

workshop



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Surfing the radio waves

Internet radio stations have been steadily springing up across the globe, some commercial, others more community or interest-based. Rupert Collins-White explains how to make your voice heard with the help of your PC

For those who can't miss the end of the *Today* programme but have to be at work by nine, or hate working late in a deserted office, web radio is a godsend. But there's far more to it than just catching shows on the internet.

You can listen to a hoard of archived programmes, such as the annual Reith Lectures on Radio 4's website (www.bbc.co.uk/radio4), plug in to a huge amount of content on America's National Public Radio service (www.npr.org) or hear *PC Advisor* staff voicing their opinions on LBC's tech show, the Lab (www.lbc.co.uk/thelab/index.html).

Broadband makes the whole experience far more satisfactory, but even those stuck with dialup pay-as-you-surf web access (not ideal for streaming media) will find online radio a joy. The PC may not be the best device to receive it, but web radio has immense value partly due to the enormous number of stations out there.

Spinners and players

To listen to internet radio you need a player; to broadcast you'll also require a tuner. There are three main players: RealNetworks' RealOne Player (www.realplayer.com), Microsoft's Windows

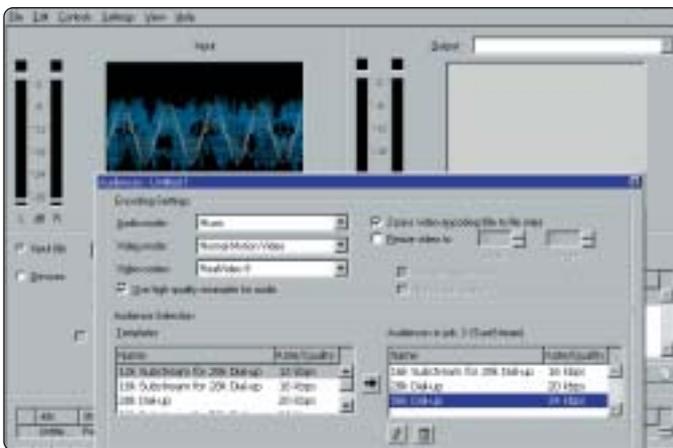
Using a streaming server

If you want a streaming radio station there are a number of options. Apple's Darwin Streaming Server (<http://developer.apple.com/darwin/projects/streaming>) is based on the same code as its QuickTime Server but is also available for Linux, Solaris and Windows NT/2000. Companies such as iTuner (www.ituner.com) also provide out-of-the-box solutions.

One of the most popular products is RealNetworks' Helix Producer. A free version is available from www.realnetworks.com/products/producer/basic.html. Helix can convert audio and video into RealMedia formats: the basic version omits

optimisation tools (such as bandwidth simulation, so you can see what your audience sees), does not allow multicast broadcasting and is limited in the number of formats it encodes.

For a fully functioning web radio site you will need a server that supports RealTime streaming protocols, but you can pseudo-stream with Helix Producer Basic, available on this month's cover disc. Essentially this creates an audio or video file that is then pulled from the server with the RealOne Player. This can be loaded to a normal server for playback on an end user's computer.



1 Helix Producer Basic presents you with a window showing screens for input and output. Select the file you wish to convert by browsing under Input File (beneath the Input screen). Next, click the Audiences button to select a download bit rate for your converted file. You are restricted in terms of the number of rates you can offer with the basic version, but it is still best to offer different rates (with varying audio quality) for users with different connections. Hit Encode to process your file

2 When the RealMedia file is ready it can be loaded on to your web server. You can use the latest version of the RealOne Player for others to download and listen to the file

Media Player (www.microsoft.com/windows/windowsmedia) and Apple's QuickTime Player (www.apple.com/quicktime). Your choice of tuners include Spinner (www.spinner.com), which drives other tuners including Netscape Radio (<http://radio.netscape.com>). Each offers different stations, though many are just playlist – that is, airing a repeating list of tracks.

Nullsoft's Winamp (www.winamp.com) Player, though mainly used as an MP3 player, can receive streamed or pseudo-streamed MP3 audio. Linked to this is Shoutcast, which has a web radio directory (www.shoutcast.com/directory) and broadcasts MP3s.

We recommend you download RealOne, Windows Media Player and Winamp and explore web radio for inspiration.

Bandwidth and bit rates

Most webcasters follow several golden rules, one of which is that it's important to have streams at a bit rate that will carry over a 28Kbps (kilobits per second) modem. If you are connected to a modem and want to listen to the radio while you surf, choose a low-quality feed such as that for 28Kbps. Sometimes you won't be given a choice of what bit rate to use as most major players try to detect your internet connection and then call streams that match it. However, if you set the maximum speed to 28Kbps you'll get some breathing space.

If you have broadband you're going to be in for a greatly enhanced experience. Streamed audio at 128Kbps, less than half your bandwidth, is 'near CD quality' and should sound better than FM radio.

A good sound card, ISDN or broadband and some hot speakers will instantly translate into something easily equivalent to excellent hi-fi reception.

Becoming a broadcaster

So what if you fancy setting up your own web radio station? First, ask yourself 'Why bother?' This should be a question you ask at every stage, because if you can't think of a damn good reason to do it then it's not worth it.

There are three reasons for this. Firstly, if you don't know why you're doing it, why should anyone listen? Secondly, if you don't have a good reason to be broadcasting you'll be lost among the thousands of stations available. And lastly, you'll end up wasting a lot of money unless you can define who you are aiming

How much will it cost?

Basic Live365 (www.live365.com) costs \$6.95 (around £4) a month, which equals \$83.40 (around £53) per year. For this you get 100MB of space and use of 'studio' software. However, you have no live capability, no control over the ads that are inserted and an unmemorable URL.

Premium Live365 provides the same basic service (100MB space and studio software) but solves some of the cheaper package's drawbacks. For \$14.95 (around £10) a month and \$179.40 (around £115) per year you get live capability, some control over the inserted advertisements and a less unwieldy URL.

Opting for an even more professional package will set you back around \$75 (about £48) a month.

your station at, why you want to reach them and why they should listen.

A web station should have a predefined idea of its content, a good knowledge of its audience and, therefore, a reason to exist. In essence, today's successful radio stations operate and continue to do so because they create a sense of community, something that the listeners identify with.

To stream or not to stream

There are two ways web radio works – streamed or unstreamed. Streaming is akin to 'real' radio. Your station transmits a stream of bits through the internet to be assembled by a player application 'on the fly'. The stream can be tailored to the listener's bandwidth and play can start seconds after a server connection is made.

If you stream content yourself with Real, you'll need Helix Producer Basic (www.realnetworks.com/products/producer/basic.html) to encode your content and Helix Universal Server Basic to stream it. Both of these packages are available on this month's cover disc. Server Basic offers a limited number of streams defined in bandwidth: 1Mbps (megabits per second). One advantage of Real's Helix is that it serves any media format. Find out

Choosing an audio format

The current king of streamed content is Real. Its capabilities are mainly acknowledged to be at the high end of the market, meaning its professional server software is able to cast a large number of streams reliably. The RealAudio format (RA and RAM) is good for file size and quality, but its best strength is streaming. There are also a lot of copies of Real's Player out there.

You might also consider Microsoft's Windows Media Audio (WMA) or Active Streaming Format (ASF), Apple QuickTime (MOV) and the open-standard Mpeg-1 Layer 3 (MP3).

Although Microsoft claims its compression is considerably better than MP3 for quality to file size, MP3 remains the best-known standard for swapping files on the internet. It's therefore well worth considering if you want to start encoding for a station as these files will play through any player.

more at www.realnetworks.com/products/media_delivery.html.

Alternatively, you can use Windows Media Encoder to turn your audio into an encoded format that's small and then use the same program to cast up to 50 simultaneous streams (www.microsoft.com/windows/windowsmedia/). As value for money goes, Encoder is good stuff.

To run a Shoutcast station is free but you'll need Shoutcast DNAS Server software, which will run on a variety of operating systems (if you ever fancied setting up a Linux box). Then on the machine you're going to use as a 'desk' you need three things: Nullsoft Winamp, the Shoutcast Source Plug-in for Winamp and an MP3 codec for Windows. For detailed information about how Shoutcast works, access its support documents online (see *Useful links* below for the URL).

However, all these options mean you're running a server yourself. If you expect to be running 50 streams at

28Kbps you'll need 1.4Mbps (or 1,400Kbps) of bandwidth from your PC to the web. Most firms in the UK only have a 2Mbps pipe.

Where this may work for you is in a pilot phase, with a five-stream maximum at a low bit rate – say around 16Kbps. This will only pull 80Kbps upstream bandwidth, easily accommodated by a standard household broadband connection.

After that you're going to need a great deal of fast hard drive space and probably a second machine, as you don't really want to be using your home PC as a server. You might want to run your pilot from your own system, but it isn't advisable to go beyond this. With Shoutcast you're almost certainly going to need a separate box.

Remember, though: running a server means security software, such as a firewall, and knowing how to set it up. Otherwise all sorts of people will put your server to use in ways you hadn't ever imagined.

Useful links

- Web server vs streaming media server
www.microsoft.com/windows/windowsmedia/compare/webstreamserv.asp

- Microsoft's Windows Media Encoder
www.microsoft.com/windows/windowsmedia/wm7/encoder.asp

- Real's Getting started page
www.realnetworks.com/resources/startingout/get_started_faq.html

- A Net Stations' web radio basics
www.anetstation.com/webradiobasics.htm

- Shoutcast's directory

- www.shoutcast.com/directory

- Shoutcast explained

- www.shoutcast.com/support/docs

- Live365's pricing explained

- www.live365.com/broadcast/packages.html

Recording WAV files to be pseudo-streamed

The simplest way to create online radio is to prerecord the audio, store it on a server and pseudo-stream it. Here, we've used an Italian weblog as the basis of a home-grown programme in the style of Radio 4's *Letter from America* and, secondly, a series of songs to be playlisted.

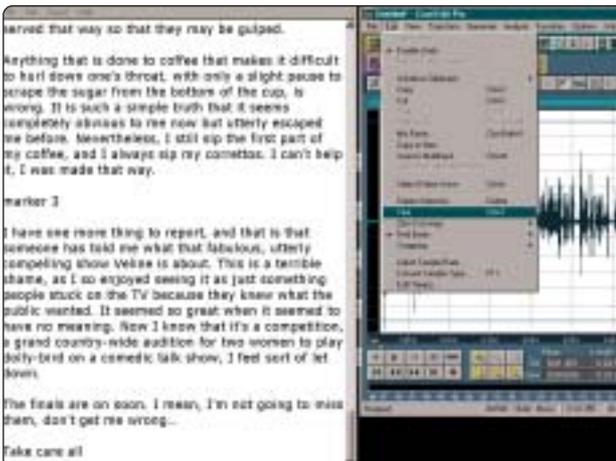
The station will appear on www.rcw.info which is already getting a number of hits from a core audience of friends and acquaintances. As we already know who the website is aimed at we don't need much marketing beyond email newsletters and word of mouth.



1 With your script to hand, open a new WAV file. Make sure the level meter is visible and ensure you've plugged in a decent microphone. If your script is onscreen, copy it to a Notepad file so it can be easily read while you simultaneously monitor your recording software – in Word you just end up with a 2in wide screen



2 Speak slowly and clearly and keep an eye on the level meter to ensure you are speaking within the tolerance of the equipment. If necessary, record the script in manageable chunks. It's not possible for a non-professional to speak for eight minutes without fluffing something



3 Record what you want to say at the highest quality stereo setting. You can drop it down to mono and a low sample rate to reduce the file size at the processing stage. Join the parts together in Cool Edit Pro and 'bounce' them down to one continuous WAV file. If necessary, 'trim' the file so that quiet parts at the beginning and end are removed

Go with the flow

Even though streaming looks achievable from the home as a hobby, it probably isn't – yet. If you want streaming audio the easiest route is to upload your content to a streaming host, such as Live365 (www.live365.com/broadcast/packages.html), who will stream it out for you. Shop around by searching for streaming media hosting at Google.com.

The major problem with these services is that you get audio advertisements inserted in your stream unless you pay top

dollar. And if you're on the cheapest service you cannot even prevent ads for 'adult, hard liquor and tobacco products' being inserted. Certainly something to consider.

But you can avoid the costs of a streaming host. Uploading your files to a host and fixing it so that they are played in the order you want is sometimes called pseudo-streaming. At the 'producer's desk' this is exactly the same as passing your 'feed' to a streaming host, except that all you need is lots of space and enough

bandwidth at the server. It's the cheapest way you will achieve your web radio goal.

With any of the formats, you need to build a playlist that defines what order your files should play in and then link to that file from your website. To be comprehensive you should encode your content in all formats (or as a RealAudio and an MP3 file) so people can choose a player for themselves. Either way, you're not streaming. Files will need to be downloaded partially before they're played, so buffering seems to take longer than

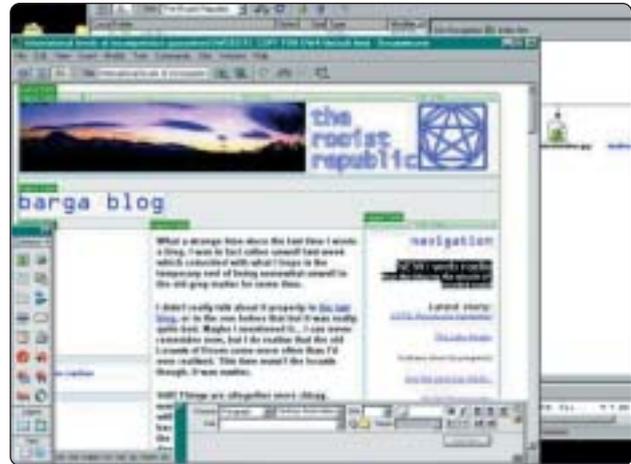
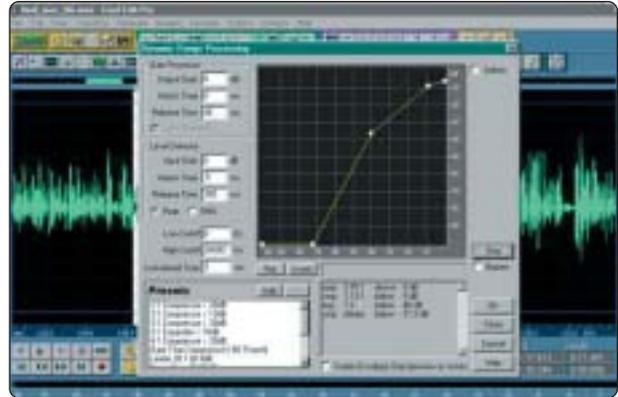
Creating and playlisting MP3 files

Cool Edit Pro 1.x doesn't have an MP3 encoder as standard, though it does let you create Real Audio files – just choose your bit rate. However, we'll convert our WAV file to MP3 format so that it can be enjoyed by all. A range of programs let you do this, including Cool Edit Pro 2.0. We've chosen Steinberg's easy-to-use MyMP3 software.

- 1 Compress the file using Cool Edit Pro's Real Audio Compressor setting (go to Transform, Amplitude, Dynamics Processing options) then launch MyMP3 and choose an appropriate bit rate. There's not too much difference between 18 and 24 but the quality is noticeably better at 32Kbps (kilobits per second) and the file size is still not too big



- 2 Now all that remains is to make a playlist file. This forces a player application to open on your listener's machine and play the file, rather than giving them options to download the file or open it from the server. Simply open a Notepad file, type the exact URL location of the file then hit Save As and save the file with the extension M3U



- 3 For the music files the same procedure applies – each new line in the Notepad file is the next song to be played. The whole process from script to final MP3 product, considering we were working from scratch, only took a couple of hours. We then put a link to the playlist files prominently in the website. You can hear the spoken weblogs and the music at www.rcw.info or www.rupertradio.com, where there's also a description of how it was done and some useful links

streaming. This solution is relatively simple, will cost only the hosting charge (and perhaps something more for a good URL) and means security and bandwidth are no longer issues.

Copyrights and caveats

Without going into it too heavily, some issues of copyright must be borne in mind. If you make no attempt to pay for playing published music, you could be in trouble.

If you intend to carry content made by other people, ask them. If they're represented artists, even if you're reading poetry, someone somewhere will own the rights for you to broadcast it. You may not

actually have to pay anything, but don't count on it. For more information visit the Performing Rights Society (www.prs.co.uk), the Phonographic Performance (www.ppluk.com) and the Mechanical Copyright Protection Society (www.mcps.co.uk). These are the three organisations which collect monies relating to copyright material broadcast in the UK.

If, of course, most of your broadcasts will be original material there's nothing to worry about. However, you should buy a book on libel and read it. It may be that no one will notice you libelling (defaming) them when you only have an audience of five people. But then again, they might.

If, like A Net Station (www.anetstation.com), you are broadcasting unsigned artists who own their music outright and you have their permission (good to get that in writing) to transmit it, you are at liberty to do so. The key is always to ask first.

But enough of these caveats. Setting up a web radio enterprise is an exciting thing to do, whether it's transmitting news from a small town, recordings of local bands or your views on the world.

Because it's so entertaining to set up and manage it's often great listening. Even if you don't want to run web radio, simply becoming a listener can be very addictive indeed. ■