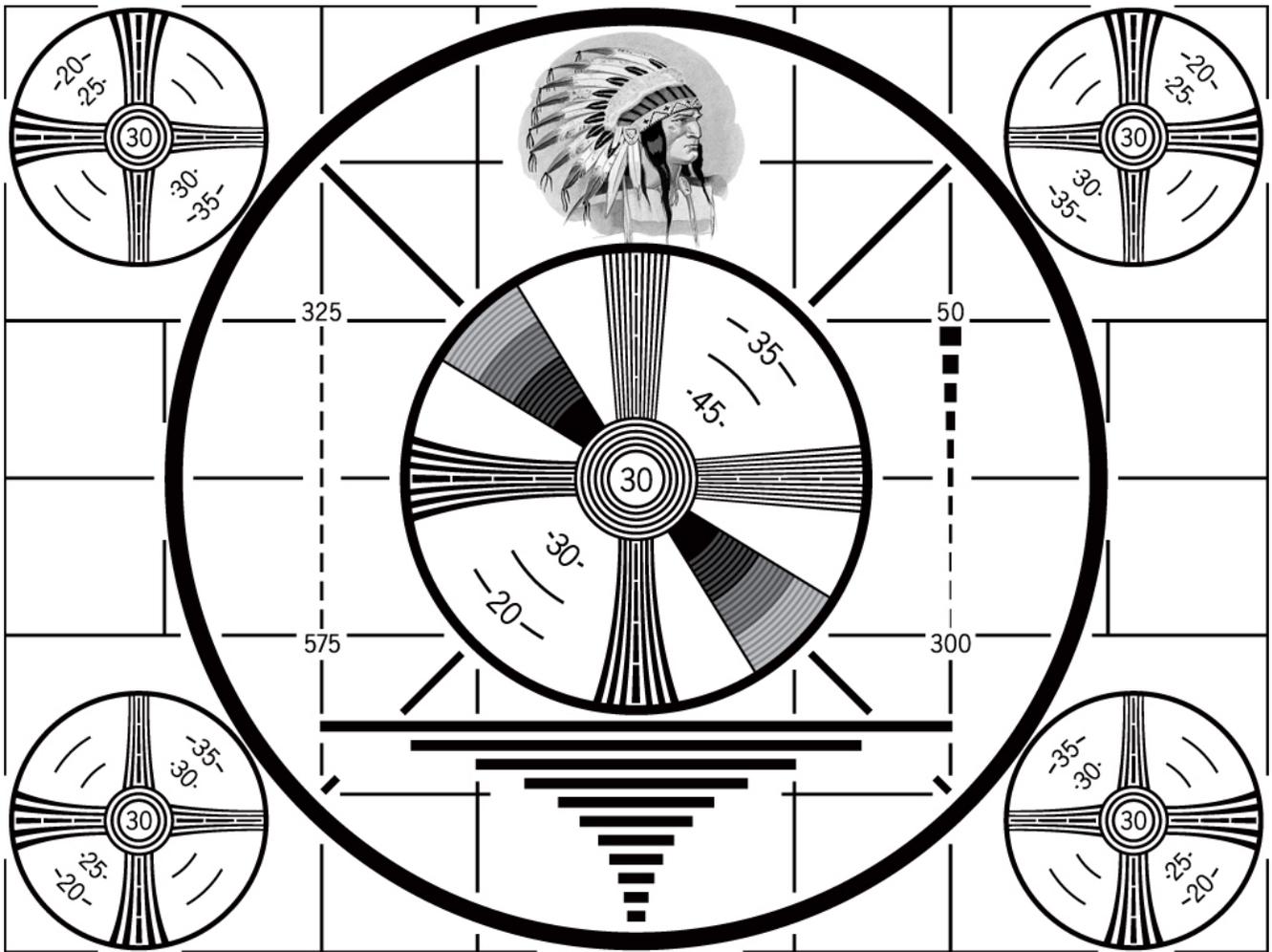


Internet Broadcasters Information Handbook

Second Edition



Written By
David Childers

SCVI.NET

www.scvi.net

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en.wikipedia.org/wiki/File:TESTPATTERN_RCA_3.jpg

About The Author

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Mr. Childers work has been cited in several national and International publications, such as:

Five Essays on Copyright In the Digital Era
Turrer Publishing

Research On High-Profile Digital Video Production
Digital Content Association of Japan

Video Podcasting in Perspective: The History, Technology, Aesthetics and Instructional Uses of a New Medium
Journal of Educational Technology Systems

Video Podcasting: When, Where and How it's Currently used for Instruction
The National Convention of the Association for Educational Communications and Technology

IP Packet Charging Model For Multimedia Services
National University of Rwanda

Preservation of audiovisual mediums : Problems and challenges
Platform for Archiving and Preservation of Art on Electronic and Digital Media

P2P Technology Trend and Application to Home Network
Electronics and Telecommunications Research Institute Journal

Peer To Peer Computing - The Evolution of a Disruptive Technology
Idea Group Publishing

Peer-to-Peer Systems and Applications
Lecture Notes In Computer Science
Springer Berlin / Heidelberg

Mr. Childers has also written several guides including:

SHOUTcast Streaming - Best of Technical Support
www.scribd.com/doc/24188933/SHOUTcast-Streaming-Best-of-Tech-Support

SHOUTcast Audio And Video Streaming Guide
www.scribd.com/doc/19781412/SHOUTcast-Audio-And-Video-Streaming-Guide

Icecast Streaming Handbook
www.scribd.com/doc/18175026/Icecast-Streaming-Handbook

Flash Encoding With Open Source Tools
www.scribd.com/doc/17215793/Flash-Encoding-With-Open-Source-Tools

Foreword

Welcome to the Second Edition of The Streaming Media Handbook. I have updated this guide with more useful information for the Internet broadcaster.

The development of the Internet has allowed the distribution of ideas and concepts on a global basis, without the need for large monetary or technical resources. The ability to deliver audio and video using the Internet gives everyone the ability to become a micro-broadcaster, without the need for expensive equipment or tedious licensing requirements.

I would like to thank Scarlet Coker and Dale Nobles for providing assistance with the editing of the manuscript and James Davey at Broadcasting World for allowing me the opportunity to create this handbook.

It is my sincere hope that the reader finds this handbook a valuable resource.

Minha vida, amor e paixão

David Childers
www.scvi.net

January 2010



The End Of An Era.

Long Range Aids to Navigation (LORAN)
United States Coast Guard
17th District (Alaska) - LORAN 7960 Chain
Attu, Kodiak, Port Clarence, Shoal Cove, St Paul, Tok

The convergence of broadcasting and telecommunications is the next problem area that we expect.

Ronald Solis

Please Donate

If you find this guide useful, please consider making a small donation to show your appreciation for my work.
https://www.paypal.com/cgi-bin/webscr?cmd=_s-xclick&hosted_button_id=10870717

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What Is Internet Streaming Media

Streaming multimedia on the Internet requires the conversion of video and audio into a compressed digital format then distributing the data through computer networks. This compressed data can be more easily delivered using computer networks because of its smaller size. The video or audio can be live or pre-recorded content, and can be continuously streamed or delivered as on demand content.

Internet streaming is similar to standard radio and television broadcasting. Software is used to convert video and audio into a format that is suitable for delivery using a computer network. Radio and television stations use special hardware to convert video and audio data into a format suitable for broadcasting. Special computer network transport protocols enable the delivery of multimedia content to the end user (audience members) versus using broadcast transmitters to send the video or audio content to individual radio and television sets.

The first step in the Internet streaming process is to digitally compress the audio or video content. This is required to conserve bandwidth that is used for the delivery of the content. Specially developed software applications, called codecs, are used to compress the video or audio data. Codecs use mathematical algorithms to compress the data. Most codecs use a method of data compression known as lossy data compression. This method allows the compression of the content without losing the quality of the original video or audio content. Advanced codecs require large amounts of computer resources for high definition video and audio data compression. A balance must be established between the compression quality, bandwidth consumed and computer resources used. This balance ensures a quality listening and viewing experience for everyone.

The next step is to distribute the encoded video and audio content. Special server software is required for the continuous distribution of multimedia content. This specialized software can be installed and run on various computer operating systems including: Windows, Linux and Macintosh; in addition to several other computer operating systems. Individual files can be distributed using on demand content delivery, without the need for specialized server software. On demand content can be hosted using a standard website account.

The final step is to prepare the compressed content for delivery. The method of data delivery used to transport the content via computer networks is determined by several factors that include: software used for the compression of the audio or video data, architecture of the computer network used for content delivery and end user requirements. Delivery of this data over computer networks uses special software or hardware instructions to route the video or audio content to the end user. Each computer network transport protocol has its own unique characteristics that make it applicable in specific situations.

No broadcast license or technical certification is required for Internet streaming, unlike a standard radio or television broadcast station. Standard radio and television broadcast stations are required to have a broadcast license and certified broadcast engineers. The only requirements for Internet video streaming are: specialized data delivery server software, special audio and video encoding software and large amounts of bandwidth. Bandwidth is required for the delivery of the video and audio content to the end user.

All multimedia content is subject to applicable intellectual property regulations. These regulations differ from country to country; however the general rule for audio and video content is the station originating the Internet stream must own, or have a license to distribute material that is covered under copyright regulations. Content that has been released under creative commons, public domain or has fallen out of copyright protection is not subject to intellectual property regulations and can be streamed with no special content licensing requirements.

Internet Broadcasting Software Guide

This is a technical assessment of current Internet broadcasting software that is available.

Icecast

Icecast supports audio streaming.

Icecast supports video streaming.

Multimedia encoder (Free)

www.videolan.org

Multimedia server (Free)

www.icecast.org

(Utility to feed multimedia files to Icecast server without re-encoding them.)

www.icecast.org/ezstream.php

Software support

Icecast Streaming Handbook

www.scribd.com/doc/18175026/Icecast-Streaming-Handbook

www.icecast.org/docs.php

www.videolan.org/streaming-features.html

www.videolan.org/doc/streaming-howto/en/ch02.html

www.videolan.org/doc/streaming-howto/en/ch03.html

Icecast does support Windows Media embedded Active X player for MP3 format.

(Java Vorbis audio player)

www.javazoom.net/jlgui/jlgui.html

(Java Theora video player)

www.flumotion.net/cortado/maikmerten.livejournal.com/2256.html

Flash stream player (MP3 audio format.)

www.draftlight.net/dnex/mp3player/minicaster/

Multimedia playback supported on most operating systems.

SHOUTcast

Shoutcast supports audio streaming.

Shoutcast supports video streaming.

Multimedia encoder (Free)

www.shoutcast.com/download

www.nullsoft.com/nsv/

Multimedia server (Free)

www.shoutcast.com/download

Software support

SHOUTcast Audio And Video Streaming Guide

www.scribd.com/doc/19781412/SHOUTcast-Audio-And-Video-Streaming-Guide

SHOUTcast Streaming - Best of Technical Support

www.scribd.com/doc/24188933/SHOUTcast-Streaming-Best-of-Tech-Support

www.shoutcast.com/support

www.scvi.net

Shoutcast does support Windows Media embedded Active X player for MP3 format.

(Java MP3 player)

www.javazoom.net/jlgui/jlgui.html

Flash stream player (MP3 audio format.)

www.draftlight.net/dnex/mp3player/minicaster/

Multimedia playback supported on most operating systems.

Adobe Flash

Adobe Flash supports audio streaming.
Adobe Flash supports video streaming.

Multimedia encoder (Free)
www.adobe.com/products/flashmediaserver/flashmediaencoder/
Open source server (Free)
www.osflash.org/red5
Multimedia server (Paid)
www.adobe.com/products/flashmediaserver/
Multimedia server (Paid)
www.wowzamedia.com/

Adobe Flash supports embedded Active X player.
Multimedia playback supported on most operating systems.

Windows Media

Supports audio streaming.
Supports video streaming.

Multimedia encoder (Free)
www.microsoft.com/windows/windowsmedia/forpros/encoder/default.msp
Multimedia server (Paid)
www.microsoft.com/windowsserver2003/default.msp
Software support
www.microsoft.com/windows/windowsmedia/knowledgecenter/helpdocs.aspx

Windows Media supports embedded Active X player.
Multimedia playback supported on most operating systems.

QuickTime Streaming

QuickTime supports audio streaming.
QuickTime supports video streaming.

Multimedia encoder (Free) (Mac operating system.)
www.apple.com/quicktime/
Multimedia server (Paid) (Mac operating system.)
www.apple.com/server/macosx/
Open Source multimedia server (Various operating systems.)
developer.apple.com/opensource/server/streaming/index.html
Installing Darwin Open Source multimedia server on Fedora Linux platform
wiki.gandi.net/en/hosting/using-linux/tutorials/fedora/darwinstreaming

QuickTime DOES NOT support embedded Active X player.
Multimedia playback supported on most operating systems.

Silverlight

Silverlight supports audio streaming.
Silverlight supports video streaming.

Multimedia encoder (Paid)
www.microsoft.com/expression/products/overview.aspx?key=encoder
Multimedia server (Paid)
www.microsoft.com/windowsserver2003/default.msp

Silverlight DOES NOT support embedded Active X player.
Multimedia playback supported on most operating systems.

RealMedia

RealMedia supports audio streaming.
RealMedia supports video streaming.

Multimedia encoder (Both free & paid)
www.realnetworks.com/products/producer/
Multimedia server (Paid)
www.realnetworks.com/products/media_delivery.html

RealMedia DOES NOT support embedded Active X player.
Multimedia playback supported on most operating systems.

Pirate Radio

Pirate Radio supports audio streaming.
Pirate Radio DOES NOT support video streaming.

Multimedia encoder (Paid)
www.clipstream.com/purchase/pirateradio/
No remote server available.

Pirate Radio DOES NOT support embedded Active X player.
Playback supported on Windows operating system only.
(Special multimedia software required - free download.)
www.pirateradio.com/downloads/

Peer-To-Peer Streaming

Goalbit

Goalbit supports audio streaming.
Goalbit supports video streaming.

Goalbit is a Open Source Peer To Peer multimedia broadcasting system that is based on the BitTorrent protocol. The encoder, server and multimedia player are bundled in the same software package.

Download
goalbit.sourceforge.net/downloads.html
Users guide
goalbit.sourceforge.net/documentation.html

Goalbit supports most multimedia stream types.

Goalbit DOES NOT support embedded Active X player.
Software installation supported on most operating systems.

Why Are Multimedia Codecs Important for Internet Broadcasting

Multimedia encoding is the most important technical consideration for Internet broadcasting. It is necessary to compress the content into a manageable amount of data because multimedia production creates a large quantity of digital data. Without reducing the size of the multimedia content, the uncompressed content would require very large amounts of network resources for content distribution and electronic storage. This would effectively limit the ability to transport or store the multimedia data and prevent the content from being delivered in a cost effective manner.

The goal of multimedia encoding is to achieve the greatest amount of data compression while retaining the best visual or audio quality as well as clarity of the original content. Specialized software applications called codecs are used to encode / compress the multimedia content. This technical term stands for coder / decoder or compressor / decompressor. Codecs use complex mathematical algorithms and specialized processes to compress the data, which allows the video content to retain its quality and clarity. Most codecs use algorithms that are based on lossy data compression, which enables multimedia compression by slightly altering the content to be encoded. This results in the encoded video being slightly different from the original content, but still providing quality visual representation.

There are many available codecs that can be used for encoding multimedia content for broadcasting, with each one having unique properties. Some of these are proprietary and may require the purchase of a end users license, and some are open source that do not require the purchase of a end users license. Technical limitations for the use of these codecs may include the following: specific operating system requirements, encoder bandwidth limitations, encoder system resource use or end user playback software requirements.

Both proprietary and open source codecs offer many unique features, with the most important feature being the ability to provide quality multimedia presentations at low bandwidth and the ease of use for end users. Excessive bandwidth consumption can severely limit the ability to deliver the multimedia content to a wide audience and complicated software set up for audience participants will dissuade people from viewing the multimedia content.

Understanding the process of multimedia encoding and multimedia compression is important. Choosing the appropriate codec for an Internet broadcast will ensure the production of quality multimedia that will be available for the audience receiving the broadcast. It is also important to have adequate network and computer resources to support the requirements for your broadcast.

Audio Codecs Available for Internet Multimedia Streaming

Open Source Codecs

Vorbis is a digital audio codec developed by the Xiph organization. This codec uses a derivative of lossy data compression and is based on Modified Discrete Cosine Transform (MDCT). Vorbis belongs to a group of codecs that use MDCT, which includes Windows Media Audio and Advanced Audio Coding. MDCT prevents the introduction of artifacts within the audio during the process of encoding or decoding. The process of data quantization used by this codec is also unique to its functionality.

Proprietary Codecs

MP3 is a proprietary digital audio codec that was commercially implemented by the Fraunhofer Society. This codec uses a derivative of lossy data compression and is based on Perceptual Coding for encoding and decoding of audio multimedia. This codec is also known as MPEG-1 Audio Layer 3.

Advanced Audio Coding (AAC) is a proprietary digital audio codec developed by a coalition of media companies. This codec uses a derivative of lossy data compression and is based on Modified Discrete Cosine Transform (MDCT). AAC belongs to a group of codecs that use MDCT, which includes Windows Media Audio and Vorbis. MDCT prevents the introduction of artifacts within the audio during the process of encoding or decoding. The process of data quantization used by this codec is also unique to its functionality. AAC was developed as a successor to the MP3 audio codec. This codec is also known as MPEG-4 AAC.

High-Efficiency Advanced Audio Coding (AAC+) is a proprietary digital audio codec developed by the Coding Technologies company. This codec uses a derivative of lossy data compression and uses Spectral Band Replication to improve the audio compression performance of the codec. This codec is also known as HE-AAC.

Windows Media Audio (WMA) is a proprietary digital audio codec developed by Microsoft. This codec uses a derivative of lossy data compression and is based on Modified Discrete Cosine Transform (MDCT). WMA belongs to a group of codecs that use MDCT, which includes Advanced Audio Coding and Vorbis. MDCT prevents the introduction of artifacts within the audio during the process of encoding or decoding. The process of data quantization used by this codec is also unique to its functionality.

RealAudio (RA) is a proprietary digital audio codec developed by RealMedia. This codec uses a derivative of lossy data compression. RealAudio 10 is the current implementation and is based on the industry standard MPEG-4 / HE-AAC .

Video Codecs Available for Internet Multimedia Streaming

Open Source Codecs

Dirac uses Wavelet Compression instead of Discrete Cosine Transforms as the basis for its compression algorithm. It promises results comparable to or better than current proprietary codecs such as H.264.

Theora is derivative of VP3. Theora aims at improving the original VP3 implementation through optimizing the encoder software and actual codec structure.

VP3 uses a multi-step approach to video encoding. These steps include Discrete Cosine Transforms, Quantization, Run Length Encoding, Zigzag Ordering, Differential, Motion Compensation, Entropy Coding, Variable Length Run Length Booleans, YUV Colorspace and Frame Type. This codec also uses a unusual feature that consists of encoding data from bottom to top, rather than from top to bottom.

Proprietary Codecs

H.264 is known as MPEG-4 Part 10 or MPEG-4 AVC. It uses block-orientation and motion-estimation to achieve superior compression performance when compared to other video codecs.

VP6 - The current generation of the VP codec is called True Motion. Some of the key milestones of VP6 include the support of multi-pass encoding, improved error recovery and direct access to the data reconstruction buffer.

Windows Media Video is based on MPEG-4 AVC. The current version of WMV has achieved several improvements that include native support for interlaced video, non-square pixels, and frame interpolation.

Real Video uses very accurate motion modeling, proprietary spatial pixel prediction methods, context adaptive entropy coding, psycho-visually tuned segmentation, filtering schemes, rate-distortion optimized encoding algorithms and two-pass encoding.

Why Are Streaming Protocols Important for Internet Broadcasting

Multimedia broadcasting on the Internet requires the use of specialized protocols to overcome the inconsistencies of data transfers. These protocols control how the data is delivered over the Internet. The multimedia broadcast must be received at specific times and in the proper sequential order to ensure a quality viewing / listening experience. Multimedia received late or out of order causes the stream to drop off or stutter.

Both the multimedia encoding and streaming server software must be capable of supporting the same streaming protocol. Both the streaming and multimedia player software must be capable of also supporting the same streaming protocol to ensure that the audience members will be able to receive the streamed multimedia content. The selection of the streaming protocol used for individual Internet broadcasts is determined by the method used to encode the multimedia and the software used for the multimedia distribution server.

Without the use of specialized protocols for multimedia content delivery, video and audio distribution would be very complicated and costly. The quality of the streamed content would be marginal and not well suited for continuous multimedia distribution. This would limit the ability to deliver high quality multimedia to large groups of audiences.

Common Protocols Used for Multimedia Streaming

SHOUTcast was developed by Justin Frankel and is a modification of HTTP, which is used to distribute web page data over the Internet. Shoutcast uses special meta tag data that is placed within HTTP communications headers. TCP is used to transport the data.

Icecast was developed by the Xiph open media organization and is a modification of HTTP, which is used to distribute web page data over the Internet. Icecast is similar to Shoutcast and uses special meta tag data that is placed within HTTP communications headers. TCP is used to transport the data.

Hyper Text Transport Protocol (HTTP) was developed by the Internet Engineering Task Force and provides a definitive architecture for data communications between a client and server. TCP is used to transport the data.

Real Time Streaming Protocol (RTSP) was developed by the Internet Engineering Task Force and functions similarly to HTTP. RTSP differs from regular HTTP content delivery by requiring a permanent data connection between clients that are exchanging data. RTSP uses a message ID to monitor each data connection between clients, so that no permanent TCP connection is required. RTSP also allows users to control the basic functions of a media server; such as starting, pausing or stopping the delivery of the content. TCP is used to transport the data.

Real Time Transport Protocol (RTP) was developed by the Internet Engineering Task Force. RTP provides identification and sequential ordering of data bits as well as monitoring the delivery of multimedia content. RTP is less susceptible to the loss of data being sent via computer networks, but it is very sensitive to data delay that can be caused by network irregularities. RTP does not provide the ability to guarantee content delivery. UDP is used to transport the data.

Real Data Transport (RDT) was developed by RealNetworks as a proprietary alternative to RTP. RDT is commonly used in conjunction with a control protocol such as RTSP. UDP is used to transport the data.

Microsoft Media Server (MMSH) was developed by Microsoft as a proprietary protocol that was used with the Windows Media Server. MMSH was replaced by RTSP, but is still used as a fall back alternative. Either TCP or UDP can be used to transport the multimedia data.

These are the data protocols that are used to deliver the packets of information over the Internet.

Transport Control Protocol (TCP) was developed by the Defense Advanced Research Projects Administration and is one of the primary methods for controlling data exchange over computer networks. TCP guarantees the reliability and order of data by requiring acknowledgment for receiving data from clients before more is sent. The use of TCP will result in a large communications overhead.

User Datagram Protocol (UDP) was developed by David Reed and is one of the primary methods for controlling data exchange over computer networks. UDP does not require the verification of data, which does not provide guaranteed delivery of the data or proper ordering of the data. This greatly reduces overall communications overhead. It provides a greater data delivery speed and is much more efficient.

The Importance of Peer-To-Peer Internet Broadcasting

The Internet was created as a medium for the exchange of thoughts and ideas on a global basis, using graphics and text content. Early network dial-up computer modems did not provide fast enough data connections for Internet audio and video distribution, limiting the availability of content that could be distributed. The introduction and expansion of High Speed Internet availability provided access to on-demand broadcast audio/video content.

The ability to integrate multimedia with other content distributed through the Internet has created greater opportunities to convey important news, education, and entertainment, and to overcome cultural and geographical barriers. Multimedia can provide insight and information that text or graphic images cannot. At considerably cheaper cost compared to other forms of radio and television content distribution methods, Internet delivery of multimedia content has the potential of reaching a large global audience. Internet broadcasting also allows distribution of multimedia content without technical licensing requirements.

The primary disadvantages of Internet broadcasting are the need for a dedicated network data server that acts as a broadcast transmitter and the need for large amounts of bandwidth for the distribution of multimedia content. The limited availability of bandwidth can affect the number of people that can receive a particular Internet broadcast at a specific time. Each listener or viewer of an Internet broadcast uses a portion of the overall bandwidth of the network data server distributing the content. An Internet broadcaster cannot exceed the available bandwidth of the network data server used for content distribution without degrading the quality of the content.

Secondary disadvantages of Internet broadcasting involve network attacks or data filtering of Internet data servers. Network attacks can overload network data servers and render them unstable and unable to function properly. Data filtering can allow groups/institutions or governments to prevent people from accessing content deemed unsuitable, similar to the way that radio and television stations were deliberately jammed by various governments during the Cold War.

Peer-to-peer content distribution does not require a central network data server architecture, providing greater protection from network attacks. Data filtering by geographic region is very difficult to control since there is no central point of distribution. To ensure that the multimedia content being distributed has not been maliciously manipulated, methods have been incorporated to check the integrity of the data.

Peer-to-peer content delivery allows the distribution of multimedia data without the need for large amounts of network resources and specialized hardware. Bandwidth is saved by sharing network resources among the receiving audience. This allows the data to be distributed simultaneously to large numbers of people, significantly lowering the distribution cost of the content.

Lowering the distribution and hardware costs for Internet broadcasting gives any size group or institution the ability to communicate their views and opinions to a global audience. Large media corporations may be prevented from controlling the distribution of content, allowing independent media producers a greater opportunity to have their content seen by prospective audiences.

Improving and enhancing the use of the Internet as a means of distribution for all types of content is crucial. Text, graphic and multimedia content support each other and enhance the ability to convey information effectively. Limiting the distribution of specific content due to the use of inefficient and costly technology places a restriction on the opportunity to educate, entertain and inform.

Promoting Your Online Radio or Television Station

Creating a promotion plan for your station is very important.

- What is the purpose of the promotional plan.
- What steps will be taken to implement the promotional plan.
- What are the cost limitations to be considered for implementing the promotional plan.

There are many aspects that should be considered when creating a promotional plan.

These aspect include:

Station uniqueness

What makes your station different from other stations.

- Genre
 - Narrowing the station genre can help it stand out from other stations.
- Location of station
 - Country, continent, state, city, building, planes, trains, automobiles, etc.
- DJ's
 - If your station has live DJ's.
- Website
 - Does it have unique content.
- Type of shows
 - If your station produces live shows.
- Other
 - * The uniqueness of the station is important for making it stand out from other stations.

Station operation

The way an Internet station is run can heavily influence the station's marketing potential and audience pull.

- Keep your station running 24 hours a day to maximize the potential audience size. Your station is broadcasting to the world, not just your local area.
- Always update your station playlist content and keep it fresh. Why should people tune in to your station if you have the same content without adding new material? Remember - variety is the spice of life.
- Consider creating regular video shows that concentrate on your station, location or listeners.
- Offer your audience the ability to download shows, if the station produces live shows.

Station sweepers

Use short multimedia files as a multi-purpose marketing tool.

- Use them to encourage audience members to visit the station website.
- Use them to encourage audience members to invite their friends to listen / watch the station.

Internet multimedia encoding

Use a streaming format that is universal. Do not force potential audience members to download additional software to view / listen to your station broadcast.

Embedded stream links

Create web links to the Internet broadcast source stream and place them on the station website. It is recommended that the source stream links are for the major multimedia player applications, according to the type of stream encoding being used. This will allow the casual web surfer to tune in to your station.

- M3U
(Creating a M3U stream link)

Open notepad or your favorite text editor.

Create a new file.

Input the following into the file:

(Substitute your station information for the information listed.)

`http://ip_address_of_server:port_number/stream_name`

Save the file as listen.m3u.

Upload the file to your web site.

Create a http link to the file.

- PLS

(Creating a PLS stream link)
Open notepad or your favorite text editor.
Create a new file.
Input the following into the file:
(Substitute your station information for the information listed.)

```
[playlist]
File1=http://ip_address_of_server:port_number/stream_name
Title1=Station name - Station website - Other station information
Length1=-1
NumberOfEntries=1
Version=2
```

Save the file as listen.pls file.
Upload the file to your web site.
Create a http link to the file.

- ASX
(Creating a ASX stream link)

Open notepad or your favorite text editor.
Create a new file.
Input the following into the file:
(Substitute your station information for the information listed.)

```
<asx version="3.0">
  <entry>
    <title>Title Of Stream</title>
    <ref href="http://ip_address_of_server:port_number" />
  </entry>
</asx>
```

Note:
<ref href="http://
Indicates the transfer protocol used, which could be http, mms, etc.

Save the file as listen.asx file.
Upload the file to your web site.
Create a http link to the file.

- RAM
(Creating a RAM stream link)

Open notepad or your favorite text editor.
Create a new file.
Input the following into the file:
(Substitute your station information for the information listed.)

```
http://ip_address_of_server:port_number/stream_name
```

Save the file as listen.ram file.
Upload the file to your web site.
Create a http link to the file.

Station website design

(KISS - Keep It Simple Stupid)

A well designed website provides a reason for audience members to stay on the website and keep coming back. Poorly designed websites discourage people and will reflect negatively on your station.

Remember - first impressions are lasting impressions.

- Use website templates to create the station website, if you are not fluent with coding html.
- The website should be easy to navigate.
- The website should have a contact page.
- The website should use a balance of text and graphics.
- Use alt tags for images - images are indexed by search engines.
- Avoid using Flash only index pages.

- Avoid configuring audio or video files to automatically start.
- Check website for spelling and grammar.
- Use quality content and update the content regularly.
- Validate the website html for multi browser viewing.
- Optimize index page to reflect uniqueness of station, using key words.
- Do not use excessive website scripting.
- Use internal banners to pull people to "hot" parts of the station website.
- Have a web page to enable audience members to send their friends e-mail notifications about the website.
- Have games on the website to keep people attracted to using the site.
- The primary Search Engines to market with are:
 - * Google
 - * Yahoo
 - * Bing

Offer website accessories

Have items that listeners can put on their websites. This provides collateral advertising and creates loyalty / community.

- Widgets to allow people to listen / view your station.
- Station logo's.
- Station pictures.

Directories

Listing your station in multiple directories is very important. This provides the station with increased exposure.

- iTunes
 - E-mail submission

Send e-mail to itunesradio@apple.com.

Any e-mails that do not follow these protocols will be deleted.

1) ALL e-mails must have one of these three subject lines as follows:

- Station Submission: Station name
(ex: Station Submission: Cameo's Favorite Tunes.com)
- Station Update: Station name exactly as it appears in iTunes.
- Other Inquiry: State issue here

2) Each station update or submission must be sent in a separate email.

(Multiple updates to one station or multiple bitrates for one station can be in the same email.)

3) Station Submission requests must contain all of the following information:

- Station name
(This MUST be the name as it is used in positioning on the station. We will not accept numbers or punctuation as part of a station's name unless that is a legitimate part of the station marketing, and yes we do check.)
- City/State/Country of Origin
- Language of broadcast
- Station Type (Internet-only, terrestrial simulcast, etc.)
- Is station commercial-free?
- Station genre(s) for tuner
(PLEASE take a minute to look at existing iTunes genres.), no more than 2 genres per station
- Website for station if there is one
- Station description (to be shown in tuner, please keep short)
- Contact person name, email and phone number
- Bitrate(s)
- IP/URL to point to.
(Multiples with different bitrates are acceptable.)
(Please note we only support MP3 streams at this time.)

* If you are a Live365 station, you must make your request through iTunes at Live365.
(iTunes@live365.com)

4) General information/guidelines/requirements:

- Station requests are handled on a first-come, first-served basis.
- There is no guarantee of being added to iTunes.

- If we do add your station, we will leave it up a minimum of 90 days unless there is an issue.
- Your station can be de-listed at any time, without notice and may or may not be reinstated depending on this issues surrounding the take down. We will try to contact you when we remove a station, but it is your responsibility to make sure your contact information is current with us.
- We randomly check stations, if we find that a station is:
 - * Abusing the system by using a name that is not part of the on-air marketing of the station.
 - * Is consistently full and inaccessible.
 We will remove the station without warning and you will not be able to get your station re-submitted until the issue is rectified.
- There is no magic number of slots that must be available for a station to be considered but we do tend to send a lot of traffic to our radio partners. If we find that the station cannot meet the demand we will de-list it. A general rule of thumb is a minimum of 300 slots to begin with.
- If we see that certain genres are getting overly full we may de-list stations to keep the content fresh for our customers. You may re-submit stations 30 days after being de-listed.
- Windows media
E-mail submission

Send e-mail to tuner@microsoft.com.

If you are requesting a new listing or renewing an expired listing, a customer service representative will ask you to fill out a form with details about your station. After all the paperwork is completed, your station will be displayed within the Internet Radio feature in Windows Media Player.

- Recieva Internet radio appliance
Website submission
reciva-users.wikispot.org/addstation
- Broadcasting world
Website submission
www.broadcastingworld.net/listen/add/
- IORSN
Website submission
www.iliketunes.com/login.asp?url=newstation.asp
- Streamfinder
Website submission
www.streamfinder.com/add-station-to-directory/
- Streamdir
Website submission
streamdir.com/addstream.php
- Shoutcast
Broadcaster must be streaming with their software.
- Icecast
Broadcaster must be streaming with their software.

Advertising

Advertising outside of your website is another important factor. This offers the ability of attracting potential audience members from other websites. It also allows your station to make connections with local people.

- Links to your station placed on reputable websites.
- Banners pointing to your station placed on reputable websites.
- Post station information on Craigslist.
- Create station flyer's and post locally.
- Print station business cards for local distribution.
- Do not waste time posting on "Link Farm" web sites.

Public relations

Making people aware of your station is another important factor.

- Become members of Internet forums related to your genre, method of broadcasting, location, etc.. (Station information should be listed in your signature.)
 - * Yahoo groups
 - * Goggle groups
 - * Local groups
 - * News groups
- Local news paper interviews.
- Subscribe to specific e-mail lists.
- Write about your station using Blogs.
- Write articles about things related to your station operation and post them around the Internet.

Social networks

Social media allows audience members to associate with each other, and stay informed of events outside of your website.

- Twitter – Currently no advertising. The number of characters per post is limited. Quick and to the point.
- Facebook – Rapidly growing with large international base.
- Orkut – Primarily non US users. Owned by Google.
- Myspace – One of the earliest social networks. Not as prominent as the other networks now.

Viral media

Your station should create viral media which can be used as a marketing tool. People can then recommend these items to others and your station will be marketed by word of mouth.

- Youtube - (Video) Funny or unique content.
- Flickr - (Pictures/Graphics) Funny or unique content.

Audience interaction

Interacting with your audience builds togetherness and makes them feel part of the operation of the station.

- News letters – E-mail is a very valuable marketing tool. It offers very fast contact with your audience.
- Forums – A place to exchange information and ideas as a community.
- Chat rooms – Live/ real time interaction with your audience.

Keeping your audience loyal

Keeping the audience loyal is not hard and does not require spending large amounts of money. Imagination and planning is the key.

- Give aways.
(You can create bumper stickers and logo's so people can download them and print them.)
- Listener dedications on the air.
- Station contests.
 - * Use listener voices on your station website - other listeners can vote for which ones to use.
 - * Use listener video on your station website - other listeners can vote for which ones to use.
 - * Use listener pictures on your station website - other listeners can vote for which ones to use.

Audience feed back

It is very important to solicit audience feed back. This can provide you with ideas and suggestions to boost your audience potential or correct problems that you are not aware of.

Web traffic / listener statistics

These statistics can be used to track the progress of marketing strategies. Track the progress by following your website visitor logs and station logs.

The most important website statistics are:

- Average length of visit.
- Location of visitor.
- Number of repeat visitors.
- Web pages that visitors access.
- Where website visitors come from.
- Any website errors.
- Which bots spider the website.

Use online tools to check page ranking and comparison with similiar websites.

* Note – Hits are not the same as visitors. Each file that is accessed by people viewing the website is listed

as a hit. A web page and three graphics would register as four hits, in reality this is only one visitor.

The most important station broadcast statistics are:

- Average length of connection.
- Location of audience members.
- Number of repeat audience members.
- Peak listening / viewing times.

Use software to analyze web traffic logs or multimedia streaming server logs.

Making Money With Your Internet Broadcast Station

An effective station website not only conveys important information, but can be used to generate revenue.

You must actively promote the station website to encourage people to visit it. It is important to create quality content for the website to keep visitors on it and keep them coming back. If you are not promoting the station website with the Internet audio or video broadcast, then you are losing valuable marketing and financial means.

The following are services and tools that can be used to help your station website generate money:

This is a free on-line Search Engine Optimization application that measures the marketing effectiveness of a website.

www.websitegrader.com

This is a free application that can track your website visitors.

www.google.com/analytics

analytics.blogspot.com

This is a hosted ad management solution that can help you sell, schedule, deliver, and measure all of your directly-sold and network-based inventory.

www.google.com/admanager

googleadmanager.blogspot.com

Banner, textual and video clip advertising companies.

www.google.com/adsense

adsense.blogspot.com

www.doubleclick.com

www.doubleclick.com/insight/blog

www.adbrite.com

blog.adbrite.com

Information for increasing revenue performance of Google AdSense web advertising. This information can also be applied to most web advertising programs.

15 Effective Tips to Increase Google AdSense CTR

www.quickonlinetips.com/archives/2005/03/increase-google-adsense-ctr-by-500

How To Increase Google AdSense Income Quickly

<http://www.kchut.com/2008/03/how-to-increase-google-adsense-income-quickly>

How to Increase Google AdSense Income Simple Tips

www.hubpages.com/hub/Google-AdSense-Dos-and-Donts

Webcasting Music Royalty Licensing

List of national agencies for various countries that are responsible for collecting music royalty fees for Internet broadcasting.

Country	Phonographic Rights Agency	Website Address
Australia	PPCA	www.pcca.com.au
Belgium	URADEx	www.uradex.be
Canada	NRCC / SCGDV	www.nrdv.ca
Denmark	GRAMEx	www.gramex.fi
Finland	GRAMEx	www.gramex.fi
France	ADAMI	www.adami.fr
Germany	GVL	www.gvl.de
Holland	SENA NORMA	www.sena.nl www.stichtingnorma.nl
Iceland	SHF	--
Ireland	RAAP	www.raap.ie
Italy	IMAIE	www.imaie.it
Japan	Geidankyo CPRA RIAJ	www.geidankyo.or.jp www.cpra.jp/web/e/activities.html www.riaj.or.jp/e/
Norway	GRAMO	www.gramo.no
Portugal	GDAIE	www.gdaie.pt
South Africa	--	--
Spain	AIE	www.aie.es
Sweden	SAMI	www.sami.se
Switzerland	SWISSPERFORM	www.swissperform.ch
UK	PPL	www.ppluk.com
USA	Sound Exchange (online only) AARC	www.soundexchange.com www.aarcroyalties.com

Companies that provide comprehensive solutions for the payment of Internet audio stream music licensing.

www.loudcity.net (USA)

www.swcast.net (USA)

www.webradioworld.com (Most countries other than United States.)

Additional Resources

Creative Common sound clips

www.freesound.org

www.free-loops.com

Creative Common music and independent musicians

www.soundclick.com

www.artistserver.com

www.jamendo.com/en

www.tribeofnoise.com

Creative Common and Public Domain video

www.archive.org/details/feature_films

www.blip.tv

www.revver.com

Open Source software repositories

www.soundclick.com

www.freshmeat.net