settings are included in the RealServerconfiguration file:

- **PnaPort** - the port number to which the Encoder connects
- **EncoderPassword** - the password the Encoder uses to connect

You have the option of specifying that the Server saves the live content as a RealAudio or RealVideo file by setting the **LiveFileTarget** and **LiveFilePassword** configuration option.

## Connecting the Encoder to RealServer

RealEncoder and RealPublisher translates the broadcast into one or more formats that RealServer can distribute over the Internet. As administrator of the RealServer , you must provide a way for the RealEncoder or RealPublisher

to connect to RealServer. You do this using the **PnaPort** and **EncoderPassword** configuration settings.

The **EncoderPassword** setting specifies the password the Encoder must use to connect to RealServer. Passwords are necessary to keep unauthorized users from connecting to the stream of your live broadcast. For example, if you have the setting:

```
EncoderPassword FrogNet
```

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

Bandwidth negotiation during live events is a feature from RealAudio 3.0 that is no longer supported in RealServer. If you are using RealAudio 3.0, connect one encoder for each encoding algorithm you want to support. Specify the same file name as the output from each encoder. RealServer recognizes the format of each stream and directs it to RealPlayers requesting that format.

The **EncoderTimeout** configuration parameter specifies how long RealServer stays connected to an encoder that is not sending data.

## EncoderPassword

Password used by RealAudio Encoder, RealEncoder or RealPublisher and the slta utility program to connect to RealServer.

Used by	<b>pnservice</b>
Default value	(none)
Range of values	Alpha-numeric string without spaces
Restart Server after change	No

```
EncoderPassword <password>
```

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

**Example**

```
EncoderPassword rmRecord1
```

## EncoderTimeout

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

Used by	<b>pnserver</b>
Default value	30
Range of values	1 - 32767 seconds
Restart Server after change	No

```
EncoderTimeout <seconds>
```

Setting EncoderTimeout to less than 10 seconds is not recommended.

**Example**

```
EncoderTimeout 20
```

## RealAudio and RealVideo Live Broadcasts

With the appropriate RealServer license key, RealEncoder and RealPublisher can deliver live content for broadcasting live events.

**To deliver live content, you must:**

1. Install RealEncoder or RealPublisher on the encoding machine.
2. Install RealServer on the serving machine. (It may be the same as the encoding machine.)
3. Attach your audio or video source to the audio or video capture card.

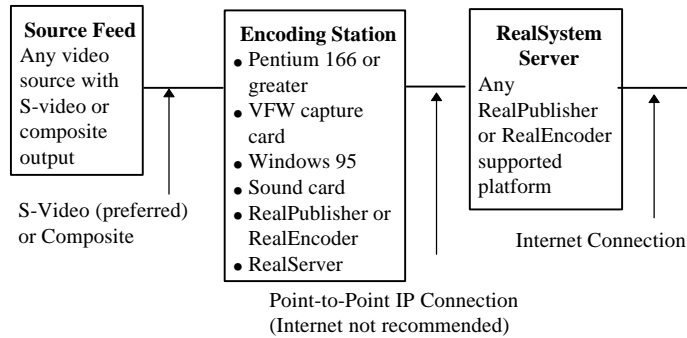
**Note:** RealEncoder, RealPublisher and RealServercomputers can be on different platforms.

### System Requirements for Live RealVideo

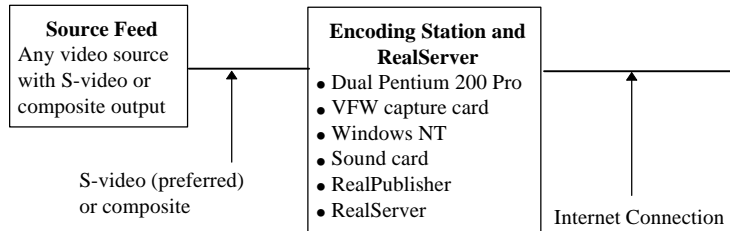
Delivering live video content at a higher frame rate requires a different system configuration than delivering live content at a low frame rate. Three recommended configurations are detailed below.



**Configuration 1: Low Frame Rate (<2 frames per second)**

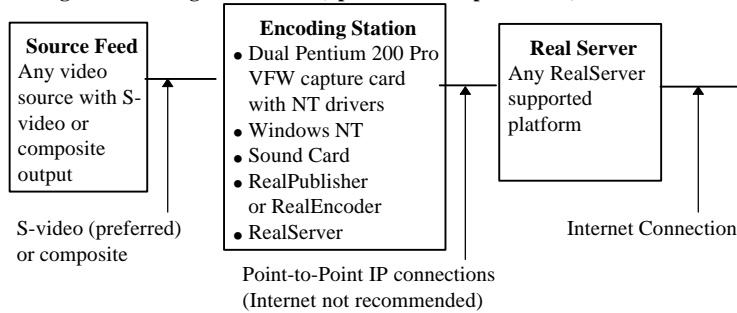


**Configuration 2: High frame rate (up to 10 frames per second\* <200 streams)**



\*Actual maximum frame rate is dependent on bit rate and content.

**Configuration 3: High frame rate (up to 15 frames per second)**



## Software Requirements

To broadcast live, the following software is required:

- RealEncoder or RealPublisher
- A minimum of a 60 stream RealServer
- RealPlayer

## Producing High Quality Live Content

- The average bit rate should be equal to the requested bit rate (the bit rate specified in the template). If the average bit rate exceeds the requested bit rate, you can:
  1. Switch to optimal frame rate.
  2. Use a lower bit rate audio codec.
  3. Use a higher requested bit rate.
- Audio quality is important when delivering live content. Setting the volume too low can result in a weak signal. Setting the volume too high can cause a distortion of the audio.
- Under no circumstance is loss of audio acceptable. If you experience audio loss in a live broadcast:
  1. Use optimal frame rate to ensure you don't send data at too high of a data rate.
  2. Test data with similar content before using a set frame rate.
  3. Lower the frame rate. If necessary, lower the video quality.
- Latency, the amount of time required for buffering the video, should not exceed 5-10 seconds when delivering live content.
- View the live content using a RealPlayer. This allows you to see how the live content looks when it is delivered.
- If you are not maintaining the required frame rate, reduce the system load by disabling the encoder preview window.

1. If you are having encoding problems you have five variables to adjust:
2. Frame size
3. Frame rate
4. Bit rate
5. Audio codec (portion of total bits)
6. Quality

You may need to experiment with these variables to achieve the overall effect you are after.

## Encoding Templates

Live encoding usually requires creating your own template. How you design your template depends largely on the power of your system. When encoding video frames that are 176 pixels by 144 pixels, a dual processor 200 MHz computer gives a good result with a frame rate of 4 fps, Quality 100, or with a frame rate of 9 fps, Quality 25. A single processor Pentium system gives a better result when set at 2-3 fps.

For more information about creating templates, refer to the “Using RealEncoder and RealPublisher.”

## Encoding and Broadcasting Live Content for Windows

RealEncoder and RealPublisher for Windows runs on Windows 95 and Windows NT.

To provide content in multiple compression algorithms, run multiple machines using RealEncoder or RealPublisher with the same input signal. All concurrently running copies of RealEncoder or RealPublisher should use identical settings except for **Compression Type** and stream name.

### **To encode and broadcast live audio or video using RealEncoder or RealPublisher:**

1. Start **RealEncoder** or **RealPublisher**. The RealEncoder or RealPublisher window opens.
2. Click **Open Session** from the File menu. The Open Session window appears:
3. In the source pane, verify that **Capture Device** is selected.
4. Click **Audio Capture** for audio only or select **Audio Capture** and **Video Capture** for video with audio.
5. In the destination pane, click **RealServer**.

While performing a live broadcast you can archive the event by also selecting **Destination RealMedia File** from the Open Session window.

6. Enter host name, which is the domain name or the IP address of the RealServer streaming media server computer.
7. Enter your password. This field is optional depending on how your RealServer is set up.
8. Enter the resource name, which is the name you give to the audio or video stream being encoded and which users will refer to.
9. Click **OK**. The Open Session window closes.
10. In the properties pane, enter the Title, Author, and Copyright information for your output stream. These fields are optional. If you choose to provide this information, it will be displayed on the viewer's Real Player.
11. To allow RealPlayer Plus users to save your Real Audio or RealVideo signal to disk, click **Selective Record**.
12. In the templates pane, select the template to encode the file.
13. Select **Statistics** from the View menu. The Statistics window appears. The information displayed in this window during broadcast will help you evaluate and adjust your template settings.
14. The audio level meter, view input video window and view output window can be turned off to marginally increase performance. From the Options menu, click **Show Source Input**, **Show Encoded Output**, and **Show Audio Meter** to clear the selection.
15. For video encoding only, notice **Frame Rate** in the results pane of the Statistics window. Wait while enough data is collected for an average frame rate to be determined. If the average frame rate is below the frame rate set in your template, adjust the encoding by varying one of the five variables.
16. For video encoding only, notice **Latency** in the results pane of the Statistics window. If latency is greater than 5 or 10 seconds, adjust the template.
17. For video encoding only, select **Set Video Format** from the Options menu. You can use this option to adjust video format settings while delivering live content. Click **OK** to accept the current settings.

18. Click **Start** and monitor the progress of the encoding.

Listening and viewing the live content through your Web browser is strongly recommended.

## Live Encoding Command-Line Control

Command line options allow automation of live feeds. Refer to the “Command Line Encoding for Windows” section of the “Editing Video Files” chapter for a list of static encoding options. Additional RealEncoder/RealPublisher options for live encoding are listed below:

Option	Description
/L	Turns on Live Input instead of static input file. The destination can then be selected between server or file output.
/S server[:port]/filename	Specifies delivery to a server on the supplied port. If the port is not supplied then the default of 7070 is used. The server can be either a hostname or IP address. The filename is used as the target on the server.
/W password	Specifies the password, if required to connect to the Live Server. The default is no password and is only used if the target is a server.
/O	Used for the file name at the encoder if simultaneous file output is required.
/I	Specifies an Input File.
/D hhh:mm:ss	Allows the encoder to run for the supplied time. The maximum time is 999:59:59. When the time elapses then the encoder should gracefully shutdown and exit. If a static file is being encoded and the file ends before the maximum duration, there is no need for an error message. If this option is not supplied, then the encoder continues to

	run.
--	------

Ctrl-C terminates encoding.

## Enhancing Live Broadcasts with Video Image Maps and Synchronized Web Pages

You can deliver a Synchronized Multimedia presentation or apply an image map to a video stream with a live broadcast. The events are delivered relative to the time a client begins playing the live broadcast, instead of relative to an absolute position in the broadcast.

The URL events must be defined before the broadcast, but you can change the content of the Web page the URL references during the broadcast.

An image map can change over time, but this is not synchronized with the video stream. You can add any static content type to a live stream that is not already present in the stream. An example of this could be a link for the whole image to a site with a link to the broadcaster tied to a superimposed logo added to the stream before encoding.

### To create a Synchronized Multimedia presentation for a live broadcast:

1. Create the input file that defines each event and the time that the event is sent. Remember that the times you specify are relative to when the client begins playing the live broadcast.
2. Run the **rmmerge** tool to create a .rm file. Repeat steps 1 and 2 for any image maps.
3. Name the .rm file with the same filename you specify in the **Resource** box in RealPublisher or RealEncoder for the broadcast.
4. Move the .rm file to the path specified in the **Resource** box in RealPublisher or RealEncoder .

The file must be named **concert.rm** and it must be located in the **/live** directory relative to the server's base path.

# Simulating a Live Broadcast

At times, you might want to play a recorded media 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 a commercial on your site. The **slta** (Simulated Live Transfer Agent) utility lets you play a recorded media file as if it were live.

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

## Simulated Live Broadcast

The **rvtlta** (RealVideo simulated live transfer agent) utility delivers pre-recorded content as if it were a live event. Users connecting to the link will get the event "in progress". It can be used as a test, to delay broadcast of a live event or to multicast pre-recorded content. The syntax is as follows:

```
rvtlta -i path\infile.rm /o outfile.rm -s server [-p port] [-w password]
```

where:

- infile** is the path and file name to the input file.
- outfile** is the path and file name to the output file.
- server** is the server name.
- port** is the server port (port defaults to 7070).
- password** specifies the password slta uses to connect to the server (defaults to none).

For example:

```
rvtlta -i c:\livefile.rm -o livenow.rm -s www.testserver.com
```



# Configuring Your Web Site

After encoding your RealMedia files, you are ready to attach the files to Web pages. The following sections explain the construction and use of RealMedia content on your Web site. When you have your RealSystem server set up, use this information to showcase audio and video content from your site.

## Making the Most of Your Content

To get the most out of your RealMedia content, educate your Web site's visitors about RealAudio and RealVideo. Let people know that they can listen and view your clips instantly, without download delays. Identify each clip with a Real bubble icon to distinguish it as real-time audio and video.



The graphics are available from the RealNetworks Web site at

[www.real.com](http://www.real.com)

Make it easy for your visitors to get RealPlayer by linking the graphics to the RealNetworks home page at:

[www.real.com/](http://www.real.com/)

## Metafiles

RealMedia material is reached via links, just as HTML documents use hyperlinks to connect Web pages. However, the RealMedia links you put into your HTML pages are not direct references to the RealAudio or RealVideo files. Instead they are references to metafiles which contain information needed to establish a connection between your RealSystem server and the user's RealPlayer and to initiate playback.

Instead of pointing to a file, your Web page is set up to point to a metafile. This metafile, in turn, contains the URL (Uniform Resource Locator) of the file (or files) you want associated with the hyperlink. The user's browser passes the URLs to RealPlayer, which retrieves **.ra** or **.rm** files from your RealSystem server.

Metafiles contain the addresses of RealAudio (.ra) and RealVideo (.rm) files. These addresses are in the form of URLs. The URLs used to establish a direct connection between a RealPlayer and your RealSystem server begin with "pnm: //" (RealNetworks Metafile). Once in place, this direct connection is used to stream to the Player and to carry commands (such as seek or pause) back to your RealSystem server.

## Creating Metafiles

Your Web pages will link to metafiles, which in turn point to the DNS name of the computer on which your RealSystem server and RealMedia files are located.

If you are using Flash Animation, you'll include that information in the metafiles.

### To create a metafile:

1. Use a text editor (such as Notepad) to create a file containing the RealAudio or RealVideo URL. The contents of your file should be in the following form:

```
pnm: //hostname/path
```

For example, to provide access to a RealVideo file called `hello.rm`, the text of your metafile would be:

```
pnm://www.server1.com/hello.rm
```

where `www.server1.com` is the DNS name of the machine running your RealSystem server, on which you store your RealAudio or RealVideo files.

If you want more than one file to play when the user clicks your link, create a metafile containing several URLs (on separate lines with no intervening blank lines). For example, if your metafile contains:

```
pnm://www.server1.com/hello.rm  
pnm://www.server1.com/welcome.rm  
pnm://www.server1.com/coolstuff.rm
```

the Player automatically plays your three files in sequence. A listener can use the Clip menu on the Player to move forward and backward between clips.

If you are using Flash Animation, add file names to the `.rm` information:

```
pnm://www.server1.com/hello.rm+hello.swf  
pnm://www.server1.com/welcome.rm  
pnm://www.server1.com/coolstuff.rm
```

2. Save your metafile in the “All files (\*.\*)” format, using a **.ram** file name extension.

For example, you could save the three lines shown above in a file named `3track.ram` on your Web server.

3. In your HTML document, reference the metafile in a hyperlink, followed by a reference to the Real icon (so that the Real icon is displayed to the left of the file) as follows:

```
<A HREF="http://www.real.com/welcome.ram"> <IMG  
SRC="http://www.real.com/pics/rvfile.gif"  
align=left border=0> Welcome!</A>
```

where `welcome.ram` is the metafile.

## File Name Extensions

Each metafile that you create must be given a file name extension. This extension tells your Web server what the metafile is, to ensure that the enclosed URL is handled properly.

There are two metafile types: **.ram** and **.rpm**. These different file name extensions are passed on by your Web server and tell the user's Web browser which application to launch to play the referenced file:

.ram file – Web browser launches RealPlayer

.rpm file – Web browser launches RealPlayer Plug-in (see below)

**Note** You must configure your Web server to understand that the extension **.ram** refers to the MIME type **x-pn-realaudio**.

## Customizing Calls to Video and Audio Content

Optional arguments may be added to metafiles to finesse what is seen and heard by users when they click your RealMedia link. You may alter the point in a clip at which play starts or ends, or the Title, Author, and Copyright information is displayed by RealPlayer.

Add the options to your metafile following the URL to which they apply. Options must be preceded by a ? (question mark) and separated from each other by an & (ampersand). The syntax is as follows:

```
pnm://www.real.com/test.rm?[opt1]&[opt2]
```

## Changing Start and Stop Times

To create a link that starts playing a clip from a point other than the beginning of the file, use the **start** command. Specify the time into the clip at which play should begin. For example:

```
pnm://www.real.com/test.rm?start="30"
```

would result in playback starting thirty seconds into the file.

The format for the start time is as follows:

```
start="dd:hh:mm:ss.ss"
```

Tenths of seconds are separated from seconds by a decimal point; the other units of time are separated by colons. The time is interpreted from right to left, and it is not necessary to specify days, hours, or minutes if these are not relevant.

Similar to the **start** option is the **end** option. For example, the metafile text:

```
pnm://www.real.com/test.rm?end="5:30"
```

is used to provide for playback of test.rm that terminates five minutes and thirty seconds from the start of the clip.

**Note:** The end time is always measured from the actual start of the data in the file, even in the case where playback begins elsewhere. For example, the line:

```
pnm://www.real.com/test.rm?start="30"&end="5:30"
```

is used to start play of test.rm from the thirty-second mark and to stop play five minutes later.

## Changing Title, Author, or Copyright Information

The following options exist to change the descriptive information from within the metafile:

```
title="new title"  
author="new author"  
copyright="new copyright"
```

Strings can be changed independently or in combination.

Changing information in this manner does not change what is stored in your file—only what is displayed when it is accessed through this particular metafile. This functionality is especially useful if, for example, you have one large file that contains your band's entire CD, and you want to credit the author of each song as it plays. You could create a multi-clip .ram file as follows:

```
pnm://www.server/band.rm?end="5:30"&title="Song1"  
pnm://www.server/band.rm?start="5:31"&end="7:45"  
    &title="song2"&author="Joe Smith"  
pnm://www.server/band.rm?start="7:46"&end="15:01"  
    &title="song3"&author="Jane  
    Smith"&copyright="My Music, 1996"
```

## HTTP Streaming

HTTP streaming enables content providers to stream RealMedia clips from a World Wide Web server. While this method is not as robust as using metafiles,

it provides a reasonable method for providing short RealMedia content to a limited number of users.

Before you can stream RealAudio and RealVideo clips through HTTP, you must define the following MIME types for your World Wide Web server:

```
audio/x-pn-RealAudio (files with a .ra, .rm or
                      .ram file extension)
audio/x-pn-RealAudio-plugin (files with a .rpm
                              file extension)
video/x-pn-RealVideo (files with a .ra, .rm or
                      .ram file extension)
video/x-pn-RealVideo-plugin (files with a .rpm
                              file extension)
```

Some World Wide Web servers are pre-configured with these MIME types.

**Note:** If you are running a Web page off an ISP server, ask the ISP administrator to configure the RealPlayer mime type.

### To stream RealAudio and RealVideo content using HTTP:

1. Copy your encoded RealAudio and RealVideo files (files with the .ra or .rm extension) to your World Wide Web server.
2. Use a text editor (such as Notepad) to create a metafile containing the RealAudio or RealVideo URL. For example, the contents of your file should be in the following form:

```
http://hostname/path
```

3. where hostname is the name of your World Wide Web server. For example: www.real.com
4. Save your metafile as “All Files (\*.\*)” using a .ram file name extension.
5. In your HTML document, reference the metafile in a hyperlink. For example:

```
<A HREF="file.ram">
<A HREF="http://hostname/file.ram">
```

6. You can use relative or complete paths. If you use complete paths, you must include both the hostname and the complete path. For example:

```
<A  
  HREF="http://www.real.com/home/welcome.ram">
```

7. When a user clicks on the link, the audio or video file(s) begin to download. RealPlayer begins playing after a few seconds; it does not need to wait for the entire file to be downloaded.

## Custom Controls for RealAudio and RealVideo

RealAudio and RealVideo enables seamless integration of RealPlayer Controls into your Web page layout. You can place individual interactive components, such as a play button or image window, anywhere on your page, just as you would place an image using the <IMG> tag in HTML.

There are two products which, in conjunction with the most popular Web browsers, enable “in page” audio controls.

- RealPlayer Plug-in provides Player-like features to browsers that support the Netscape Navigator Plug-in architecture. This plug-in also works in Internet Explorer 3.0.
- RealPlayer Control for ActiveX works with Internet Explorer 3.0 and Visual Basic applications to provide RealAudio and RealVideo playback capabilities.

### Using RealPlayer Plug-in

The Plug-in runs as an adjunct to Web browsers that support Netscape’s Plug-in architecture. This RealPlayer Plug-in is included in the Player installation.

The <EMBED> tag specifies Plug-in attributes in HTML pages in much the same way that the <IMG> tag specifies image attributes. The basic <EMBED> tag for RealPlayer contains only the attributes SRC, WIDTH, and HEIGHT, as shown below:

```
<EMBED SRC=metafile.rpm WIDTH=width_value  
  HEIGHT=height_value>
```

For example:

```
<EMBED SRC="sample1.rpm" WIDTH=300 HEIGHT=134>
```

creates an in-page RealPlayer that is 300 pixels wide and 134 pixels high.

For the Plug-in, metafiles are stored with a .rpm file name extension.

The name tag is supported as an option with JavaScript to refer to a specific plug-in.

**Note** Do not place the <EMBED> tag within a table.

Feature	Description
SRC Attribute	<p>The SRC attribute specifies a metafile to be accessed. RealPlayer Plug-in is associated with a .rpm file name extension. This extension tells the user's Web browser to load RealPlayer Plug-in rather than the stand-alone RealPlayer.</p> <p>For the user's Web browser to correctly identify .rpm files, you or your system administrator must first configure the .rpm MIME type in your Web server. Users do not need to configure their Web browsers to recognize the .rpm MIME type. The plug-in architecture automatically sends .rpm files to RealPlayer Plug-in. Files with a .rpm extension are identical to .ram files, except for the extension.</p>



Feature	Description
<p>WIDTH and HEIGHT Attributes</p>	<p>The WIDTH and HEIGHT attributes specify the size of the embedded RealAudio or RealVideo component. Unlike images, Plug-ins do not size automatically. The WIDTH and HEIGHT can be specified in pixels (the default) or as a percentage of the Web browser window (for example: WIDTH=100%).</p> <p><b>Note</b> If the WIDTH and HEIGHT attributes are not included, the Plug-in may appear as a tiny (and useless) icon with some browsers.</p> <p>If you want your Plug-in component to maintain an absolute size, specify HEIGHT and WIDTH in pixels. If you want the Plug-in graphic to scale with the Web browser window, specify size as a percentage. For example, if you want to fit the entire width of the Web browser window, use WIDTH=100%.</p>
<p>CONTROLS Attribute</p>	<p>The CONTROLS attribute of the &lt;EMBED&gt; tag allows you to place individual control elements within your page. You can use multiple &lt;EMBED&gt; statements to construct a custom interface, made up of individual controls. You can also place multiple controls within a single &lt;EMBED&gt; statement. CONTROLS supports the following values: All, ControlPanel, InfoVolumePanel, InfoPanel, StatusPanel, StatusBar, PlayButton, StopButton, VolumeSlider, PositionSlider, PositionField, StatusField, ImageWindow.</p>
<p>CONSOLE</p>	<p>Sets a console name used to link multiple control instances. All controls with the same console name work together. For example, if you have multiple Play and Stop buttons on the same page, the console name would enable them to control the same RealAudio or RealVideo clip. Call this function once for each instance of the Play or Stop button you want to link.</p> <p>The console name. “_master” links to all instances. “_unique” links to no other instances.</p>

Feature	Description
AUTOSTART	Sets whether or not the control automatically starts playing once the source data is available. Valid values are TRUE or FALSE.
NOLABELS	Suppresses the Title, Author, and Copyright label text in the controls window. The text strings in the fields are still displayed.
RESET	Resets RealPlayer Control for ActiveX playlist. Valid values are TRUE or FALSE.
AUTOGOTOURL	Specifies how a URL is handled. Valid values are TRUE or FALSE. TRUE indicates that RealPlayer Control for ActiveX automatically forwards the URL event to the browser. FALSE indicates that the OnGotoURL VBScript event is used instead.

## Creating HTML Pages for Browsers Unable to Use the Plug-in

Some Web browsers do not support plug-ins. You can create HTML pages that are enhanced for plug-ins but which also work for other browsers. Simply use the <NOEMBED> tag to include HTML statements for use by Web browsers that do not support Plug-ins.

The <NOEMBED> command should appear after an <EMBED> command and take the following syntax:

```
<NOEMBED> HTML to be ignored </NOEMBED>
```

For example, the command:

```
<EMBED SRC="sample1.rpm" WIDTH=300 HEIGHT=134>  
<NOEMBED> <A HREF="sample1.ram"> Please play the  
clip using the stand-alone RealPlayer!  
</A></NOEMBED>
```

would show a page with the Plug-in if your page were accessed by a browser supporting Plug-ins, and would otherwise display the message "Please play the clip using the stand-alone RealPlayer!" (and allow playback with the standard RealPlayer).

## Using RealPlayer Control for ActiveX

You can embed RealPlayer Control for ActiveX in HTML pages using the Object tag.

The following is an example of RealPlayer Control <OBJECT> in an HTML page.

```
<OBJECT
  ID=RAOCX
  CLASSID="clsid:CFCDA03-8BE4-11cf-B84B-0020AFBCCFA"
  HEIGHT=140
  WIDTH=312>
  <PARAM NAME="SRC" VALUE="pnm://audio.real.com/file.rm">
  <PARAM NAME="CONTROLS" VALUE="all">
</OBJECT>
```

**Note** Directory names cannot have spaces.

### Embedded Object Parameters

Feature	Description
OBJECT	Tag is used to embed RealPlayer Control for ActiveX. There should be one <Object> tag per RealPlayer Control on the page.
CLASSID	Specifies the control's CLSID. This value is always "clsid:CFCDA03-8BE4-11cf-B84B-0020AFBCCFA" for RealPlayer Control for ActiveX.
HEIGHT	Specifies the control's height on the HTML page. A value of 0 makes the control invisible.
WIDTH	Specifies the control's width on the HTML page. A value of 0 makes the control invisible.
PARAM	Specially embedded tag for supplying parameters to the ActiveX object.

The following properties are available to the PARAM Parameter:

Parameter	Description
SRC	Sets the source of RealAudio or RealVideo clip. The SRC location can be pnm, file or http protocol. This parameter is required.
CONTROLS	Sets the visible components of the control. Valid CONTROLS include All, ControlPanel, InfoVolumePanel, InfoPanel, StatusPanel, StatusBar, PlayButton, StopButton, VolumeSlider, PositionSlider, PositionField, StatusField, and ImageWindow.
CONSOLE	Sets a console name used to link multiple control instances. All controls with the same console name work together. For example, if you have multiple Play and Stop buttons on the same page, the console name would enable them to control the same RealAudio or RealVideo clip. Call this function once for each instance of the Play or Stop button you want to link. The console name. “_master” links to all instances. “_unique” links to no other instances.
AUTOSTART	Sets whether or not the control automatically starts playing once the source data is available. Valid values are TRUE or FALSE.
NOLABELS	Suppresses the Title, Author, and Copyright label text in the controls window. The text strings in the fields are still displayed.
RESET	Resets RealPlayer Control for ActiveX playlist. Valid values are TRUE or FALSE.
AUTOGOTOURL	Specifies how a URL is handled. Valid values are TRUE or FALSE. TRUE indicates that RealPlayer Control for ActiveX automatically forwards the URL event to the browser. FALSE indicates that the OnGotoURL VBScript event is used instead.

## Specifying How the Control Should Look

The **CONTROLS** attribute allows you to place individual control elements within your page. The **CONTROLS** attributes for the Netscape Navigator Plug-in and RealPlayer ActiveX Control are the same. The following explains the output of each attribute:

**All** - Displays a full Player view including the Control Panel, Information-and-Volume Panel and Status Bar.

**Minimum Width:** 21%

**Maximum Width:** 100%

**Minimum Height:** 23%

**Maximum Height:** 80%

**InfoVolumePanel** - Displays the Title, Author, and Copyright information panel and the volume slider.

**Minimum Width:** 21%

**Maximum Width:** 100%

**Minimum Height:** 12%

**Maximum Height:** 50%

**InfoPanel** - Displays the Title, Author, and Copyright information.

**Minimum Width:** 20%

**Maximum Width:** 100%

**Minimum Height:** 10%

**Maximum Height:** 50%

**ControlPanel** - Displays the play/pause button, the stop button and the position slider.

**Minimum Width:** 21%

**Maximum Width:** 100%

**Minimum Height:** 8%

**Maximum Height:** 25%

**StatusPanel** - Displays the Status Panel showing informational messages, current time position, and clip length. If you do not embed a Status Panel in your page, error messages are displayed in the Web browser's status bar.

**PlayButton** - Displays the play/pause button.

**Minimum Width:** 5%

**Maximum Width:** 100%

**Minimum Height:** 2%

**Maximum Height:** 25%

**StopButton** - Displays the stop button.

**Minimum Width:** 5%

**Maximum Width:** 100%

**Minimum Height:** 2%

**Maximum Height:** 25%

**VolumeSlider** - Displays the volume slider.

**Minimum Width:** 4%

**Maximum Width:** 100%

**Minimum Height:** 10%

**Maximum Height:** 100%

**PositionSlider** - Displays the position slider.

**Minimum Width:** 8%

**Maximum Width:** 100%

**Minimum Height:** 5%

**Maximum Height:** 25%

**PositionField** - Displays the field of the Status Bar showing position and clip length.

**Minimum Width:** 10%

**Maximum Width:** 100%

**Minimum Height:** 4%

**Maximum Height:** 25%

**StatusField** - Displays the message text area of the Status Bar.

**Minimum Width:** 13%

**Maximum Width:** 100%

**Minimum Height:** 4%

**Maximum Height:** 15%

**ImageWindow** - Displays the video image. (Only available for .rm files)

**Minimum Width:** 100%

**Maximum Width:** 100%

**Minimum Height:** 100%

**Maximum Height:** 100%

**StatusBar** - Displays the status field, position field, channels (stereo/mono).

**Minimum Width:** 21%

**Maximum Width:** 100%

**Minimum Height:** 5%

**Maximum Height:** 14%

## ActiveX Methods and Properties

### Methods

Methods are functions that control the performance of the Control. Unless otherwise noted, these methods have no return values and no parameters.

Method	Description
DoPlayPause	Plays or pauses the current clip. Equivalent to clicking the Play/Pause button.
DoStop	Stops the clip. Equivalent to clicking the Stop button.
DoNextItem	Skips to the next clip in a .ram file that contains multiple clips. A .ram file is a metafile that points to one or more RealAudio or RealVideo files.
DoPrevItem	Skips to the previous clip in a .ram file that contains multiple clips. A .ram file is a metafile that points to one or more RealAudio or RealVideo files.
CanPlayPause	Tests if Play/Pause function is available. Returns TRUE or FALSE
CanStop	Tests if Stop function is available. Returns TRUE or FALSE.
HasNextItem	Tests if the next clip function is available. The next clip function is available when the connected source is a .ram file that contains multiple clips, and the current clip is not the last clip in the .ram file. Returns true or false.
HasPrevItem	Tests if the previous clip function is available. The previous clip function is available when the connected source is a .ram file that contains multiple clips, and the current clip is not the first clip in the .ram file. Returns true or false.
AboutBox	Opens the Copyright information for the control.

EditPreferences	Opens the Preferences dialog box. Enables the end user to set his/her preferences. These preferences are global to all RealAudio or RealVideo clients on the machine.
HideShowStatistics	Shows or hides the Connection Statistics dialog box.
IsStatisticsVisible	Tests if the Connection Statistics dialog box is displayed. Returns true or false.
DoGotoURL(url, target)	Causes the control to attempt a navigation to the specified URL in the specified frame target. The container must support URL browsing. Parameters: string URL, string target.

### Object Properties

The object properties are set within Visual Basic and specify properties about the control.

Property	Description
Source	Specifies the URL of the clip to play. The Source location can be pnm:, file: or http: protocol.
Controls	Returns/Sets the visible components of the control. Valid CONTROLS include ALL, ControlPanel, InfoVolumePanel, InfoPanel, StatusBar, StatusPanel, PlayButton, StopButton, VolumeSlider, PositionSlider, PositionField, ImageWindow and StatusField.
Console	Sets a console name used to link multiple control instances. All controls with the same console name work together. For example, if you have multiple Play and Stop buttons on the same page, the console name would enable them to control the same clip. Call this function once for each instance of the Play or Stop button you want to link. The console name master links to all instances while unique links to no other instances.
Autostart	Sets whether or not the control automatically starts playing once the source data is available. Valid values are TRUE or FALSE.
NoLabels	Suppresses the Title, Author, and Copyright label text in the controls window. The text strings in the fields are still displayed.
AutoGotoURL	Specifies how a URL will be handled. Valid values are TRUE or FALSE. TRUE indicates that the RealPlayer ActiveX Control will automatically forward the URL event to the browser. FALSE indicates that the OnGotoURL VBScript event will be sent instead.



## Java and JavaScript Methods

Methods are functions that control the performance of the Java enabled RealPlayer Plug-in.

Method	Description
SetSource(String <i>Source</i> )	Specifies the URL of the RealAudio clip to play. The Source location can be pnm:, file: or http: protocol.
SetControlsString(String <i>ControlsString</i> )	Returns/Sets the visible components of the control. Valid CONTROLS include ALL, ControlPanel, InfoVolumePanel, InfoPanel, StatusBar, PlayButton, StopButton, VolumeSlider, PositionSlider, PositionField, and StatusField.
SetConsoleName(String <i>ConsoleName</i> )	Sets a console name used to link multiple RealVideo Plug-in instances. All Plug-ins with the same console name work together. For example, if you have multiple Play and Stop buttons on the same page, the console name would enable them to control the same clip. Call this function once for each instance of the Play or Stop button you want to link. The console name master links to all instances while unique links to no other instances.
SetAutoStart(Boolean <i>bAutoStart</i> )	Sets whether or not the Plug-in automatically starts playing once the source data is available. Valid values are TRUE or FALSE.
SetNoLabels(Boolean <i>bNoLabels</i> )	Suppresses the Title, Author, and Copyright label text in the Plug-in window. The text strings in the fields are still displayed.
DoPlayPause()	Plays or pauses the current clip. Equivalent to clicking the Play/Pause button.
DoStop()	Stops the RealAudio clip. Equivalent to clicking the Stop button.
DoNextItem()	Skips to the next clip in a .ram file that contains multiple clips. A .ram file is a metafile that points to one or more RealAudio files.
DoPrevItem()	Skips to the previous clip in a .ram file that contains multiple clips. A .ram file is a metafile that points to one or more RealVideo files.
CanPlayPause()	Tests if Play/Pause function is available. Returns TRUE or FALSE
CanStop()	Tests if Stop function is available. Returns TRUE or FALSE.
HasNextItem()	Tests if the next clip function is available. The next clip function is available when the connected source is a .ram file that contains multiple clips, and the current clip is not the last clip in the .ram file. Returns true or false.
HasPrevItem()	Tests if the previous clip function is available. The previous clip function is available when the connected source is a .ram file that contains multiple clips, and the current clip is not the first clip in the .ram file. Returns true or false.
AboutBox()	Opens the Copyright information for the control.
EditPreferences()	Opens the Preferences dialog box. Enables the end user to set his/her preferences. These preferences are global to all clients on the machine.
HideShowStatistics()	Shows or hides the Connection Statistics dialog box.
IsStatisticsVisible()	Tests if the Connection Statistics dialog box is displayed. Returns true or false.

### Callback Methods

Callback methods are functions that provide notification from the RealAudio or RealVideo engine. Callback methods can only be used with Java applets by implementing the RAObserver interface.

Method	Description
<code>onClipOpened(String <i>shortClipname</i>, String URL)</code>	Sent when a clip has been opened.
<code>onClipClosed()</code>	Sent to indicate that no clip is currently open.
<code>onShowStatus(String <i>status</i>)</code>	Sent to indicate that the status text is changing.
<code>setAutoGoToURL(boolean <i>bAutoGoToURL</i>)</code>	Specifies how a URL will be handled. Valid values are true or false. True indicates that the RealPlayer Plug-in will automatically forward the URL event to the browser. False indicates that the OnGoToURL event will be handled by the Java applet instead.
<code>onGoToURL(String <i>url</i>, String <i>target</i>)</code>	Sent when a URL event has been encountered for the currently playing clip. This event will only occur if the AutoGotoURL property is false.

## Advanced Control Attributes

The more exciting features of RealPlayer Plug-in and RealPlayer Control for ActiveX can be enabled by specifying custom attributes within your HTML documents.

### Removing Text Labels from Controls

If your Web page is in a language other than English, or if you want to use the Description fields to display information other than Title, Author, and Copyright, you may remove the Title, Author, and Copyright Labels from the information area. Controls that display Title, Author, and Copyright information for a clip, support a NOLABELS=TRUE attribute.

For example, allowing the default behavior

```
<EMBED SRC="use_lbl.rpm" WIDTH=350 HEIGHT=80  
CONTROLS=InfoPanel>
```

or specifying NOLABELS=FALSE

```
<EMBED SRC="use_lbl.rpm" WIDTH=350 HEIGHT=80  
CONTROLS=InfoPanel NOLABELS=FALSE>
```

results in the following display.

On the other hand, using NOLABELS=TRUE, for example:

```
<EMBED SRC="no_lbl.rpm" WIDTH=350 HEIGHT=80  
CONTROLS=InfoPanel NOLABELS=TRUE>
```

produces the following InfoPanel:

### Starting Clips Automatically

Adding an AUTOSTART=TRUE attribute tells the user's browser to automatically begin playing your clip when the page is visited. You can use this feature to begin narration, to play a welcome message or start a video.

Since only one clip can play at a time, if you specify AUTOSTART for more than one control instance, only the last control to load will play. The order in which your files are delivered is dependent on the Web server and on the browser's cache size. This is not necessarily the order in which you put them

within your HTML. Therefore, you should specify AUTOSTART for only one control instance per page.

### Playing Clips with a Hidden Control or Plug-in

If you want to play RealAudio or RealVideo clips without having a visible Plug-in control, you hide the control. By embedding a Plug-in in your page that has its size set to width=2 height=0, no image appears on your Web page. You can control the Plug-in with JavaScript.

For example:

```
<script Language=JavaScript>
function playSource()
{if (navigator.appName == "Netscape")
  {document.javaPlug1.DoPlayPause();}
else
  {RAOCX.DoPlayPause();}
}
</script>
<A HREF="#" onClick="playSource()"><IMG
  RC="button.gif"></A>
<OBJECT ID=RAOCX CLASSID="clsid:CFCDAA03-8BE4-11cf-B84B-
  0020AFBCCFA" WIDTH=2 HEIGHT=0>
<PARAM NAME="SRC" VALUE="pnm://audio.real.com/welcome.rm">
<PARAM NAME="CONTROLS" VALUE="PlayButton">
<embed src="start.rpm" Width=2 Height=0
  Controls=PlayButton name=javaPlug1>
</OBJECT>
```

The above example works in both Netscape and Internet Explorer. Only one control will appear on the Web page.

### Making Controls Work Together

You can embed any number of RealPlayer controls within a Web page. Normally, each tag instance refers to different content. Sometimes, however, you may want to link two or more controls together. For example, you can create a play button and an image window that work as a pair.

To include multiple components that work together, specify a CONSOLE attribute for each control and assign this the same value in each instance. For example:

```
<EMBED SRC="sample1.rpm" WIDTH=30 HEIGHT=33
  CONTROLS="PlayButton" CONSOLE="Clip1">
```

```
<EMBED SRC="empty1.rpm" WIDTH=176 HEIGHT=144  
CONTROLS="ImageWindow" CONSOLE="Clip1">
```

**Note** Each <EMBED> tag must have a unique SRC attribute (if the same source is specified for two tags, one is ignored). Create a dummy .rpm file (named, for example: empty1.rpm) for a second control accessing a clip. Put a hard carriage return (ASCII code 13) into the dummy file.

Specifying a CONSOLE value of “\_master” links a particular control to all other RealPlayer Controls on the page. Use this value, for example, to add a Status Bar to display information for all clips, for example:

```
<EMBED SRC="sample1.rpm" WIDTH=300 HEIGHT=33  
CONTROLS="StatusBar" CONSOLE="_master">
```

Because many platforms, including Windows, only support one volume setting, all volume sliders act on the same underlying value and affect all clips regardless of CONSOLE name. For this reason, you may want to include only one volume slider per page, with no reference to a .rm file in its associated .rpm file.

If you only include an ImageWindow control on the Web page, the video stream may still be controlled by using the context sensitive pop-up menu. For Windows users, right-click the ImageWindow; Macintosh users, click and hold the mouse button until the pop-up menu appears.

## Frame Document

A frame document describes the sub-HTML documents or frames that make up a window. The basic structure of a frame document is similar to that of a normal HTML document except that the FRAMESET tag replaces the BODY tag. Each frame is defined by the FRAME tag. In order to effectively use RealVideo, each FRAME tag needs the SRC and NAME attributes. The SRC points to the URL to be displayed in the frame. The NAME attribute assigns a name to the frame so that it can be targeted by links in other documents. The example below shows a simple frame document that would create two frames:

```
<HTML>  
<FRAMESET ROWS="105,*">  
  <FRAME SRC="banner.html" NAME="banner">  
  <FRAME SRC="lyrics.html" NAME="Lyric">  
</FRAMESET>  
</HTML>
```

## Synchronizing Frames and Video and Audio

Frames and RealVideo and RealAudio content are synchronized in the same way that a regular Web page and RealVideo and RealAudio content are synchronized: a .rae file. The difference lies in the addition of the targeted frame name to the text file that is used to create the .rae file. The syntax for each entry should follow the format:

```
u starttime endtime &&frameName&&EventURL
```

where:

u stands for URL event (each line starts with the letter u)  
starttime is the time into the clip when the new event is shown  
endtime is the time into the clip when that event ends, && is a delimiter  
frameName is the frame name as specified in your frame document  
EventURL (generally beginning with "http:" or "file:") is the URL for that event (usually an HTML document).

The time format is:

```
[ [ [days:]hours:]minutes:]seconds[.tenths]
```

The lines of the input file must be in ascending order of start time. The end time should be at least one tenth of a second before the start time for the next event.

The example below shows an .rae input file for a Web site that displays lyrics as a song plays. Each verse is displayed within a frame called Lyric.

```
u 00:00:10.0 00:00:35.0
&&Lyric&&http://www.songs.com/ver1.html
u 00:00:35.0 00:00:50.0
&&Lyric&&http://www.songs.com/ver2.html
```

**Note** You cannot use frames within a presentation using RealPlayer. You can only use frames within a multimedia presentation using the Plug-in or ActiveX.

## More Information on Frames

A complete discussion of frames is beyond the scope of this manual. For more information on frame attributes and syntax and on targeting windows consult the following Web pages:

Frames -- Syntax

**[www.netscape.com/assist/net\\_sites/frame\\_syntax.html](http://www.netscape.com/assist/net_sites/frame_syntax.html)**

Targeting Windows

**[www.netscape.com/eng/mozilla/2.0/relnotes/demo/target.html](http://www.netscape.com/eng/mozilla/2.0/relnotes/demo/target.html)**

# Synchronized Multimedia

In addition to basic audio and video content, RealAudio and RealVideo System allows you to create real-time on-demand multimedia presentations using the RMMerge tool (Windows or UNIX). These presentations can be as simple as a narrated slide show of your home page or as intricate as a multi-frame training program that the viewer controls.

RealAudio and RealVideo System includes the ability to synchronize World Wide Web pages with audio. Thus the audio can be used as a “time line” to display new pages or frames in the Web browser or to update its content. This enables the creation of Internet slide shows, presentations, guided tours and site walk-throughs. A user can have full random access (fast forward and rewind), and the Web browser content is synchronized with the audio.

RealAudio and RealVideo System stores the information for the synchronized events in a file with a .rm file extension. RealSystem server streams audio and event information to RealPlayer. The event information is streamed to RealPlayer, and in turn RealPlayer sends Web page information to the Web browser telling it to update the page’s content.

Another way to create a synchronized multi-media presentation is using RealPlayer Plug-in. However, since sending the Web browser to a new URL unloads RealPlayer Plug-in when the HTML page is unloaded, it is best to create separate frames for RealPlayer Controls and for the changing images. For more information about frames, refer to the “Frames: The Basics” section of the “Synchronized Multimedia” chapter.

## Creating a RealVideo Events File

Creating a synchronized multimedia event using .rm files use the RMMerge tool. This is a three-step process:

1. Use a text editor to create an input file specifying the display time for each URL, title, author or copyright event.



2. Use the RMMerge tool to generate a binary file from the text input file by typing the following command:

```
rmmmerge -f rmevents.dll event.txt output.rm
```

where:

event is the text file created in step 1

output is the .rm file that contains these events

3. Merge your new events .rm file with an audio or video file using the following command:

```
rmmmerge <event file> <audio or video file> <output file>
```

where:

event file is the .rm file created in the previous step

audio/video is the file merged with the event file

output file is the file resulting from the merge

For example:

```
rmmmerge event.rm audio_video.rm output.rm
```

## Creating the Input File

Begin by creating a list of the URLs, titles, authors, or copyrights that you want to be shown during your presentation and the times within RealAudio or RealVideo clip when they should be displayed. The syntax for each entry should follow the format (with a space between each part of the command):

```
u starttime endtime EventURL  
i starttime endtime Title  
a starttime endtime Author  
c starttime endtime Copyright
```

where:

u stands for URL event; each line starts with the letter u

i stands for title; each line starts with the letter i

a stands for author; each line starts with the letter a

c stands for copyright; each line starts with the letter c

`starttime` is the time into the clip when the new event is shown  
`endtime` is the time into the clip when that event ends  
`EventURL` (generally beginning with “http:” or “file:”) is the Internet address for that event (usually an HTML document)

The time for `starttime` and `endtime` is:

```
[[[days:]hours:]minutes:]seconds[.tenths]
```

The lines of the input file must be in ascending order of start time. The end time should be at least one tenth of a second before the start time of the next event. The following example shows how an input file might look:

```
u 00:00:10.0 00:00:59.9 http://www.real.com/  
u 00:01:00.0 00:02:00.0 http://www.mysite.com/ page2/
```

This input file tells RealPlayer to send the Web browser to the RealNetworks home page ten seconds into the audio clip. One minute into the audio clip, the Web browser displays a page from “www.mysite.com”.

The input file may also contain comment lines beginning with the # symbol. These comment lines are ignored by the event creation tool and are a good way to document the date that the file was created and the type of information found on each page.

## Creating a RealAudio Events File

The RealAudio system allows you to create real-time on-demand multimedia presentations using the `Cevents` utility (Windows or UNIX). Creating a synchronized multimedia event using the `Cevents` command line tool is a three-step process:

1. Use a text editor to create an input file specifying the display time for each URL.
2. Use the `Cevents` command line tool to generate a binary file from the text input file.
3. Place the resulting `.rae` file in the same directory as the `.ra` audio file.

## Creating the Input File

Begin by creating a list of the URLs that you want to be shown during your presentation and the times within the RealAudio clip when they should be displayed. The syntax for each entry should follow the format (with a space between each part of the command):

```
u starttime endtime EventURL
```

where:

u stands for URL event; each line starts with the letter u  
starttime is the time into the audio clip when the new event is shown  
endtime is the time into the audio clip when that event ends  
EventURL (generally beginning with "http:" or "file:") is the Internet address for that event (usually an HTML document)

The time for starttime and endtime is:

```
[ [ [days:]hours:]minutes:]seconds[.tenths]
```

The lines of the input file must be in ascending order of start time. The end time should be at least one tenth of a second before the start time of the next event. The following example shows how an input file might look:

```
u 00:00:10.0 00:00:59.9 http://www.real.com/  
u 00:01:00.0 00:02:00.0 http://www.mysite.com/  
page2/
```

This input file tells RealPlayer to send the Web browser to the RealNetworks home page ten seconds into the clip. One minute into the clip, the Web browser displays a page from "www.mysite.com".

The input file may also contain comment lines beginning with the # symbol. These comment lines are ignored by the event creation tool and are a good way to document the date that the file was created and the type of information found on each page.

## Generating an Event File

After creating the text version of the input file, you must convert the file to a binary event file. This is done with the command line utility Cevents. It uses the following syntax:

```
cevents <input text file> <output event file>
```

where:

<input event file> is the file you just created

<output event file> is the same name as the file with which it will be associated.

For example, to create a synchronized multimedia presentation to accompany `paradise.ra`, you would generate `paradise.rae` using the following command:

```
cevents paradise.txt paradise.rae
```

## Placing Event Files on Your Server

Copy the `.rae` file to the same directory as your `.ra` file. The `.ra` and `.rae` files must have the same name except for the file extension. RealSystem server automatically detects the file and sends the event information to RealPlayer, which then sends it to the Web browser.

## Using Synchronized Multimedia from Local Files

RealPlayer can also read local `.rae` files just as the Server does. In order for the local presentation to work with multiple platforms and with both Internet Explorer and Netscape Navigator, without hardcoding the directory structure, you need to follow these steps.

### To play a `.rae` file locally:

1. Place all `.rpm/.ram`, `.ra`, HTML and image files in one directory. The starting document should be named `Index.html`.
2. Do not use `/`'s in your file names. Use the following syntax:

```
u 10.0 45.0 &&media&&test2.html
```

**Note** You cannot use relative path commands like `../` if you want the presentation to work on a Macintosh.

.TXT file - convert into `.rae` file using Cevents compiler

```
u 10.0 45.0 &&media&&test2.html
```

.RAM and .RPM

```
file:lshapfut.ra
```

IMAGES

```
<IMG src="lshapfut.gif">
```

HREFs

```
<a href="rasld011.htm">
```

EMBEDs

```
<EMBED SRC="lecture5.rpm">
```

## Using Synchronized Multimedia with Bandwidth Negotiation

When you deliver a Synchronized Multimedia presentation using Bandwidth Negotiation, you can choose to deliver the same event for all encoding formats, or you can choose to deliver different events for each encoding format.

You can create a single synchronized multimedia presentation for multiple formats, or you can create a different multimedia presentation for each encoding format. If you are working with previously created content, you can continue to use the previous method to create presentations. For new content, refer to the “Synchronized Multimedia” chapter.

## Frames: The Basics

Some Web browsers support a feature which allows the browser window to be divided into multiple regions. Each region is called a frame and can display a separate URL such as a graphic or document. For an introduction to frames visit Netscape’s Web site at:

**[www.netscape.com](http://www.netscape.com)**

If you are unfamiliar with frames the following two sites provide a good introduction:

Understanding Frames

**[www.netscape.com/navigate/understanding\\_frames.html](http://www.netscape.com/navigate/understanding_frames.html)**

Frames: An Introduction

**[www.netscape.com/assist/net\\_sites/frames.html](http://www.netscape.com/assist/net_sites/frames.html)**

# RealAudio and RealVideo Content Creation for Internet Appliances and Set-top Boxes

Recently, there has been a significant increase in the number of appliances such as televisions, Internet phones etc. that are able to view content resident on servers on the World Wide Web. Increasingly, these appliances will also have the capability to view and play RealAudio and RealVideo content. While these devices may be able to play RealAudio or RealVideo, they are often constrained in various ways. Some examples of these constraints include:

- Their Internet connections are at relatively low bit rates.
- They may not have the capability to playback RealVideo.
- They may be able to playback content that uses only the RealVideo(Standard) codec.

To make your content accessible by this increasingly large user population, we strongly recommend creating content in a variety of formats that are playable both on RealAudio and RealVideo players running on PCs and workstations as well as appliances. To do so, you can take advantage of RealAudio and RealVideo's many codec offerings and do one or more of the following:

- If you choose to use the RealVideo(Fractal) codec to create high-quality, high bandwidth content, you may also wish to use the RealVideo(Standard) codec to create a lower bit-rate version of the same content. The same strategy could be used if you are creating high bandwidth content using RealVideo(Standard).
- Create links on your web-pages to audio-only versions of video presentations. These audio-only versions can be created at multiples bandwidths (using bandwidth negotiation). You may also wish to create content using codecs that are part of RealAudio Encoder 3.0 to accommodate users that may have audio players.

Another alternative would be to use bandwidth negotiation and create high bandwidth RealVideo content and low bandwidth RealAudio versions of the

same content, ie. pnrv.20 and 14\_4.18 would play video to RealPlayers 4.0 and 5.0 and 14.4 audio to any other.

These options are well supported in RealEncoder and RealPublisher . As time progresses, making these options available on your site will only add to your audience.



# Index

## A

- ActiveX
  - advanced control attributes, 132
  - making controls work together, 133
  - methods and properties, 127
  - RealVideo Control, 123
- Adobe Premiere, 44
  - encoding, 35
  - marker options, 37
- Advanced Control Attributes, 132
- AREA tag, 74
- Audio
  - algorithms, 51
- Author. *See* File Descriptions

## B

- Bandwidth Negotiation, 43, 78
  - delivering content, 78
  - diagram, 79
  - example, 89
  - using during live broadcasts, 102
  - with Synchronized Multimedia, 58, 142
- Broadcast. *See* Live broadcast
- Broadcasting, live, 16

## C

- Ceents, 140
- Clips starting automatically, 132
- Configuration settings
  - EncoderPassword, 102
  - EncoderTimeout, 103
- Configuring Your Web Site, 113
- Control Attributes, advanced, 132
- Controls
  - autostart, 132
  - display, 125

- no text labels, 132
- Conventions used in manual, 8
- Copying RealVideo Files
  - UNIX, 66
  - Windows, 66
- Copyright. *See* File Descriptions
- Custom Controls for RealVideo, 119
- Customizing Calls to Audio Content, 116
- Customizing Calls to Video and Audio Content, 116

## D

- Delivering a RealAudio or RealVideoVideo Clip, 12
- Delivering Live RealVideo Content, 104
- Delivering Synchronized Multimedia, 14
- Drag-and-Drop Encoding
  - Windows Encoder, 46
- DURATION tag, 73

## E

- Editing Input Files, 59
- Editing RealVideo Files
  - UNIX, 64
  - Windows, 59
- Editing utilities, 10
- Embedded Object Parameters, 123
- EncoderPassword setting, 102
- EncoderTimeout setting, 103
- Encoding a RealVideo clip, 27
- Encoding RealVideo files
  - Adobe Premiere, 44
- Events File, creating, 55, 58, 137

## F

- Filename Extensions, 116
- Files

- .ram, 11, 77
- .rm, 11
- .rpm, 11
- delivering with Bandwidth Negotiation, 78
- descriptions, modifying, 77
- formats, 82, 88
- RealServer, 78
- Formats, video, 34
- Frames, 58, 142
  - frame document, 134
  - synchronizing with audio, 135

### H

- Hidden Controls, 133
- HTTP Streaming, 118

### I

- Image
  - cropping, 32
  - quality, 33
- Image Map, 73
  - merging with video image, 76
- Input File, creating, 56, 138
- Invisible Controls, 133

### J

- Java and JavaScript
  - callback methods, 131
  - methods, 130

### L

- Live
  - broadcasting, 16
  - encoding, 16
- Live broadcast
  - connecting to RealAudio Encoder, 102
  - example, 98
- Live RealEncoder
  - Windows, 108
- Live RealVideo Content, 104
  - command line controls, 110
  - high quality, 106

- software requirements, 106
- system requirements, 104
- templates, 108

### M

- Managing Content, 78
- MAP tag, 74
  - /MAP tag, 76
- Metafiles, 11, 114
  - table of, 80
- Modifying RealVideo File Descriptions, 77

### P

- Plug-in
  - Adobe Premiere, 44
  - RealVideo, 11, 119
- Producing High Quality Video, 33

### R

- ram file, 11, 77
- Real Icon, 113
- RealAudio Encoder
  - connecting to RealServer, 102
- RealEncoder, 10
- RealMedia clip, 11
- RealPlayer, 10
- RealServer, 10
  - managing content, 78
  - setting up for live broadcasts, 101
- RealVideo clip, 9
  - encoding, 27
  - updating, 15
- RealVideo Control for ActiveX, 123
- RealVideo Live
  - software requirements, 106
  - system requirements, 104
- RealVideo Live Encoder
  - Windows, 108
- RealVideo Plug-in, 11, 119
- RealVideo Tools, 10
- rm files, 11
- RMCut, 66
- RMDump, 67

RMEdit, 64, 77  
RMMerge, 55, 76, 137  
RMTTools, 77  
    editing file data, 62  
    editing file properties, 60  
    examining file contents, 61  
rpm file, 11

## S

Settings File  
    example, 49  
Simulated Live Broadcast, 112  
Slta, 112  
    using, 112  
Source Files, 28  
Synchronized Multimedia, 55, 137  
    Cevents, 140  
    frames, 58, 142  
    from local files, 141  
    placing on a Server, 141  
    using with Bandwidth Negotiation, 58, 142  
Synchronized Multimedia, delivering, 14

## T

Templates, 40, 50  
    create new, 53  
    live RealVideo content, 108  
Title. *See* File Descriptions

## U

UNIX  
    copying files, 66  
    editing files, 64  
    RMCut, 66  
    RMDump, 67  
    RMEdit, 64

## V

Video Formats, 34  
Video Quality, 33

## W

Web Browser, 10  
Web Server, 10  
Web Site Configuration, 113  
Windows  
    copying files, 66  
    drag-and-drop encoding, 46  
    editing files, 64  
    editing RealVideo files, 59  
    RMCut, 66  
    RMEdit, 64  
Windows Encoding  
    command line encoder example settings  
    file, 49