SIMPLIFIED STREAMING AUDIO FOR THE WEB

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Recent advances in technology for the world wide web have introduced low cost, easy to create streaming audio. Although there are limits to when and where to deploy this technology you can now add music, voice over and special effect audio to your web site. In this paper the authors take a step by step look at the process involved in adding streaming audio to a web site using Macromedia's ShockWave with Streaming Audio ™. We chose to work with Macromedia's ShockWave because of the high quality of the streaming audio, the ease of use and the overwhelming popularity of ShockWave.

WHAT IS STREAMING AUDIO
Lets start with a little background. From the beginning it has been possible to download a sound file from the internet or the web. But from a designers point of view these files are hardly integrated into the design. They are more like appendages. When you click on a link to such a file they are either saved to your hard drive or are stored temporary in RAM. You can then play these files using an application that can read the audio file type. In some cases these audio applications are linked to the web browser as a helper application. For the designer using the web for a gaming or a story telling media this just will not do. A second type of audio is streaming audio. For over a year it has been possible to find web sites that have links to compressed sound files that play back as the are loading. This near real-time play back is known as streaming audio. Up until recently if you were to encounter a site with streaming audio it would most likely be implemented using RealAudio ™ or Streamwork ™. Both of these technologies utilize a special server that works in concert with the web server to host the web site. The audio server managers the audio stream traffic to ensure that multiple clients can access the audio streams with continuous real-time play back. This is necessary for sites that expect fairly heavy traffic. Couple the expense of a specialized server with the license fee associated with either of these two choices and the cost of adding streaming audio to your site quickly rises into the to 4 or 5 figure range. If your needs and budget were more modest you had no solution. Until now! Using a suite of tools from Macromedia it is now possible to add streaming audio to your web site without adding a special audio server and no licensing fees.

BUILDING A SIMPLE STREAMING AUDIO APPLET
Preparing Your Sound Files For Streaming

We will now take you step-by-step through the creation of a streaming audio Shockwave™ applet. We will be using Sound Edit 16 2.x and Director 5.x. We will also need the Streaming Audio Xtra. You can download the Xtra from the Macromedia web site (www.macromedia.com). The applet that we will create is designed as a photographic viewer that also plays a n minute and m second music track. You may view the finished applet by pointing your browser to http://www.povmtdiablo.com/gallery/viewer.html. We will start our work by processing our digital audio file. The digital audio file that we start with is a 22.05 KHZ, 16 bit sample size, mono AIF file. We want to start with a high quality source file so that the sound quality will be as high as possible. To convert this file to a streaming audio file we will be using Macromedia's "Sound Edit 16 2.x". Open the file with Sound Edit 16. We will need to preform two steps to prepare for compression. One step is "Equalization" the second step is "Normalization". See your Sound Edit manual or visit Macromedia's web site for details on preforming these steps. Next we must determine the bandwidth of the slowest connection that we wish to author for. The lower the bandwidth the lower the quality of the audio. Higher bandwidths will produce higher quality audio but it is important to balance your desire for superior quality with a reality check on modem speed. Ask yourself what you can expect as the slowest baud rate of your target audience and use this to select your audio digitizing and compression parameters. For our example we assume that the slowest connection will be with a 22.8 modem. Using the Bit Rate menu select the 16 kbps setting. This combination is good for our source material. Next chose the Export command from the File Menu and select the SWA file as your export type. Give the exported file a name that ends with .swa. It is a good idea to follow an 8 dot 3 naming convention since many servers require that file names be 8 or less characters with a 3 character extension. We named our file "song1.swa". Upload this file to your web server storing it at the directory level where the player HTML document and applet are going to reside.

Using LINGO To Control The Playback Of Your Audio Stream

Now that our audio file is ready to be streamed we will need to create our ShockWave™ applet to support and control the streaming. Using Macromedia's Director 5.x we've created a simple picture viewer. The viewer will have two controls, one to change the picture being displayed in the viewer and the other to turn on and off the streaming audio. After we've created the general functionality of the viewer we are ready to add the necessary code to support the streaming audio. Macromedia has added several new LINGO commands to support the loading and playback of an audio stream from within the applet. The first thing that we will need to do is to place a SWA file cast member reference into Director's cast window. Open the cast window and select an unused cast member. Next select the "Insert" menu item and pull down until you get to the "Other" item located near the

bottom of the menu. If you have installed the streaming audio Xtra correctly you will see an item in the sub-menu named "SWA streaming Xtra". Select it. This will place a SWA reference in the cast. You can name this cast member as you would any cast member and refer to it by it's name. The name we have given it is "SWA file". When ever we need to refer to this cast member we will do so using this name. Once we have this SWA file reference in we are ready to write the LINGO to support the playback of the file. You can write a very sophisticated controller using the handful of SWA LINGO commands. All of the SWA commands are described very well on Macromedia's web site. Our player has only one function, an on/off switch so we will be using a bare minimum of commands. We will need to write a handler for each of the following functions: initialize a stream, turn on a stream, and turn off a stream.

To initialize a stream write a handler that includes a line:
```
        set the URL of member "SWA file" = gSongURL
```
where gSongURL is the path on your server where the sound file, player applet and HTML document will reside. For our server the gSongURL = "http://www.povmtdiablo.com/gallery/mdAudio1.swa".
To start the stream write a handler that includes the lines:
```
        -- set the preloadTime to 3 seconds
        set the preLoadTime of member "SWA file" = 3
        -- start the preloading
        preLoadBuffer(member "SWA file")
        -- start the stream
        play(member "SWA file")
```

 To stop the stream write a handler that includes the lines:
```
stop(member "SWA file")
```

Call the initialize stream handler in your startMovie handler or at some other convenient initialize time. The play stream handler can be called from the startMovie handler causing your stream to start right after the applet loads. You can provide some sort of interactive actuator that starts the stream when the user rolls over or clicks on a sprite. Our player calls it when the play button is clicked on by the user. You will notice that we chose a value of 3 seconds for preloading. This will fill a buffer with 3 seconds of audio for playback. If the baud rate of the connection can't keep up with the playback the buffer could become empty causing a gap in the playing of the audio. Selecting a larger value of 5 or 6 seconds will decrease the likelihood of this happening. Keep in mind that the playback will not begin until the buffer is filled. By selecting the value of 3 we have created a latency of at least three seconds between the time that the user clicks upon the play button and the start of the playback on the clients machine. The stop stream handler is called when the user clicks the button off. Notice that we have always referred to the

sound file via the SWA cast member. Once you associate the SWA file with this cast member all of the control for that file is executed by using LINGO commands that effect the SWA cast member. Once you get all of your LINGO to compile you will need to upload it to your server to test it. If you try to run it off line you will get a LINGO error. So shock and upload the applet to the directory where your SWA file is located.

Write A HTML Page To Support Your Applet

As always you will need a HTML page into which to embed your applet so that it can be viewed with a web browser. The tag that you will add to your HTML page is no different from the tag that you would use for any ShockWave applet. Here is the tag from our page using the dimensions of our applet:

```
<embed width=352 height=215 src="player.dcr">
```

Debugging Your Applet

If your applet fails to play the audio you may have made one of these common errors:

1   Be sure that you have the most resent version of the ShockWave plugin in your browse's plugin folder.

2   Check to see that the URL that you assign to the SWA cast member is correct.

If you wish you can add a debug feature to your code. Place a text field on the stage and write to it once per frame. You can display the URL that you assign to the applet or the status of the stream using the following LINGO

```
set the text of member "debug cast" =
        string(the state of member "SWA file")
```

Summation

Remember that the web is still an environment that requires careful and well planned use of rich media types like sound. Many web surfers have limited bandwidth available to them and may be running client hardware that is a step behind today's 100 MHZ+ machines. Don't load up your site with content that no one will have the patience to down-load. If you plan well and add sound in suitable and beneficial places your web site will be a standout!