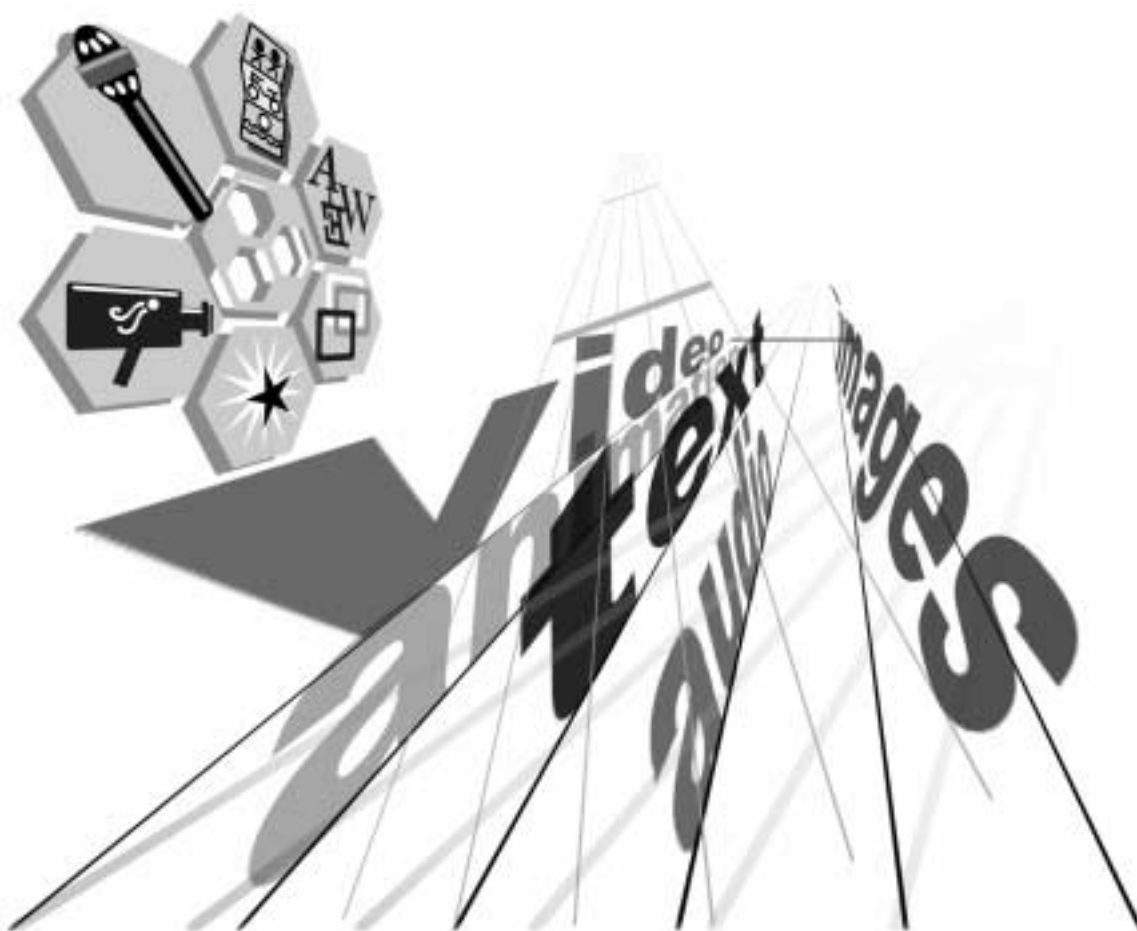




REALPIX™ AUTHORIZING GUIDE

RealSystem™ G2

Revision Date: December 21, 1998



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RELEASE UPDATES

If you are new to RealPix, start with “Introduction” on page 2. If you have worked with RealPix using a version of this manual published before December 21, 1998, this sections gives you a quick look at the changes included in this version of the manual.

Revisions Included December 21, 1998

New Broadcast Files

The RealPix broadcast application files included in the utils directory of the HTML version of this manual have been updated. Be sure to use the new files if broadcasting RealPix.

Additional Information

To get the latest broadcast application, download the bundled HTML version of this manual from
<http://service.real.com/help/library/encoders.html>.



INTRODUCTION

RealPix, part of RealSystem G2, lets you stream images across an intranet or the World Wide Web. By combining images with media such as audio and text, you can create compelling presentations for many purposes. This guide explains how to create RealPix presentations using graphics files and a simple mark-up language you use to specify visual effects. If you know HTML, you will master RealPix mark-up quickly.

Note

The HTML version of this manual, available at <http://service.real.com/help/library/index.html>, contains RealPix examples you can view with RealPlayer.

Tools for Creating RealPix

You will need the following tools to create and test your RealPix presentation:

- Image Editing Software

Image software such as Adobe Photoshop lets you create images in formats RealPix can stream. You should know the basics of creating graphics for the Web, such as JPEG compression and GIF color palettes.

- Text Editor

A RealPix file lists the images used in the presentation, creates the presentation timeline, and specifies the visual effects used. To create this file, you can use any text editor or XML editor that can save output as plain text.

- RealPlayer G2

Use RealPlayer G2, available free at <http://www.real.com>, to test your RealPix presentation. Other applications may also have RealPlayer G2 features that enable them to receive RealPix as well. Note that previous

versions of RealPlayer, such as RealPlayer 4.0 and 5.0, cannot display RealPix.

- RealServer G2

RealServer G2 streams your RealPix presentation to RealPlayer. If you are not operating RealServer yourself, you need to have access to RealServer through, for example, an Internet Service Provider (ISP). Note that previous versions of RealServer cannot stream RealPix.

- Microsoft Excel 97

You will need this spreadsheet program to use the RealPix Bandwidth Calculator described in “Calculating Bandwidth Use” on page 40.

Conventions Used in this Manual

The following table explains the conventions used in this manual.

Notational Conventions	
Convention	Meaning
<i>variables</i>	Italicized text represents variables. Substitute values appropriate for your situation.
[options]	Square brackets indicate optional values you may or may not need to use.
choice 1 choice 2	Vertical lines separate values you can choose between.
...	Ellipses indicate nonessential information omitted from the example.

Additional RealSystem G2 Resources

In addition to this manual, you may need the following RealNetworks resources, available at <http://service.real.com/help/library/index.html>:

- *RealSystem G2 Production Guide*

This manual explains the basics of streaming files with RealSystem. It tells how to calculate bandwidth needs and shows how to put a multimedia presentation together.

- *Embedded RealPlayer Extended Functionality Guide*

This guide supplements *RealSystem G2 Production Guide*. It explains how to use JavaScript or VBScript to control RealPlayer functions for a presentation embedded in a Web page.

- *RealServer Administration Guide*

The basic reference for the RealServer administrator, this manual explains how to set up, configure, and run RealServer to stream multimedia. You need this manual only if you are running RealServer yourself.

- RealSystem G2 Software Development Kit (SDK)

The RealSystem G2 SDK lets you integrate applications with RealSystem. A knowledge of programming is required to use the SDK. Register for and download the SDK from **<http://www.real.com/devzone/>**.

Technical Support

For technical support with RealPix, please fill out the form at:

- **<http://service.real.com/contact/email.htm>**

The information you provide in this form will help technical support personnel to give you a prompt response. For general information about RealNetworks' technical support, visit:

- **<http://service.real.com/help/call.html>**

REALPIX AUTHORIZING

With RealPix you can create streaming images, combining them with other media clips such as audio or text. This chapter explains the basics of RealPix authoring and streaming.

Image Formats

RealPix can stream images in these formats:

- GIF87 and GIF89 (.gif)

Both interlaced and noninterlaced GIFs will work, but RealPix does not take advantage of any features of interlaced GIFs. Noninterlaced GIFs are therefore recommended. RealPix does not support animated GIFs.

- JPEG (.jpg)

RealPix can use RGB baseline JPEGs. Progressive and grayscale JPEGs are not supported.

With the images ready, you simply create a RealPix file with mark-up similar to HTML. This mark-up describes how and when the images display, specifying special effects such as a fade to a solid color or a “wipe” transition between two images.

Image Caching

Because RealPlayer G2 does not maintain a disk cache or allow users to copy or download images, users do not have access to copyrighted materials in a RealPix presentation. RealPix caches images in memory for the duration of the RealPix presentation, however. A RealPix presentation can thereby reuse an image without consuming additional bandwidth. Each cache is specific to each RealPix presentation, though. A RealPix presentation does not have access to the image cache of another presentation playing concurrently.

Hosting a RealPix Presentation

Use RealServer G2 instead of a Web server to host your RealPix presentation. When delivered by RealServer, images in a RealPix presentation stream at different times depending on their place in the RealPix timeline. This lets you structure a RealPix presentation to keep it flowing smoothly. When delivered by a Web server, however, all RealPix images begin to download as soon as presentation playback begins. This causes a higher preroll.

Additional Information

See *RealSystem G2 Production Guide* available at

<http://service.real.com/help/library/index.html> for more on RealServer and Web server hosting.

Preparing Images

For a RealPix presentation, you can use scanned pictures, clip art, or images downloaded from the Web. When preparing your presentation, maintain three separate sets of images:

1. Original set

The original set includes the unedited files you start with, such as original images off a scanner. Keep this set in case you need to change an image in the working set by, for example, restoring an area you cropped out. Leave these images uncompressed.

2. Working set

The working set comprises the files you have edited. You may have cropped the original images or combined them to form new images, for example. Keep these files uncompressed so that you can edit them later if necessary.

3. Presentation set

This set consists of the compressed files used in the presentation. For a given working set, you may have several presentation sets. For instance, you may have slightly compressed images for a high-bandwidth presentation, heavily compressed images for a low-bandwidth version.

Establishing a Timeline

If your presentation consists solely of streaming RealPix images, you have full control over the RealPix timeline. When you combine RealPix with another component such as RealAudio or RealText, however, the other component may establish the timeline. You then need to coordinate the RealPix images with the other clip's existing timeline. In these cases it is better to finish the other component first, then assemble your RealPix presentation to the final timeline.

When working with an audio track, for example, think about the order of the images, deciding at which points in the audio timeline each image must display. When you are ready to assemble your RealPix presentation, play back the audio and note where you want to add an image. This will establish your RealPix presentation timeline.

Once you have a timeline for your presentation and have ideas about how to place the images, you are ready to create a RealPix presentation. You may find it easier to create a storyboard to lay out the transitions and effects. Or you may want to dive right in, using the presentation in progress as your guide. Either way, carefully consider the bandwidth implications as you place your image and set the start times and durations.

Additional Information

For more on bandwidth, see “Bandwidth Usage” on page 38.

Using JPEGTRAN

JPEGTRAN optimizes JPEG (.jpg) images for streaming with RealPix. It modifies them so that if packets are lost, missing image data is randomly dispersed instead of appearing as continuous blank lines across the image. A windows version (jpegtran.exe) is included in the utils directory of the HTML version of this manual. A Macintosh version is not yet available.

Note

Download the HTML version of this manual from **<http://service.real.com/help/library/index.html>** to get these tools.

To use JPEGTRAN, first create JPEG-format images with the image editor of your choice. Then run JPEGTRAN from the command line on Windows 32-bit

operating systems. From the directory that holds the **JPEGTRAN** program, use this command to process an image:

```
jpegtran -restart 1B -outfile output.jpg input.jpg
```

Additional Information

You can run **jpegtran.exe** in batch mode from the RealPix Bandwidth Calculator. For more information on the calculator, see “Running JPEGTRAN from the Calculator” on page 42.

Creating a RealPix Presentation

The following steps describe how to create a RealPix file. A following section describes the RealPix mark-up tags in detail.

► To Create a RealPix Presentation:

1. Prepare your image presentation set. If you are using JPEG images, run the **JPEGTRAN** utility on them to prepare them for streaming.

Additional Information

For more on this utility, see “Using JPEGTRAN” on page 7.

2. Open a new text document in your text editor. At the top of the file, add the `<imfl>` tag. Add the `</imfl>` end tag at the bottom:

```
<imfl>
...All Other Mark-up Goes Between These Tags...
</imfl>
```

3. Between the `<imfl>` and `</imfl>` tags, add the mark-up that defines how and when the RealPix images appear:

```
<imfl>
...
<image handle="1" name="drums.jpg"/>
<image handle="2" name="franklin.jpg"/>
...
</imfl>
```

Additional Information

See “Tag Descriptions” on page 15.

4. Save the file as plain text, using the .rp extension to mark the file as a RealPix file. On your local machine, open the RealPix file with RealPlayer to test the presentation.

Note

Playing a RealPix file on your local machine indicates whether the RealPix mark-up is correct. However, it does not guarantee that the file will stream across a network well. See “Bandwidth Usage” on page 38 for information on making a RealPix presentation stream well.

5. To combine RealPix with another file, create a SMIL file that controls the overall presentation. For example, the SMIL file can list a RealPix file and an audio soundtrack to be played together:

```
<smil>
  <body>
    <par>
      <ref src="rtsp://realserver.company.com/pix/ads.rp"/>
      <audio src="rtsp://realserver.company.com/pix/ads.ra"/>
    </par>
  </body>
</smil>
```

Additional Information

See *RealSystem G2 Production Guide* available at **<http://service.real.com/help/library/index.html>** for information about creating a SMIL file.

6. Move your files to RealServer. If you are using an Internet Service Provider, for example, contact the ISP's RealServer administrator for instructions on doing this.
7. In your Web page, add a hypertext link to the SMIL file. Or if the RealPix file is the only file in your presentation, simply link to that file.

Additional Information

RealSystem G2 Production Guide available at **<http://service.real.com/help/library/index.html>** explains the options for linking your Web page to your presentation. It also explains how to play your RealPix presentation in your Web page rather than in RealPlayer.

8. Test the RealPix presentation by clicking the hyperlink in your Web page. This launches RealPlayer, which displays the streaming images with the properties you defined through the RealPix mark-up.

Controlling Image Size, Placement, and Aspect

In your RealPix file you define a presentation display window. When RealPlayer plays your presentation, it expands its main window to this size (or larger if your presentation contains multiple clips laid out with SMIL). To create a simple presentation such as a basic slide show, you can simply fade the images in and out of the display window. Images the same size as the presentation window appear full-size. Larger images shrink to fit the window, smaller images expand.

You may want to display just a portion of a source image, however. Or you may want to display two images side-by-side. RealPix lets you specify the area of a source image that appears in the display window. It also lets you determine the size and placement of images in the display window. To understand how this works, keep in mind the following definitions.

Source Image

An image used in your presentation. A presentation may display one source image at a time, or it may display several source images arranged in a checkerboard pattern, for instance.

Display Window

The RealPlayer window in which your presentation plays back. You set the display window size with the RealPix `<head/>` tag's width and height attributes (see page 16).

Source rectangle

The portion of a source image you want to display. You might want to display only the top half of a source image in the display window, for example. You can think of the source rectangle as a cropped version of your source image.

Destination rectangle

The area of the display window where the source rectangle appears. Think of the destination rectangle as a separate window within the RealPlayer display window. The source and destination rectangles do not have to be the same size.

Defining Image Size and Placement

To use just a portion of a source image or the display window for an effect, you define the source or destination rectangle (or both) in a RealPix tag. To do this, you work with these attributes:

“srcx” or “dstx”

Horizontal coordinate in pixels for the left-hand corner of the source rectangle (srcx) or destination rectangle (dstx).

“srcy” or “dsty”

Vertical coordinate in pixels for the left-hand corner of the source rectangle (srcy) or destination rectangle (dsty). For example, the upper, left-hand corner of the source image is identified as `srcx="0"`, `srcy="0"`. The upper, left-hand corner of the destination window is identified as `dstx="0"`, `dsty="0"`.

“srcw” or “dstw”

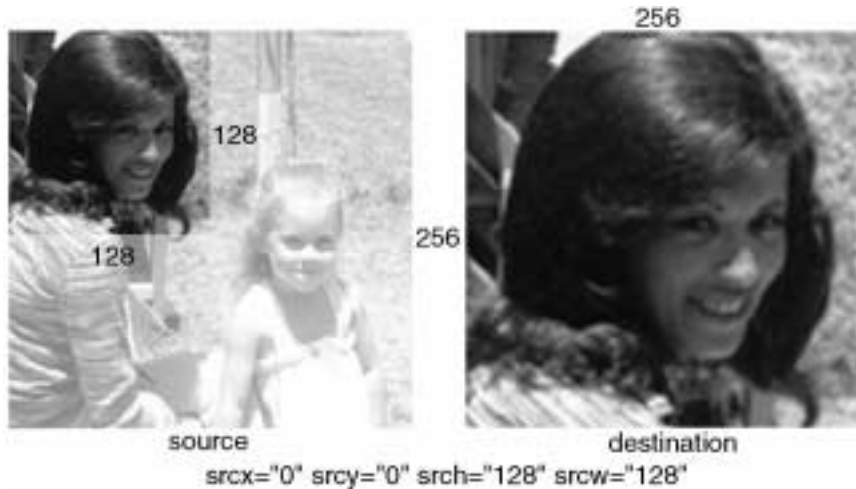
Width of the source rectangle (srcw) or destination rectangle (dstw) in pixels. A width of 0 (zero) is assumed to be the source image’s or destination window’s default width.

“srch” or “dsth”

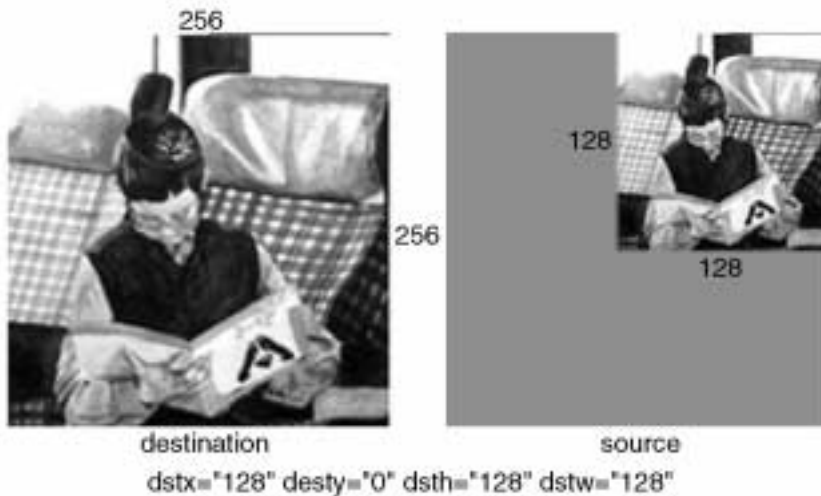
Height of the source rectangle (srch) or destination rectangle (dsth) in pixels. A height of 0 (zero) is assumed to be the source image’s or destination window’s default height.

Placement Examples

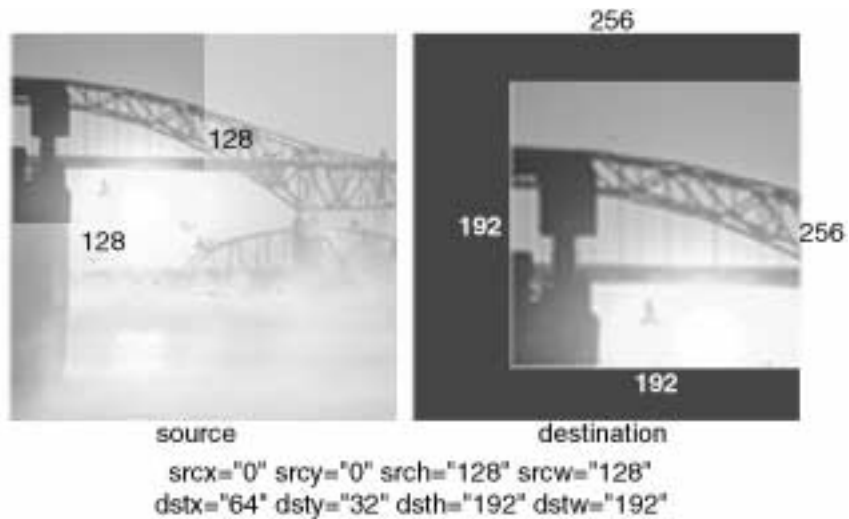
In the example below, both the source image and destination window are 256 pixels high by 256 pixels wide. The source tags make the top, left quadrant of the source image display in the destination window, effectively magnifying the source rectangle by a factor of 2. Because the destination rectangle defaults to the destination window size, no destination rectangle coordinates are needed.

Part of the Source Image Filling All of the Destination Window

In this next example, the source image displays in the top, right quadrant of the destination window, effectively reducing the size of the source image by half. No source coordinates are included, so the entire source image displays in the destination rectangle.

All of the Source Image Filling Part of the Destination Window

This last example shows a portion of the source image displayed at a slightly larger size in the display window. In this case, both source and destination coordinates are given to define the source and destination rectangles.

Part of the Source Image Filling a Part of the Destination Window**Note**

A source or destination attribute defaults to 0 (zero). Zero for height or width means the source image or destination window's default height or width. You can therefore leave an attribute out to set x to "0," y to "0," w to the default width, or h to the default height.

Controlling Image Aspect

In the examples above, the source and destination rectangles all have height-to-width ratios of 1:1. This may not always be the case in your RealPix presentations. When source and destination rectangles have different height-to-width ratios, the RealPix `<head/>` tag's `aspect` attribute (see page 19) determines how the source image displays.

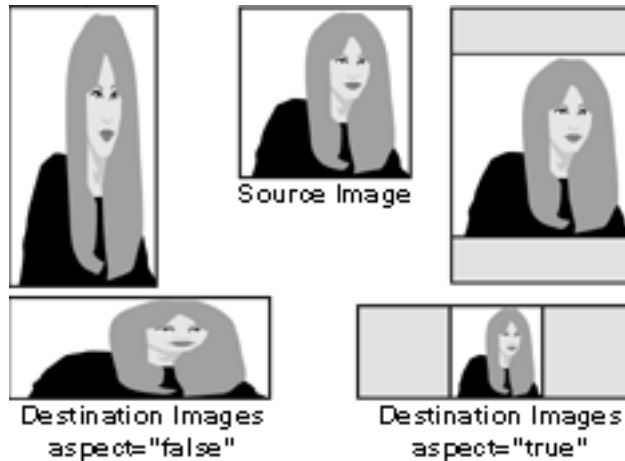
When `aspect` is "true", RealPix keeps a source rectangle's height-to-width ratio constant when the destination rectangle has a different ratio. For example, a source rectangle's height-to-width ratio of 1:1 stays constant even if the destination rectangle's height-to-width ratio is 2:3.

In these cases, RealPix centers the source rectangle in the destination rectangle. It scales the source and preserves its height-to-width ratio until one dimension reaches the rectangle's boundaries and the other dimension is

within the boundaries. The existing background shows through any part of the destination rectangle not filled by the source rectangle.

If you turn the aspect feature off, the width-to-height ratio in the source rectangle changes as necessary to fill the destination rectangle fully. This may distort the source image. The following figure shows how a source image fills different destination rectangles when aspect is "false" or "true."

Effects of Overriding and Maintaining Image Aspect Ratios



Chapter 2

TAG DESCRIPTIONS

RealPix tags and attribute values create the RealPix timeline and visual effects. If you are familiar with HTML, you will master RealPix mark-up quickly. A typical RealPix tag looks like this:

```
<fadein start="3" duration="1" target="1"/>
```

Syntax Rules

Keep the following points in mind when writing a RealPix file:

- RealPix tags and attribute names must be lowercase.
- A tag that does not have a corresponding end tag closes with a forward slash (/):

```
<fadein.../>
```

Only the `<imfl>` tag, which uses the end tag `</imfl>`, does not close with a slash.
- Attribute values must be enclosed in double quotation marks.
- Unless noted otherwise, the order of attributes following the tag name does not matter.
- You can add a comment to a RealPix file like the following. Note that the comment tag does not require a closing slash:

```
<!-- This is a comment -->
```

Additional Information

When you are familiar with the tags, you can use “Tag Summary” on page 50 as a quick reference. To learn more about Extensible Mark-up Language (XML), the language that RealPix is based on, visit <http://www.w3.org/XML>.

<imfl>...</imfl>

All information in the file occurs between an opening `<imfl>` tag and a closing `</imfl>` tag. This is the only tag that uses an end tag.

<head/>

The `<head/>` tag follows the `<imfl>` tag in the RealPix file. Unlike the HTML `<head>` tag, the RealPix `<head/>` tag does not have a corresponding `</head>` tag. Instead, it ends with a slash:

```
<head...attributes.../>
```

The `<head/>` tag defines standard header information such as title, author, and copyright. It also sets necessary parameters such as the presentation duration and streaming bit rate.

width and height

These required attributes set the width of the display window in pixels. RealPlayer's playback area expands to this size when the RealPix presentation begins. This example creates a RealPix playback area 256 by 256 pixels:

```
<head width="256" height="256".../>
```

When you play RealPix with another visual clip such as video, you lay out playback regions with SMIL. You typically create for RealPix a playback region that uses the same width and height you set here. If the region is a different size, the SMIL settings determine how to handle the size difference, such as by scaling or cropping the RealPix presentation to fit the display region.

Additional Information

Download *RealSystem G2 Production Guide* from

<http://service.real.com/help/library/index.html> for more on SMIL.

timeformat

This attribute sets the format the for start and duration times of RealPix effects. The default value is milliseconds, which means a time value such as 5400 is read as 5400 milliseconds (5.4 seconds). Millisecond time values cannot include colons or a decimal point.

You can also set the timeformat to the dd:hh:mm:ss.xyz format:

```
<head timeformat="dd:hh:mm:ss.xyz".../>
```

Here, dd is days, hh is hours, mm is minutes, ss is seconds, x is tenths of seconds, y is hundredths of seconds, and z is milliseconds. Only the ss field is required.

When the time value does not include a decimal point, the last field is read as the seconds. For example, 1:30 means 1 minute and 30 seconds, whereas 1:30:00 means 1 hour and 30 minutes. Note that all the following values are equivalent. Each starts the effect 90 minutes after the RealPix presentation begins:

```
start="1:30:00.0"  
start="90:00"  
start="5400"
```

duration

The required duration attribute sets the length of the entire RealPix presentation. For example, the following value sets a duration of 50 seconds:

```
<head duration="50".../>
```

All RealPix effects stop immediately when the duration elapses. When the duration time exceeds the time required to complete the effects, the last effect stays frozen in the display window.

Tip

Set a high duration when you start building a RealPix presentation. Set the final duration time when you have finished defining the effects.

Additional Information

SMIL mark-up also includes a duration setting that can stop the RealPix presentation even if its internal duration time has not elapsed. For more on this, download *RealSystem G2 Production Guide* from <http://service.real.com/help/library/index.html>.

bitrate

The required bitrate attribute specifies the maximum bandwidth the presentation consumes. Specify the value in bits per second (bps). For example, the following value sets a maximum bandwidth of 12000 bps (approximately 12 Kbps):

```
<head bitrate="12000".../>
```

Additional Information

“Bandwidth Usage” on page 38 explains how to calculate bandwidth requirements for a RealPix presentation. For information on dividing bandwidth between various media types in a presentation, see *RealSystem G2 Production Guide*, available at <http://service.real.com/help/library/index.html>.

preroll

The optional preroll attribute specifies the time to buffer data in RealPlayer before the start of the RealPix presentation. For example, the following sets the RealPix preroll to 40 seconds:

```
<head preroll="40".../>
```

RealSystem always calculates the preroll required for the presentation based on the image file sizes and presentation timing parameters. If this calculated value is larger than the preroll you set, it overrides your specified preroll. Your preroll value is used, however, if it is higher than the calculated preroll value. You therefore need to set the preroll value only if you want an artificially high preroll.

A high preroll can be useful when you stream RealPix with another clip. Suppose that a RealVideo clip starts midway through a RealPix presentation. You can use a high preroll to download a significant portion of the RealPix data before the presentation starts. The RealVideo clip then has more bandwidth available when it begins. It can therefore stream its required preroll without competing with RealPix for bandwidth.

Tip

Always balance preroll values with viewer expectations. Viewers may not stay tuned to a presentation that takes a long time to start playing back.

Additional Information

For more on preroll, see Chapter 3 beginning on page 38.

title, author, copyright

These optional tags define the title, author, and copyright information for the presentation:

```
<head title="The Garden"  
  author="Jane Doe"  
  copyright="(c) 1998 RealNetworks, Inc.".../>
```

When present, these tags define the values that display in the RealPlayer information window. If the RealPix presentation is played through a SMIL file, however, title, author, and copyright information set through SMIL for the RealPix clip overrides the information you set here.

Additional Information

See the SMIL chapter in *RealSystem G2 Production Guide*.

url

This optional attribute sets a hyperlink URL for the presentation. When the user clicks a presentation image, the URL opens in the user's default Web browser. Individual effects can override this value with their own URL setting. For the attribute value, use a fully qualified URL such as the following:

```
<head url="http://www.real.com".../>
```

aspect

With its default value of "true", the aspect attribute keeps a source rectangle's height-to-width ratio constant when the destination rectangle has a different ratio. You can turn this off by setting the attribute to false:

```
<head aspect="false".../>
```

In this case, the height-to-width ratio in the source rectangle changes as necessary to fill the destination rectangle fully. This may distort the source image. This aspect attribute in the <head/> tag affects the entire presentation. Individual effects can override this setting with their own aspect attributes, however.

Additional Information

See "Controlling Image Aspect" on page 13.

maxfps

This optional attribute sets the maximum frames per second (fps) for transition effects. It is not required because RealPlayer determines the optimal frame rate based on the playback computer's available CPU power. When CPU power is plentiful, RealPlayer renders transition effects at the maximum of 30 fps. It scales down the transition rates accordingly when less CPU power is available.

You can set the maxfps attribute low to create special effects. For example, a value of 5:

```
<head...maxfps="5"/>
```

keeps transitions constrained to no more than 5 fps. This causes visible jerks in transitions, which may be a desirable effect.

Note

Specify maxfps as the last attribute in the <head/> tag. The maxfps value affects the entire presentation, but individual effects can override it with their own maxfps values.

<image/>

For each image you use in the RealPix presentation, you add an <image/> tag after the <head/> tag. The <image/> tag provides the image file location and assigns a unique handle number to the image. An <image/> tag looks like this:

```
<image handle="2" name="eagle.jpg"/>
```

handle

The required handle attribute assigns a positive integer to the image. Each handle number within the file must be unique. The RealPix effects then refer to the handle number rather than the file name. Here is an example:

```
<image handle="23".../>
```

name

The name attribute is required. It specifies the image file name and a path relative to the location of the RealPix file on RealServer or the local machine. The following example designates an image file that resides in the same directory as the RealPix file:

```
<image name="tulip.jpg".../>
```

This next example indicates that the image file resides one level below the RealPix file in the "images" directory:

```
<image name="images/tulip.jpg".../>
```

Tip

The file name and path are case sensitive. If you are streaming files from RealServer, folder (directory) names should not contain spaces.

Additional Information

The relative syntax for paths works like relative hyperlink syntax in HTML. You can find additional information about this topic in an HTML reference.

<fill/>

The <fill/> tag displays a colored rectangle in the display window. This is useful at the beginning of a presentation or anytime you want to paint over all or part of the display window. You can fade in an image, for instance, then fill the display window with black to paint over the image. A <fill/> tag looks like this:

```
<fill start="0" color="blue"/>
```

start

The start attribute is required. It specifies the time from the beginning of the RealPix timeline that the fill occurs. The following example starts the fill 2.3 seconds into the presentation timeline:

```
<fill start="2.3".../>
```

Additional Information

For information on the time format, see the <head/> tag `timeformat` attribute on page 16.

color

This required attribute sets the fill color. You can use a predefined color name or a hexadecimal value as illustrated here:

```
<fill color="#FF0000".../>
```

Additional Information

For more on color values and names, see “Colors” on page 35.

dstx, dsty, dstw, dsth

These optional attributes define the size and placement of the filled region. Leave them out to fill the entire display window. To fill only a portion of the display window, set the destination rectangle’s x and y coordinates, as well as its height and width in pixels:

dstx X coordinate of the destination rectangle.
dsty Y coordinate of the destination rectangle.
dstw Width of the destination rectangle.
dsth Height of the destination rectangle.

Here's an example that fills a rectangle 128 by 128 pixels. The filled region appears 92 pixels to the right of the main window's left edge and 64 pixels down from its top edge

```
<fill...dstx="92" dsty="64" dstw="128" dsth="128"/>
```

Additional Information

For more on the sizes and offsets of source and destination rectangles, see "Controlling Image Size, Placement, and Aspect" on page 10.

<fadein/>

The <fadein/> tag creates a gradual transition from the currently displayed color or image to another image. A <fadein/> tag looks like this:

```
<fadein start="4" duration="3" target="2"/>
```

The following figure illustrates a fade-in from a solid color to an image.

Fade-in from a Solid Color to an Image



Note

You cannot fade in multiple images simultaneously.

start

The start attribute is required. It specifies the time from the beginning of the RealPix timeline that the fade-in occurs. Here is an example that starts the fade-in 4 seconds into the timeline:

```
<fadein start="4".../>
```

Additional Information

For information on the time format, see the <head/> tag `timeformat` attribute on page 16.

duration

This required attribute specifies the total time for the effect to complete. The higher the value, the slower the fade-in. For example, the following value means the fade-in takes 2.5 seconds to complete:

```
<fadein duration="2.5".../>
```

target

The `target` attribute is required. It specifies the <image/> tag handle (see page 20) of the image to fade in. For example:

```
<fadein target="2".../>
```

dstx, dsty, dstw, dsth

These optional attributes define the size and placement of the image that fades in. Leave them out to fade the image into the entire display window. To fade the image into a portion of the display window, set the destination rectangle's x and y coordinates, as well as its height and width in pixels:

`dstx` X coordinate of the destination rectangle.

`dsty` Y coordinate of the destination rectangle.

`dstw` Width of the destination rectangle.

`dsth` Height of the destination rectangle.

The following example fades the image into a rectangle 128 by 128 pixels. The image displays 20 pixels to the right of the main window's left edge and 40 pixels down from its top edge:

```
<fadein dstx="20" dsty="40" dstw="128" dsth="128".../>
```

Additional Information

For more on the sizes and offsets of source and destination rectangles, see "Controlling Image Size, Placement, and Aspect" on page 10.

srcx, srcy, srcw, srch

These four attributes define what portion of the source image fades into the destination rectangle. Leave them out to fade the entire source image into the

destination rectangle. To use only a portion of the source image, set the source rectangle's x and y coordinates, as well as its height and width in pixels.

srcx X coordinate of the source rectangle.
srcy Y coordinate of the source rectangle.
srcw Width of the source rectangle.
srch Height of the source rectangle.

The following example selects from the source image a source rectangle 128 pixels wide by 256 pixels high. The source rectangle starts 64 pixels to the right of the source image's left edge and 92 pixels down from its top edge:

```
<fadein dstx="64" dsty="92" dstw="128" dsth="256".../>
```

Additional Information

For more on the sizes and offsets of source and destination rectangles, see "Controlling Image Size, Placement, and Aspect" on page 10.

url

This optional attribute sets a hyperlink URL for the effect. When the user clicks the image, the user's default Web browser opens the URL. This URL value overrides the presentation default set in the <head/> tag (see page 19). Use a fully qualified URL like the following:

```
<fadein url="http://www.real.com".../>
```

aspect

This optional attribute determines whether the source rectangle's height-to-width ratio is maintained when the destination rectangle has a different height-to-width ratio. The presentation's default value is set in the <head/> tag (see page 19), but you can override it for the fade-in:

```
<fadein aspect="false".../>
```

maxfps

This optional attribute sets the maximum frames per second for the effect. It overrides any default maxfps value set in the <head/> tag (see page 19). Include it as the last attribute. Here's an example:

```
<fadein...maxfps="5"/>
```

<fadeout/>

The <fadeout/> tag defines a transition from an image to a color. The basic <fadeout/> tag looks like this:

```
<fadeout start="10" duration="3" color="yellow"/>
```

The following figure illustrates a fade-out.

Fade-out from an Image to a Solid Color



start

The start attribute is required. It specifies the time from the beginning of the RealPix timeline that the fade-out occurs. The following example starts the fade-out 10 seconds into the presentation:

```
<fadeout start="10" .../>
```

Additional Information

For information on the time format, see the <head/> tag `timeformat` attribute on page 16.

duration

This required attribute specifies the total time the effect takes to complete. The higher the value, the slower the fade-out. For example, the following makes the fade-out last 3.75 seconds:

```
<fadeout duration="3.75" .../>
```

color

This required attribute sets the color the image fades to. You can use a hexadecimal value or a predefined color name as illustrated here:

```
<fadeout color="blue" .../>
```

Additional Information

For more on color values and names, see “Colors” on page 35.

dstx, dsty, dstw, dsth

These optional attributes define the size and placement of the rectangle that fades out. Leave them out of the tag to fade out the entire display window. To fade out only a portion of the display window, set the destination rectangle's x and y coordinates, as well as its height and width in pixels:

dstx	X coordinate of the destination rectangle.
dsty	Y coordinate of the destination rectangle.
dstw	Width of the destination rectangle.
dsth	Height of the destination rectangle.

The following example fades out a rectangle 64 pixels wide by 64 pixels high. The rectangle starts 110 pixels to the right of the main window's left edge and 80 pixels down from its top edge:

```
<fadeout dstx="110" dsty="80" dstw="64" dsth="64".../>
```

Additional Information

For more on the sizes and offsets of source and destination rectangles, see “Controlling Image Size, Placement, and Aspect” on page 10.

maxfps

This optional attribute sets the maximum frames per second for the effect. It overrides any default maxfps value set in the <head/> tag (see page 19). Include it as the last attribute. Here's an example:

```
<fadeout...maxfps="5"/>
```

<crossfade/>

The <crossfade/> tag creates a transition from one image to another, as illustrated in the following figure.

Crossfade from One Image to Another

start

The start attribute is required. It specifies the time from the beginning of the RealPix timeline that the crossfade occurs. Here is an example that starts the effect 12.3 seconds into the timeline:

```
<crossfade start="12.3".../>
```

Additional Information

For information on the time format, see the `<head/>` tag `timeformat` attribute on page 16.

duration

This required attribute specifies the total time the effect takes to complete. The higher the value, the slower the crossfade. For example, the following makes the crossfade take just 1.5 seconds to complete:

```
<crossfade duration="1.5".../>
```

target

The target attribute is required. It specifies the `<image/>` tag handle (see page 20) of the image to fade in. For example:

```
<crossfade target="2".../>
```

dstx, dsty, dstw, dsth

These optional attributes define the size and placement of the image that fades in. Leave them out to fade the image into the entire display window. To fade the image into a portion of the display window, set the destination rectangle's x and y coordinates, as well as its height and width in pixels:

dstx X coordinate of the destination rectangle.

dsty Y coordinate of the destination rectangle.

dstw Width of the destination rectangle.

dsth Height of the destination rectangle.

The following example fades the image into a rectangle 128 by 128 pixels. The image displays 20 pixels to the right of the main window's left edge and 40 pixels down from its top edge:

```
<crossfade dstx="20" dsty="40" dstw="128" dsth="128".../>
```

Additional Information

For more on the sizes and offsets of source and destination rectangles, see “Controlling Image Size, Placement, and Aspect” on page 10.

srcx, srcy, srcw, srch

These four attributes define what portion of the source image fades into the destination rectangle. Leave them out to fade the entire source image into the destination rectangle. To use only a portion of the source image, set the source rectangle’s x and y coordinates, as well as its height and width in pixels.

srcx X coordinate of the source rectangle.

srcy Y coordinate of the source rectangle.

srcw Width of the source rectangle.

srch Height of the source rectangle.

The following example selects from the source image a source rectangle 128 pixels wide by 256 pixels high. The source rectangle starts 64 pixels to the right of the source image’s left edge and 92 pixels down from its top edge:

```
<crossfade dstx="64" dsty="92" dstw="128" dsth="256".../>
```

Additional Information

For more on the sizes and offsets of source and destination rectangles, see “Controlling Image Size, Placement, and Aspect” on page 10.

url

This optional attribute sets a hyperlink URL for the effect. When the user clicks the image, the user’s default Web browser opens the URL. This URL value overrides the presentation default set in the <head/> tag (see page 19). Use a fully qualified URL like the following:

```
<crossfade url="http://www.real.com".../>
```

aspect

This optional attribute determines whether the source rectangle’s height-to-width ratio is maintained when the destination rectangle has a different height-to-width ratio. The presentation’s default value is set in the <head/> tag (see page 19), but you can override it for the crossfade:

```
<crossfade aspect="false".../>
```


maxfps

This optional attribute sets the maximum frames per second for the effect. It overrides any default maxfps value set in the <head/> tag (see page 19). Include it as the last attribute. Here's an example:

```
<crossfade...maxfps="5"/>
```

<wipe/>

The <wipe/> tag creates a transition from one image to another, either by covering the displayed image or by pushing it out of the way with a sliding effect. A typical <wipe/> tag looks like this:

```
<wipe type="push" direction="left" start="10" duration="3" target="2"/>
```

The following figure illustrates this effect.

"Push" Wipe Transition from One Image to Another**start**

The start attribute is required. It specifies the time from the beginning of the RealPix timeline that the wipe occurs. Here is an example that starts the effect 30 seconds into the presentation:

```
<wipe start="30".../>
```

Additional Information

For information on the time format, see the <head/> tag timeformat attribute on page 16.

duration

This required attribute specifies the total time the effect takes to complete. The higher the value, the slower the transition. For example, the following makes the wipe take 5.5 seconds to complete:

```
<wipe duration="5.5".../>
```

target

The target value is required. It specifies the <image/> tag handle of the image (see page 20) to bring in with the wipe effect. For example:

```
<wipe target="2".../>
```

type

This required attribute defines the type of transition that occurs:

- | | |
|--------|---|
| normal | New image moves over current image, which remains stationary. |
| push | New image pushes current image out (both images move). |

Here is an example:

```
<wipe type="push".../>
```

direction

This required attribute sets the direction the new image moves:

- | | |
|-------|---|
| left | New image starts at right edge, moves toward left edge. |
| right | New image starts at left edge, moves toward right edge. |
| up | New image starts at bottom edge, moves toward top edge. |
| down | New image starts at top edge, moves toward bottom edge. |

For example:

```
<wipe direction="up".../>
```

dstx, dsty, dstw, dsth

These optional attributes define the size and placement of the image that moves in. Leave them out to move the image into the entire display window. To move the image into a portion of the display window, set the destination rectangle's x and y coordinates, as well as its height and width in pixels:

- | | |
|------|--|
| dstx | X coordinate of the destination rectangle. |
| dsty | Y coordinate of the destination rectangle. |
| dstw | Width of the destination rectangle. |
| dsth | Height of the destination rectangle. |

The following example moves the image into a rectangle 64 by 64 pixels. The image displays 50 pixels to the right of the main window's left edge and 70 pixels down from its top edge:

```
<wipe dstx="50" dsty="70" dstw="64" dsth="64".../>
```

Additional Information

For more on the sizes and offsets of source and destination rectangles, see “Controlling Image Size, Placement, and Aspect” on page 10.

srcx, srcy, srcw, srch

These four attributes define what portion of the source image moves into the display rectangle. Leave them out to move the entire source image into the destination rectangle. To use a portion of the source image, set the source rectangle’s x and y coordinates, as well as its height and width in pixels.

srcx X coordinate of the source rectangle.
srcy Y coordinate of the source rectangle.
srcw Width of the source rectangle.
srch Height of the source rectangle.

The following example selects from the source image a source rectangle 128 pixels wide by 128 pixels high. The source rectangle starts 89 pixels to the right of the source image’s left edge and 115 pixels down from its top edge:

```
<wipe dstx="89" dsty="115" dstw="128" dsth="128".../>
```

Additional Information

For more on the sizes and offsets of source and destination rectangles, see “Controlling Image Size, Placement, and Aspect” on page 10.

url

This optional attribute sets a hyperlink URL for the new image. When the user clicks the image, the user’s default Web browser opens the URL. This URL value overrides the presentation default set in the <head/> tag (see page 19). Use a fully qualified URL like the following:

```
<wipe url="http://www.real.com".../>
```

aspect

This optional attribute determines whether the source rectangle’s height-to-width ratio is maintained when the destination rectangle has a different height-to-width ratio. The presentation’s default value is set in the <head/> tag (see page 19), but you can override it for the wipe effect:

```
<wipe aspect="false".../>
```

maxfps

This optional attribute sets the maximum frames per second for the effect. It overrides any default maxfps value set in the <head/> tag (see page 19). Include it as the last attribute. Here's an example:

```
<wipe...maxfps="5"/>
```

<viewchange/>

The <viewchange/> tag defines a pan or a zoom. A typical <viewchange/> tag looks like this:

```
<viewchange start="24" duration="3" srcx="80" srcy="80" srcw="48" srch="48"/>
```

Note that <viewchange/> does not specify an image. The view change always affects the image currently in the display window. The following figure illustrates a zoom created with a <viewchange/> tag.

Zoom Effect Created with a View Change**start**

The start attribute is required. It specifies the time from the beginning of the RealPix timeline that the view change occurs. The following example starts the effect 35.2 seconds into the presentation timeline:

```
<viewchange start="35.2".../>
```

Additional Information

For information on the time format, see the <head/> tag timeformat attribute on page 16.

duration

This required attribute specifies the total time the effect takes to complete. The higher the value, the slower the pan or zoom. For example, the following makes the transition take 8 seconds to complete:

`<viewchange duration="8".../>`

dstx, dsty, dstw, dsth

These four attributes define in pixels the placement and size of the destination rectangle. See below for more information.

dstx X coordinate of the destination rectangle.
dsty Y coordinate of the destination rectangle.
dstw Width of the destination rectangle.
dsth Height of the destination rectangle.

srcx, srcy, srcw, srch

These four attributes define in pixels the placement and size of the source image. See below for more information.

srcx X coordinate of the source rectangle.
srcy Y coordinate of the source rectangle.
srcw Width of the source rectangle.
srch Height of the source rectangle.

maxfps

This optional attribute sets the maximum frames per second for the effect. It overrides any default maxfps value set in the `<head/>` tag (see page 19). Include it as the last attribute. Here's an example:

`<viewchange...maxfps="5"/>`

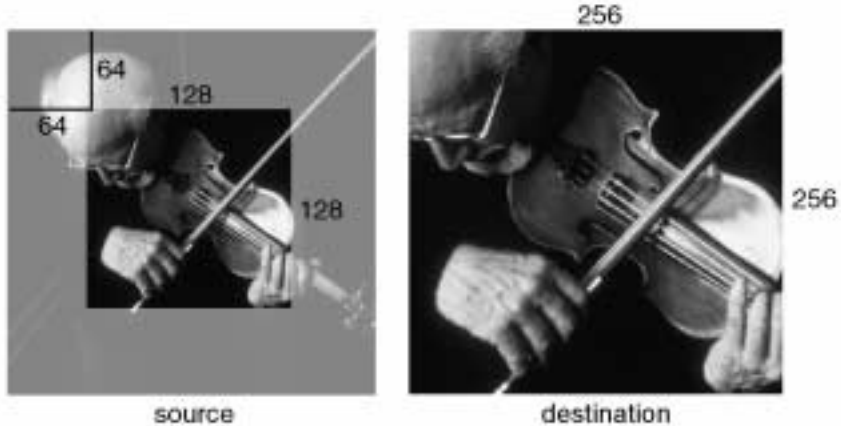
Zooming in on an Image

To zoom in on an image, display the image and then use `<viewchange/>` to define the area to zoom in on. The following example is taken from a RealPix presentation that displays in a window 256 by 256 pixels. The source image is also 256 by 256 pixels. The presentation fades in on the image and then zooms in, taking three seconds to complete the zoom:

`<fadein start="1" duration="2" target="1"/>`
`<viewchange start="4" duration="3" srcx="64" srcy="64" srcw="128" srch="128"/>`

The zoom selects an area 128 by 128 pixels square in the center of the source image. This square displays in the full 256 by 256 pixel display window. The following figure illustrates this zoom.

Zooming in on Part of an Image



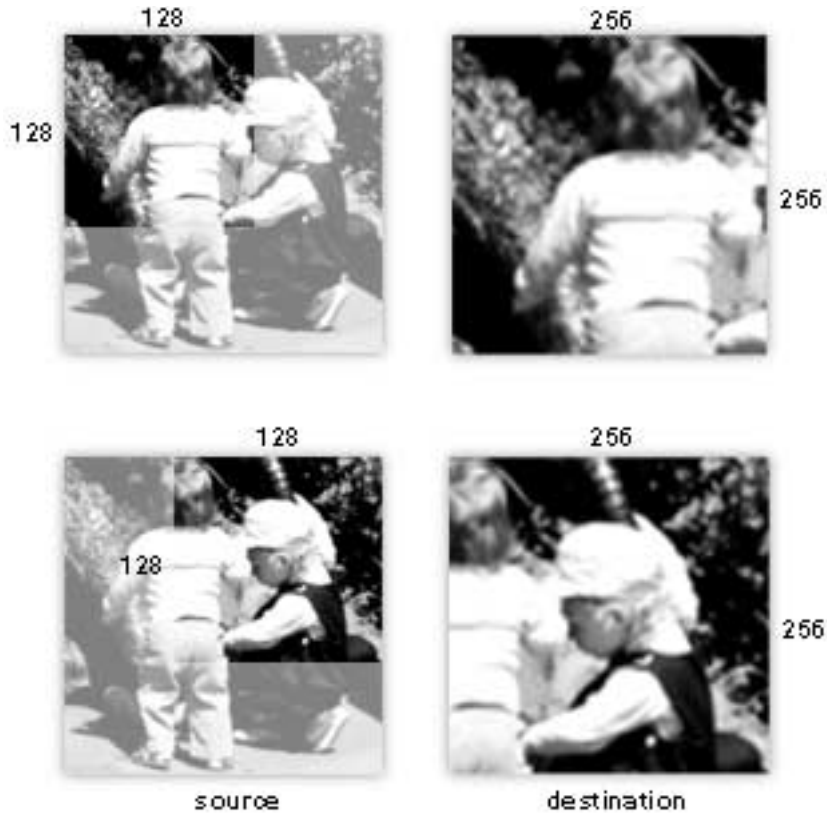
Because this zoom effect does not specify a destination rectangle, the zoom image fills the entire display window. But you can also use the destination coordinates (dstx, dsty, dstw, dsth) to specify a portion of the display window.

Panning across an Image

To pan across an image, you display a portion of the source image, then use `<viewchange/>` to move to a different part of the source image. The following example uses a RealPix presentation that displays in a window 256 by 256 pixels. The source image is also 256 by 256 pixels:

```
<fadein start="1" duration="3" target="2"/>
<viewchange start="4" duration="3" srcx="0" srcy="0" srcw="128" srch="128"/>
<viewchange start="7" duration="3" srcx="128" srcy="0" srcw="128" srch="128"/>
```

The presentation fades in an image, zooms in on the upper left-hand quadrant, then pans to the upper, right-hand quadrant. Each effect takes three seconds to complete. The following figure illustrates this movement.

Zooming in on, then Panning across an Image

Because this pan effect does not specify a destination rectangle, the source rectangle fills the entire display window. But you can also use the destination coordinates (*dstx*, *dsty*, *dstw*, *dsth*) to specify a portion of the display window.

Colors

RealPix effects that use colors can specify a 24-bit, hexadecimal color value. These are the same color values as those used in HTML. The first two hex digits represent red, the next two green, and the last two blue. For example, “#FF8000” indicates the 24-bit RGB color 255:128:0. Alternately, RealPix color attributes can use the predefined names shown below.

white (#FFFFFF)	silver (#C0C0C0)	gray (#808080)	black (#000000)
yellow (#FFFF00)	fuchsia (#FF00FF)	red (#FF0000)	maroon (#800000)
lime (#00FF00)	olive (#808000)	green (#008000)	purple (#800080)
aqua (#00FFFF)	teal (#008080)	blue (#0000FF)	navy (#000080)

Example Presentation

The following example file demonstrates the RealPix mark-up. To play this and other examples in RealPlayer, download the HTML version of this manual from <http://service.real.com/help/library/index.html>.

```
<imfl>
  <head title="RealPix(tm) Sample Effects"
    author="Jay Slagle"
    copyright="(c)1998 RealNetworks, Inc."
    timeformat="dd:hh:mm:ss.xyz"
    duration="46"
    bitrate="12000"
    width="256"
    height="256"
    url="http://www.real.com"
    aspect="true"/>

  <!-- Assign handle numbers to images -->

  <image handle="1" name="jbeans.jpg"/>
  <image handle="2" name="peppers.jpg"/>
  <image handle="3" name="elephant.jpg"/>
  <image handle="4" name="hippo.jpg"/>
  <image handle="5" name="interior.jpg"/>

  <!-- Fade in and crossfade images -->

  <fill start="0" color="black"/>
  <fadein start="1" duration="2" target="1"/>
  <crossfade start="4" duration="3" target="2"/>

  <!-- Fade out with expanding squares -->

  <fadeout start="8" duration="1" color="lime"
    dstx="96" dsty="96" dstw="64" dsth="64"/>
  <fadeout start="9" duration="1" color="green"
    dstx="64" dsty="64" dstw="128" dsth="128"/>
```



```
<fadeout start="10" duration="1" color="#6D8073"
  dstx="32" dsty="32" dstw="192" dsth="192"/>
<fadeout start="11" duration="1" color="black"
  dstx="0" dsty="0" dstw="256" dsth="256"/>

<!-- Wipe in checkerboard images -->

<fadein start="13" duration="3" target="3"/>
<wipe type="push" direction="left" start="16"
  duration="3" target="4"
  srcx="0" srcy="0" srcw="128" srch="128"
  dstx="0" dsty="0" dstw="128" dsth="128"/>
<wipe type="push" direction="right" start="19"
  duration="3" target="4"
  srcx="128" srcy="128" srcw="128" srch="128"
  dstx="128" dsty="128" dstw="128" dsth="128"/>
<wipe type="push" direction="up" start="22"
  duration="3" target="4"
  srcx="0" srcy="128" srcw="128" srch="128"
  dstx="0" dsty="128" dstw="128" dsth="128"/>
<wipe type="push" direction="down" start="25"
  duration="3" target="4"
  srcx="128" srcy="0" srcw="128" srch="128"
  dstx="128" dsty="0" dstw="128" dsth="128"/>

<!-- Zoom in and pan -->

<fadein start="29" duration="3" target="5"/>
<viewchange start="32" duration="3"
  srcx="0" srcy="0" srcw="160" srch="160"/>
<viewchange start="35.5" duration="3"
  srcx="96" srcy="0" srcw="160" srch="160"/>
<viewchange start="39" duration="3"
  srcx="96" srcy="96" srcw="160" srch="160"/>
<viewchange start="42.5" duration="3"
  srcx="0" srcy="96" srcw="160" srch="160"/>
</imfl>
```

BANDWIDTH USAGE

When you stream your RealPix presentation to viewers over a network such as the World Wide Web, you need to consider the bandwidth (bit rate) the presentation will consume. You don't need to consider bandwidth if copies of the presentation files will reside on each viewer's desktop computer, however. This section helps you determine your presentation's bandwidth usage. It also gives tips for lowering bandwidth consumption.

Additional Information

For an explanation of bandwidth in RealSystem G2, see *RealSystem G2 Production Guide* available at <http://service.real.com/help/library/index.html>.

Targeting a Bit Rate

The following table lists the recommended maximum presentation bit rate for streaming files over different network connections. If you want to reach users with 28.8 Kbps modems, for example, your presentation should not consume more than 20 Kilobits of data per second. The full 28.8 Kbps is not available because bandwidth is required for noise, data loss, and packet overhead.

Bit Rates Available for Streaming Files

Target Connection Speed	Suggested Maximum Bit Rate for Streaming Files
14.4 Kbps modem	10 Kbps
28.8 Kbps modem	20 Kbps
56.0 Kbps modem	34 Kbps
56.0 Kbps ISDN	45 Kbps
112 Kbps dual ISDN	80 Kbps

You also need to consider bandwidth required by other clips in the presentation. If you target 28.8 Kbps modem connections, for example, and your presentation has a RealAudio soundtrack that consumes 5 Kbps, you have 15 Kbps left for RealPix. You should set this value in the <head/> tag bitrate attribute (see page 17). This tells RealServer your target bandwidth value.

The bandwidth your presentation actually requires, however, depends on the total size of the image files and the presentation length. To get a rough estimate of this bandwidth, add together the sizes of all image files used in the presentation. Convert this total to Kilobits using the chart below. Then divide by the RealPix presentation length in seconds.

Converting File Size to Kilobits

Using This Measurement	Do This to Get Kilobits
Megabytes	Multiply by 8192
Kilobytes	Multiply by 8
bytes	Divide by 128
bits	Divide by 1024

For example, if your image files add up to 200 Kilobytes, multiply 200 by 8 to get 1600 Kilobits. A presentation that lasts two minutes, for instance, uses an average of 13.3 Kilobits per second:

$(200 \text{ Kilobytes} \times 8) / 120 \text{ seconds} = 13.3 \text{ Kilobits per second}$

If your RealPix target is 15 Kbps, your presentation should stream smoothly with bandwidth to spare.

This simple estimate assumes that all images are each about the same size and are streamed at regular intervals. You run into bandwidth problems, however, if you use a lot of images near the start of the presentation. If the presentation begins by fading four big images into four quadrants of the display window, for example, RealServer needs to download a lot of image data before the presentation can begin. This results in a lengthy *preroll*.

What is Preroll?

Before it delivers a RealPix presentation, RealServer looks at the image sizes and the presentation timeline. Weighing these against the bit rate set in the <head/> tag (see page 17), RealServer determines how much data RealPlayer must receive before it can start to play the presentation. This ensures that once

RealPlayer commences playback, it does not need to halt the presentation while it receives more data. The initial data sent before playback is the preroll. As a general rule, you want the preroll under 15 seconds, ideally under 10 seconds.

For example, if a RealPix presentation streams for 60 seconds at 20 Kbps, it can deliver up to 1200 Kb of data during playback. If the RealPix presentation requires 1400 Kb of data, at least 200 Kb of data must be sent as preroll. At 20 Kbps, this equals a 10 second preroll:

$$(1400 \text{ Kb} - 1200 \text{ Kb}) / 20 \text{ Kbps} = 10 \text{ seconds}$$

As mentioned above, presentation size divided by presentation length is only a rough guide to preroll length. RealServer considers when each image is introduced in the timeline when it calculates preroll. The following sections give instructions for determining preroll more accurately and for reducing bandwidth consumption.

Calculating Bandwidth Use

The RealPix Bandwidth Calculator (**rpcalc.xls**) is a Microsoft Excel 97 spreadsheet included in the `utils` directory of the HTML version of this manual. The calculator and the HTML manual are available for download from <http://service.real.com/help/library/index.html>. Use the calculator to derive a detailed picture of RealPix bandwidth usage. You may want to do this if you experience high preroll when streaming your presentation. You can then determine where the problem occurs and resolve it by modifying image size or adjusting the timeline.

In the calculator you can enter RealPix information manually, or read in a RealPix (.rp) file to gather the image file names and display times. The calculator will also load the image sizes automatically. To be read automatically, a RealPix file must meet these criteria:

- It must follow the guidelines in “Syntax Rules” on page 15. All attribute values must be in double quotation marks, for example.
- Comments must be in the form `<!-- comment -->` and not `<!-- comment --/>`.

In the calculator, make sure that the RealPix bit rate is set correctly. This reflects the RealPix bandwidth target set in the `<head/>` tag `bitrate` attribute (see page 17). The example below uses 20 Kbps, the bandwidth target for a presentation delivered over a 28.8 Kbps modem. Set the buffer time to your targeted preroll, which should be approximately 10 seconds.

Presentation Information in RealPix Bandwidth Calculator

Presentation Information	
Current RP File	Output Directory
	graphics
Total Bit Rate	
28.8	
RealPix Bit Rate	RealPix Buffer Time (secs)
20.0	10.0
Remaining Bit Rate	
8.8	

Additional Information

See “Targeting a Bit Rate” on page 38.

When setting values manually, enter file names (not shown below) and image sizes in Kilobytes, along with the times each image first displays. These values go in the white columns. The calculator computes the values in gray. When you load a RealPix file automatically, the calculator adds an entry for each effect. After the first effect that uses an image, though, RealPlayer has the image in memory, so the entries for subsequent effects show that image as 0 Kb. You can ignore these entries and examine only the initial appearance of each image.

Based on the image sizes, the calculator computes the transmission time in seconds for each image. This is the time it takes RealServer to stream the image to RealPlayer at the presentation bit rate. The last column shows the earliest display time for each file. This reflects the earliest time in the RealPix timeline the image can appear. The calculator derives this time by subtracting the presentation preroll from the cumulative image transmission times.

RealPix Bandwidth Calculator Showing Presentation that will not Stream Well

Image Size (Kb)	Transmission Time (sec)	Display Time (from rp file)	Earliest Display Time
29.0	12.3	1.0	2.3
48.5	20.6	4.0	22.9
50.0	21.3	10.0	44.2
64.0	27.2	70.0	71.4
13.8	5.8	84.0	77.2
89.0	37.8	100.0	115.1

The example above illustrates a RealPix presentation that will not stream with the desired preroll of 10 seconds. It shows, for example, that the first image

can display at 2.3 seconds into the timeline at the earliest. The image is slated to appear at 1 second after the start of playback, however. The calculator flags this display time in red to indicate the problem. As shown above, only the fifth image can display at its slated time of 84 seconds.

Were it to stream this RealPix presentation, RealSystem would compensate with a preroll higher than the desired 10 seconds. Although the presentation would stream smoothly, viewers would have to wait too long for playback. (To determine the actual preroll for a presentation, increase the preroll value until all display time values turn black.)

To improve a presentation's performance, you can take steps described in "Lowering Bandwidth Consumption" on page 43. Then reload the RealPix file into the spreadsheet or update the image sizes and display times manually. The following figure illustrates a revised presentation that makes better use of bandwidth.

RealPix Bandwidth Calculator Showing Presentation that will Stream Well

Image Size (Kb)	Transmission Time (sec)	Display Time (from rp file)	Earliest Display Time
21.0	8.9	1.0	(1.1)
42.0	17.9	17.0	16.8
45.0	19.1	36.0	35.9
64.0	27.2	80.0	63.1
13.8	5.8	90.0	68.9
89.0	37.8	110.0	106.8

In this example the preroll is still 10 seconds, but files 1 through 3 are reduced in size. The entire presentation is lengthened and the images appear at more even intervals within the timeline. All display time values are now in black. The first image shows its earliest display time in green as (1.1). This indicates that the preroll is 1.1 seconds longer than necessary to display this image. If the earliest display times for all images appears in green, the actual preroll will be lower than the value listed in the calculator.

Running JPEGTRAN from the Calculator

As described in "Using JPEGTRAN" on page 7, you run **JPEGTRAN** on JPEG images to prepare them for streaming. On Windows, you can run **JPEGTRAN** in a batch conversion mode from the RealPix spreadsheet as described below.

► To run JPEGTRAN from the spreadsheet:

1. Click the **Find JPEGTran** button and navigate to the directory that holds the executable program. Select the program and click **Open**.

2. In the **Output Directory** field, enter the directory that will hold the processed files. The directory syntax can be absolute or relative to the directory that holds the spreadsheet.
3. Click **JPEGTran Images** and select the images you want to process. A DOS command window pops-up momentarily for each image. Processed files appear in the specified output directory.

Lowering Bandwidth Consumption

If your presentation requires too much initial buffering, you can take several steps to lower the preroll. You can modify your RealPix presentation or balance multiple media types so that initial presentation bandwidth needs are low. This gives RealSystem extra bandwidth when the presentation starts to stream the higher bit rate items required later in the timeline.

Lowering RealPix Preroll

Within the RealPix presentation, you can do the following to lower bandwidth consumption:

- Crop out unused portions of the source files. This lowers the source file sizes, making more efficient use of bandwidth than cropping images by defining source rectangles through RealPix mark-up tags.
- Reduce the resolution and number of colors in images while maintaining satisfactory image quality. For JPEG files, experiment with higher compression rates.
- Use smaller images at the beginning of the presentation. They will stream to RealPlayer faster and RealServer can use the extra bandwidth to start delivering larger files needed later.
- Introduce images gradually over the timeline. Don't use rapid effects with a lot of images at the beginning of the presentation. Once you have displayed all images, however, you can use rapid effects because RealPlayer holds the image data in memory.
- Increase the length of the presentation by, for example, adding an extra second to the duration time of each effect.

Masking Preroll using Other Media

When you stream RealPix along with a low-bandwidth media file, you can mask the RealPix preroll so that it takes place while the other file plays. For example, start the presentation with RealText (to display opening credits, for example) or a low-bandwidth RealAudio file (as a narration, for instance) to consume from 1 to 5 Kbps at the start of the presentation.

As these files play, RealServer takes advantage of the extra bandwidth available in the connection to stream the RealPix preroll. If RealPix starts 20 seconds after the RealAudio or RealText file, for example, you make 300 to 380 Kilobits available (at 20 Kbps) for the RealPix preroll. To do this, you assemble the overall presentation with a SMIL file, put all files in a <par> group, and set a 20-second delay for RealPix.

Additional Information

For more on masking preroll, see the appendix on advanced production techniques in *RealSystem G2 Production Guide*. For more on RealText, see *RealText Authoring Guide*. You can download both guides from <http://service.real.com/help/library/index.html>.

Chapter 4

REALPIX BROADCASTING

The RealPix broadcast application connects to RealServer G2 and polls a specified directory every second for an updated image file, which can be in JPEG or static GIF format. When it finds an updated image file, it sends the file to RealServer, which broadcasts the file to the connected RealPlayers. New files replace old files with a transition that alternates between a fade-in and a “push” wipe transition.

Additional Information

RealSystem G2 Production Guide provides an overview of broadcasting. For more on configuring a broadcast, see *RealServer Administration Guide*. Both guides are available at <http://service.real.com/help/library/index.html>.

RealPix Broadcast Application

You can broadcast RealPix to multiple viewers with an application included in the utils directory of the HTML version of this manual. To get this application, download the bundled HTML version of this manual from <http://service.real.com/help/library/index.html>.

The broadcast application runs on any Windows 32-bit operating system. Its C++ source code is publicly available, though, and you can compile it on a different operating system as noted in “Developing a Custom RealPix Broadcast Application” on page 49.

Tip

Available at <http://www.real.com/products/tools/>, RealNetworks tools let you broadcast RealAudio and RealVideo as well. For information on broadcasting RealText, download *RealText Authoring Guide* from <http://service.real.com/help/library/index.html>.

Installing the RealPix Broadcast Application

The RealPix broadcast application comprises the **exlvpix.exe** executable file and a few DLLs. These files must reside together, but you can move them from the utils directory to any directory on a RealPix broadcast machine. You can use the RealServer G2 machine or any Windows 32-bit machine with a network connection to RealServer G2. RealPix broadcast requires minimal system resources, but RealNetworks recommends using a Pentium 133 MHz or faster processor with at least 32 Megabytes of memory.

Creating a Broadcast RealPix Clip

Create RealPix broadcast images in JPEG or static GIF format. You set RealPix window attributes such as width and height when you start the broadcast application. RealServer sends these attributes to each RealPlayer when it connects to the broadcast. The broadcast images then scale to the window size when received by RealPlayer, maintaining their height-to-width aspect ratios.

Additional Information

For more on aspect ratios, see “Controlling Image Aspect” on page 13.

Setting the Broadcast URL

Consult with the RealServer administrator to determine the URL for the RealPix broadcast. If you are linking a Web page directly to the RealPix broadcast, the URL may look like this:

```
<a href="http://realserver.company.com/ramgen/encoder/media/slides.rp">...</a>
```

This URL includes two virtual directories. The ramgen virtual directory makes RealServer launch RealPlayer without a separate RAM file. The encoder virtual directory specifies a broadcast coming in on a certain port of RealServer rather than an actual file existing on a file system. The RealServer administrator sets up and names these virtual directories.

If you use a SMIL file, the Web page URL to the file may look like this:

```
<a href="http://realserver.company.com/ramgen/media/daily.smi">...</a>
```

Within the SMIL file, you'll have an RTSP link to the RealPix broadcast:

```
<textstream src="rtsp://realserver.company.com/encoder/media/slides.rp"/>
```

Using SMIL, you can embed a RealPix broadcast in a multiclip presentation. You might have a RealAudio narration and a RealPix region for broadcast images, for example. The SMIL file uses the broadcast URL for RealPix and a standard URL for the on-demand RealAudio clip. Each person who views the presentation hears the audio from its normal beginning, but joins the RealPix broadcast in progress.

Additional Information

For more on using SMIL and specifying URLs for media clips, see *RealSystem G2 Production Guide*, available at <http://service.real.com/help/library/index.html>.

Starting the RealPix Broadcast Application

To run the RealPix broadcast application, start the Windows DOS prompt and change to the directory that holds the application. Then start the application as shown in this example:

```
c:\RealPix> exlvttext.exe server port filename imgname width height bitrate
```

The following table explains the parameters you enter on the command line. Enter all values without quotation marks.

RealPix Broadcast Application Start-up Parameters

Parameter	Value
server	The network address of the RealServer G2 machine that will stream the RealPix clip. This can be a DNS name such as <code>realserver.company.com</code> or an IP address such as <code>204.71.154.5</code> .
port	The port on the RealServer machine that receives the RealPix data from the broadcast application. The RealServer administrator determines which port is used.
filename	Name for the RealPix live stream. This file name is used in the live RealPix hypertext link within the SMIL file or Web page. It does not have to be the same as the image input file, but it should end with the <code>.rp</code> extension.
imgname	Full path and file name of the image file on the broadcast machine to monitor, such as <code>c:\RealPix\broadcast\slide.jpg</code> .
width	Pixel value for the width of the RealPix display window. Equivalent to width set in <code><head/></code> tag described on page 16.

(Table Page 1 of 2)

RealPix Broadcast Application Start-up Parameters (continued)

Parameter	Value
height	Pixel value for the height of the RealPix display window. Equivalent to height set in <head/> tag described on page 16.
bitrate	Estimated average bit rate for the live RealPix stream in Kilobits per second (Kbps). When the RealPix broadcast is part of a multclip presentation, RealPlayer uses this estimate to determine if it has enough bandwidth to play the presentation.

(Table Page 2 of 2)

Moving a RealPix File to the Broadcast Directory

Once started, the broadcast application checks the designated directory every second for an updated image file. You can place a new file in the directory manually or use any automated method. All files must use the same image file name specified during application start-up.

Make sure that the frequency with which you broadcast images does not exceed your broadcast bit rate. If a broadcast image is 35 Kilobytes (280 Kilobits) and your broadcast rate is 10 Kbps, for example, RealServer needs 28 seconds to broadcast that image.

Additional Information

For more on bandwidth, read “Bandwidth Usage” starting on page 38.

Stopping the Broadcast Application

To stop the RealPix broadcast stream, type a lowercase q at the RealPix command console. This causes RealServer to terminate the broadcast stream. It also shuts down the application console window on the RealPix broadcast machine.

Warning

Do not stop the RealPix broadcast by pressing **Ctrl+C** from the broadcast application console. This terminates the window but does not properly shut down the RealPix broadcast on RealServer.

Developing a Custom RealPix Broadcast Application

The RealSystem G2 SDK, available at <http://www.real.com/devzone>, includes the C++ source code for the RealPix broadcast application. Subject to the SDK license agreement, you can customize the broadcast application to do any of the following:

- Compile the RealPix broadcast application to run on a different operating system.
- Modify the broadcast application with new features.
- Integrate RealPix broadcast features into another application.

TAG SUMMARY

<head/>

Attribute	Definition	Required	Default	Example
aspect	Presentation default for maintaining aspect ratio of images (true or false). Other effects can override this.	no	true	aspect="false"
author	Name of author.	no	(none)	author="Jane Doe"
bitrate	Peak bandwidth in bits per second.	yes	(none)	bitrate="64000"
copyright	Copyright notice.	no	(none)	copyright="© 1998 RealNetworks, Inc."
duration	Duration of RealPix presentation.	yes	(none)	duration="50"
height	Height of display window in pixels.	yes	(none)	height="256"
maxfps	Maximum frames per second for transition effects. (Include as last attribute.)	no	calculated automatically	maxfps="5"
preroll	Time for which data should be buffered before presentation starts.	no	calculated automatically	preroll="20"
timeformat	Sets format for start and duration times. Can be dd:hh:mm:ss.xyz or milliseconds.	yes	milliseconds	timeformat="dd:hh:mm:ss.xyz"
title	Name of presentation.	no	(none)	title="The Garden"
url	Hyperlink URL for presentation images.	no	(none)	url="http://www.real.com"
width	Width of display window in pixels.	yes	(none)	width="256"

<image/>

Attribute	Definition	Required	Default	Example
handle	Unique number for the image. Referred to by certain effects.	yes	(none)	handle="23"
name	Path to the image file, relative to the location of the RealPix file.	yes	(none)	name="tulip.jpg"

<fill/>

Attribute	Definition	Required	Default	Example
color	Hexadecimal color description or standard palette color.	yes	(none)	color="yellow"
dsth	Height in pixels of destination rectangle.	no	0	dsth="256"
dstw	Width in pixels of the destination rectangle.	no	0	dstw="256"
dstx	X coordinate in pixels of the destination rectangle.	no	0	dstx="128"
dsty	Y coordinate in pixels of the destination rectangle.	no	0	dsty="128"
start	Time from the start of the RealPix track that the fill occurs.	yes	(none)	start="23"

<fadein/>

Attribute	Definition	Required	Default	Example
aspect	Maintain image aspect ratio, true or false.	no	set in <head/>	aspect="false"
dsth	Height in pixels of the destination rectangle.	no	0	dsth="128"
dstw	Width in pixels of the destination rectangle.	no	0	dstw="128"
dstx	X coordinate in pixels of the destination rectangle.	no	0	dstx="20"
dsty	Y coordinate in pixels of the destination rectangle.	no	0	dsty="30"
duration	Time for the effect to complete.	yes	(none)	duration="0.75"
maxfps	Maximum frames per second for effect. (Include as last attribute.)	no	set in <head/>	maxfps="5"
srch	Height in pixels of source rectangle.	no	0	srch="128"
srcw	Width in pixels of source rectangle.	no	0	srcw="128"
srcx	X coordinate in pixels of the source rectangle.	no	0	srcx="128"
srcy	Y coordinate in pixels of the source rectangle.	no	0	srcy="128"
start	Time from the beginning of the RealPix track that the effect begins.	yes	(none)	start="4"
target	Target image handle.	yes	(none)	target="15"
url	Hyperlink URL for image.	no	set in <head/>	url="http://www.real.com"

<fadeout/>

Attribute	Definition	Required	Default	Example
color	Hexadecimal color description or standard palette color.	yes	(none)	color="black" color="#FF8000"
dsth	Height in pixels of the destination rectangle.	no	0	dsth="128"
dstw	Width in pixels of the destination rectangle.	no	0	dstw="128"
dstx	X coordinate in pixels of the destination rectangle.	no	0	dstx="128"
dsty	Y coordinate in pixels of the destination rectangle.	no	0	dsty="128"
duration	Total time for the transition to complete.	yes	(none)	duration="1.2"
maxfps	Maximum frames per second for effect. (Include as last attribute.)	no	set in <head/>	maxfps="5"
start	Time from the beginning of the RealPix track that the effect begins.	yes	(none)	start="10"

<crossfade/>

Attribute	Definition	Required	Default	Example
aspect	Maintain image aspect ratio, true or false.	no	set in <head/>	aspect="false"
dsth	Height in pixels of the destination rectangle.	no	0	dsth="64"
dstw	Width in pixels of the destination rectangle.	no	0	dstw="64"
dstx	X coordinate in pixels of the destination rectangle.	no	0	dstx="64"
dsty	Y coordinate in pixels of the destination rectangle.	no	0	dsty="64"
duration	Total time for the transition to complete.	yes	(none)	duration="1.8"
maxfps	Maximum frames per second for effect. (Include as last attribute.)	no	set in <head/>	maxfps="5"
srch	Height in pixels of the source rectangle.	no	0	srch="128"
srcw	Width in pixels of the source rectangle.	no	0	srcw="128"
srcx	X coordinate in pixels of the source rectangle.	no	0	srcx="64"
srcy	Y coordinate in pixels of the source rectangle.	no	0	srcy="64"
start	Time from the beginning of the presentation that the crossfade begins.	yes	(none)	start="20"
target	Target image handle.	yes	(none)	target="1"
url	Hyperlink URL for image.	no	set in <head/>	url="http://www.real.com"

<wipe/>

Attribute	Definition	Required	Default	Example
aspect	Maintain image aspect ratio, true or false.	no	set in <head/>	aspect="false"
direction	Direction the new image moves: up, down, left, or right.	yes	(none)	direction="up"
dsth	Height in pixels of the destination rectangle.	no	0	dsth="64"
dstw	Width in pixels of the destination rectangle.	no	0	dstw="64"
dstx	X coordinate in pixels of the destination rectangle.	no	0	dstx="64"
dsty	Y coordinate in pixels of the destination rectangle.	no	0	dsty="64"
duration	Time for the transition to complete.	yes	(none)	duration="3.5"
maxfps	Maximum frames per second for effect. (Include as last attribute.)	no	set in <head/>	maxfps="5"
srch	Height in pixels of the source rectangle.	no	0	srch="64"
srcw	Width in pixels of the source rectangle.	no	0	srcw="64"
srcx	X coordinate in pixels of the source rectangle.	no	0	srcx="64"
srcy	Y coordinate in pixels of the source rectangle.	no	0	srcy="64"
start	Time from the beginning of the presentation that the wipe begins.	yes	(none)	start="25"
target	Target image handle.	yes	(none)	target="2"
type	How the wipe occurs, either sliding over the current image (normal) or pushing it out (push).	yes	(none)	type="push"
url	Hyperlink URL for image.	no	set in <head/>	url="http://www.real.com"

<viewchange/>

Attribute	Definition	Required	Default	Example
dsth	Height in pixels of the destination rectangle.	no	0	dsth="64"
dstw	Width in pixels of the destination rectangle.	no	0	dstw="64"
dstx	X coordinate in pixels of the destination rectangle.	no	0	dstx="64"
dsty	Y coordinate in pixels of the destination rectangle.	no	0	dsty="64"
duration	Time for the effect to complete.	yes	(none)	duration="5"
maxfps	Maximum frames per second for effect. (Include as last attribute.)	no	set in <head/>	maxfps="5"
srch	Height in pixels of the source rectangle.	no	0	srch="256"
srcw	Width in pixels of the source rectangle.	no	0	srcw="256"
srcx	X coordinate in pixels of the source rectangle.	no	0	srcx="512"
srcy	Y coordinate in pixels of the source rectangle.	no	0	srcy="64"
start	Time from the beginning of the presentation that the view change begins.	yes	(none)	start="35"