Webcasting primer for IBC Daily **- Making the Leap onto the Internet** By Greg Ogonowski

You're a broadcaster who would like to send your signal out across the Internet, to reach an ever-larger audience of listeners. Where do you begin?
Putting your station's content on the Internet can be divided into two main steps: conditioning the audio signal and connecting to the Internet (Please note that the current U.S. model does not apply to countries in Europe.)

For optimum sound, loudness and peak control, the Internet audio signal should be processed digitally, as for DAB, CD mastering, or digital satellite. Take the audio signal out of the mixing desk and send it as directly as possible to a digital signal processor, such as the Orban Optimod 6200 or the Orban Optimod PC-1100. To ensure the best performance, use an AES/EBU or SPDIF digital connection between the audio processor's output and the sound card's input. The sound card will be located in a computer, which we will call the "encoder computer," as it runs the encoding software.

Signal processing is necessary for several reasons. Automatic gain control and equalization achieve a consistent sound, while accurate peak control maximizes loudness. Standard peak clipping sounds terrible in digital systems, because they donot rely on pre-emphasis/de-emphasis to reduce audible distortion. Instead of peak clipping, the best sounding processors use some form of look-ahead limiting. The carefully peaked limited signal is then digitally connected to the sound card to preserve the audio signal waveform integrity.

You must choose between several types of encoding algorithms available. In my opinion, the best quality that current technology provides is the Real Audio Real G2, which runs on several different platforms, including various flavors of Unix and Microsoft Windows '95, '98 and NT. This encoding algorithm requires that your end users/listeners have a Real G2 player/decoder, which is available to them, at no charge, on the download page of the Real Audio Web site: *www.real.com*. Although the free version of the Real G2 decoder offers fewer features than a version you would pay for, it is readily available and it works with a number of browsers, including Microsoft Internet Explorer and Netscape Navigator. The Real G2 player will run on Unix, Mac or PC platforms.

Microsoft has its own algorithm, Windows Media Technologies 4.0 which only runs on Microsoft Windows NT. Microsoft's current decoder/player (which runs on both PCs and Macs) is called the Windows Media Player. You can learn more about this player on the company's Web site: *www.microsoft.com*. The site also offers some content tools that are available for free. The Microsoft server software is free of charge as well. The new Microsoft Content Creation software can be downloaded and run off the PC you're using. Although in my opinion the Microsoft Codec isn't quite up to the Real G2 standards, it is a close second — and it's free, with no licensing involved.

Other technologies are emerging now as well, including a good-quality codec from Q- Design Music Codec Version 2.0 that works with Apple QuickTime, and the Telos Audioactive encoder, which appears to support the MP3 algorithm for Microsoft Media Player.

The trick with any codec that you choose is that it needs to perform well at low bit rates — 32 kbps or below. Because listeners are connecting with modems of 56 K or less, you need a codec that performs well at such low bit rates. It is here that the Real G2 excels.

Essentially, in streaming your audio signal, you're taking approximately 1.4 Mbps of uncompressed audio and squashing it down to 20–32 kbps. That's an incredible compression ratio, and a remarkable how well these codecs work at these data rates.

Each of these companies claims that their codec sonically outperforms their competition. Use very careful signal processing, and pay serious attention to encoding detail when evaluating these codec's.

Having dealt with the encoder, now it's time to get connected to the Internet.

For both the encoder and Internet connectivity, you have to run a server. Both Real Audio and Microsoft have their own server software. Q-Design runs on an Apple QuickTime Server. If you are located where you have access to large bandwidth Internet connectivity, you could conceivably run the server software on your encoder computer — just connect the computer to a 10 or 100 Mb Internet feed and you're ready to go.

Most broadcasters don't have that option, however, because the studio is in one place and the Internet service provider (ISP) is somewhere else. If that's the case, the best way to connect is to establish what's called a "co-lo," or co-location, which involves running the server software on one computer, locating that computer at the ISP, and then running one stream per program from your encoder to the server. Typically, this would involve a full-time, non-dial-up dedicated 56 kbps connection from your studio to your ISP. You need one 56 k connection per program, so if you were streaming two stations, you would need two *times* 56.

I have just described how to get your radio station on the Internet. Here's where the listeners come in. There are different ways that people can connect to your signal. One of the ways is called a netcast, whereby the server is constantly feeding to several different ISPs. When people make a connection, they don't make a separate connection to your server. Instead, they make a connection to these ISPs hook onto an existing stream—conceptually, a bit like cable TV. This technology is new, and it's more efficient and conserves bandwidth; you don't need a single, separate stream for each user.

Typically, what everyone is doing now is called Webcasting (or, more accurately, unicasting) with single, independent connections to the server.

Greg Ogonowski is a netcasting expert and broadcast consultant in the U.S. For more information on netcasting refer to www.indexcom.com.

For A/B comparisons of digital signal processing, refer to the Orban Web site at www.orban.com.