



BARIX
ONSITE

BARIX
IN-STORE MUSIC
03-2010

TECHNOLOGY FROM BARIX: DISTRIBUTION AND CONTROL OF IN-STORE AUDIO.

The proliferation of reliable network connectivity, from single-building local-area networks (LANs) up to the entire world wide web, has changed the landscape when it comes to content distribution options. The Internet is fully-utilized by broadcasters to distribute “mission-critical” content to end-users of all types, tuned into live radio or TV streams, sports, concerts, meetings, the list of applications is nearly endless. Many professional radio engineers for example have embraced both the Internet and Barix technology as top choices for their distribution needs.

In-store audio is an integral component to the overall shopping (or dining or visiting) experience, playing a key role in driving sales. While in-store video displays also benefit sales, they take more direct focus and do not “blend in” to the background of the user experience as well as audio does. Video may grab you, but audio both guides you and goes with your flow.

Until now, retailers have had limited options for audio service, primarily via a satellite on the roof. These audio providers typically offer many channels with a cross-section of musical tastes, but they do not allow custom branding or the insertion of ads or messaging. In some cases, you could even play a competitors ad in your store. And in most cases, this kind of service is expensive.

Barix technology is changing the game. It is now possible for retailers and others to create their own custom radio networks using the Internet, including the ability to target ads or messages to different stores.

A Barix audio-over-IP distribution solution allows retailers to do the following:

- Offer branded audio content, from your supplier of choice, distributed throughout your store network with a local touch. Barix technology allows you to do this with low investments in infrastructure and marginal recurring costs, re-using the network connections you already pay for.
- Eliminate the need for satellite dish installations or physical media distribution. Know at any time how your system is performing and that your brand message is getting through – a Barix online system gives you perfect control, using your standardized IP infrastructure.
- Include localized advertising or individualized messaging. Embedded within your perfectly branded radio programming, per-location content insertion is effortless and real time. Retailers for example can include store-specific (or even department-specific) ads, publicity for a local charity event, or even a paid advertisement from one of your suppliers, running nationally. Imagine making money on your in-store audio.

Barix devices are reliable, not susceptible to viruses or other tampering. They work in the background with low power needs, no maintenance, updates or cooling requirements – you use the same technology that retailers, broadcasters, military and commercial users worldwide rely upon. Whether in Antarctica, America, or Zurich, audio-over-IP devices from Barix work reliably, without maintenance, day after day, year after year.

This paper introduces you to the distribution options available to retailers and similar operators, the factors affecting your choices, the components required to make it work, and related points to consider.

Per-location Internet infrastructure, various rates for music royalties, and a company's ability and desire to manage this technology as opposed to outsourcing: these factors play a role in determining the best approach. This paper will help to explain many of the finer details involved. Barix can also recommend partners that will assist you with managing part or all of your system.

Options for in-store audio from Barix

Barix hardware and technology can deliver high-quality in-store audio in three ways:

- **Live Streaming:** deliver high-quality branded audio in real-time via the Internet to all retail locations, including the option for localized and targeted ad insertion.
- **Periodic File Download:** store audio locally at each retail location, updating the music via scheduled FTP or HTTP download as desired.
- **Offline:** store the audio locally at each location, and update it manually as desired.

We'll review these options in the following pages, and then provide a comparison of the factors and components of each option.

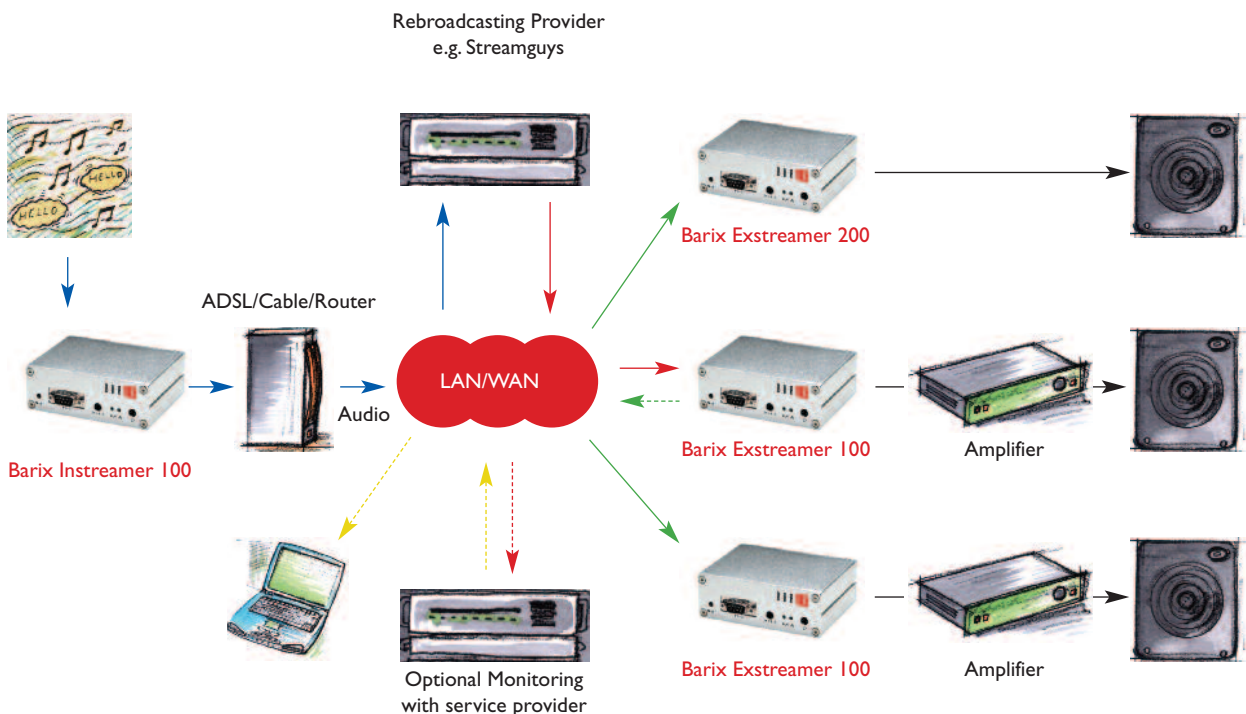
Live streaming

Live streaming requires an in-house or out-sourced CDN (content distribution network) with sufficient resources to reliably deliver streams to all locations. Each receiving location in turn must have sufficient “last-mile” bandwidth in order to receive the stream, typically using a DSL, cable, or T1 connection.

The source stream originating from the CDN may be from an MP3 stream server (Shoutcast or Icecast for example), or a Windows Media server, or from an RTP stream (generated by a Barix Instreamer for example), or even from an RTP replicator where applicable.

Exstreamers can tune in directly to the streaming server and receive your branded, customized audio stream(s). Or, using the Barix ad insertion middleware software you can insert location-specific advertising and messaging. MP3 or AAC+V2 playback is supported, as is integration with Barix PA solutions, allowing priority break-in to the audio to make in-store announcements.

Monitoring and automatic alerting is supported using the MOH Technology Barimon monitoring service: devices periodically report their status to the Barimon server, which takes appropriate action.



Live streaming

Periodic File Download

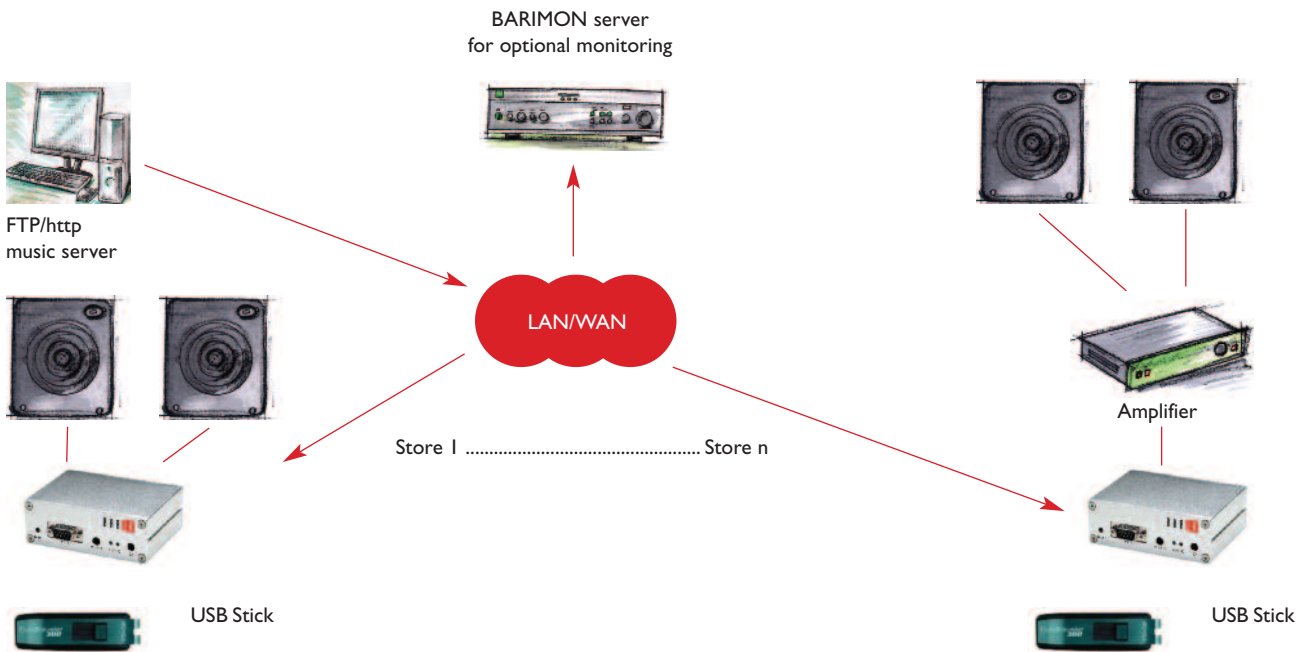
Live streaming requires an in-house branded radio station, but not everyone needs this. In some cases, creating the right atmosphere with background music does the trick. This is easy to do using Barix devices, and it places much less demand upon network resources.

The application plays music from playlists. The playlists can be prioritized, scheduled by day or time. If you want to play Christmas songs every weekday between 3.30 and 5p.m., Monday to Friday in the 8 weeks leading up to Christmas, it's not a problem.

Playlists and music can be regularly updated, to keep things fresh for customers and staff alike. On schedule, the in-store devices can contact your central music server (using either FTP or

HTTP) and check for files to download. Any files that are no longer required are deleted from the local device. In this way your regular customers and staff will never become bored due to hearing the same music all the time.

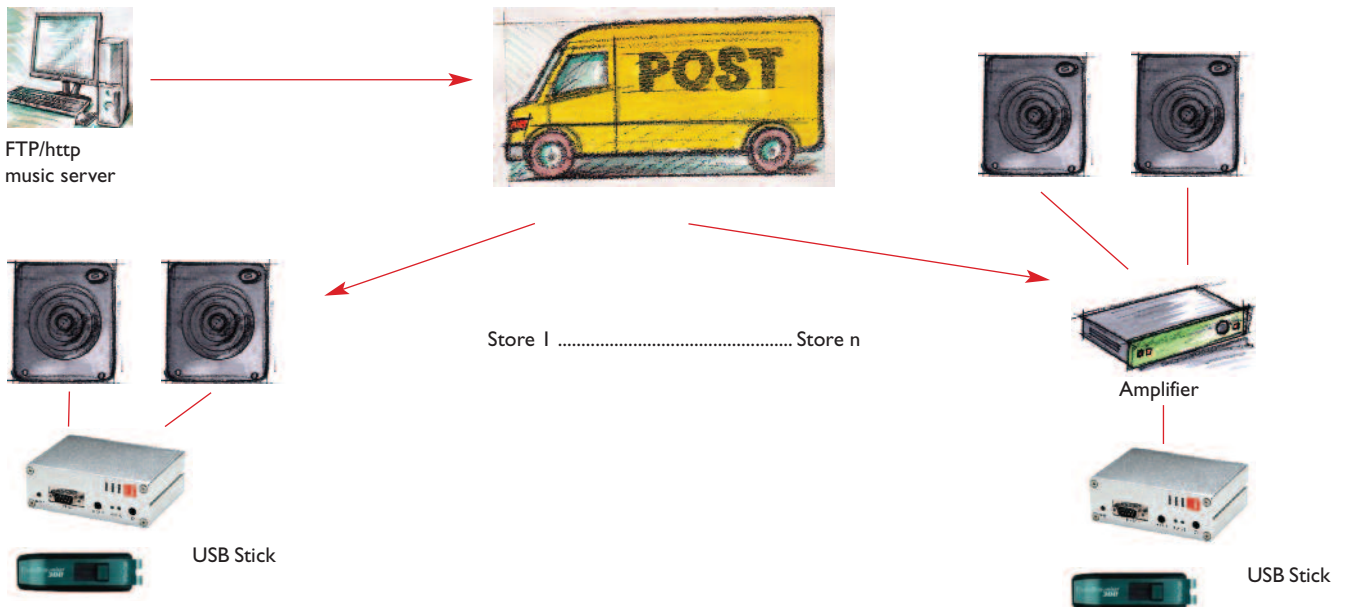
Local announcements are possible using a Barix PA solution, allowing priority break-in to the audio to make announcements. Such announcements can be local or remote in origin. System monitoring is supported using the Barimon service, as per live streaming.



Playback from file

Offline

In the event that some or all of your locations have no reliable Internet connection, the playlist application mentioned above can be used in standalone mode. Upon installation, the Barix device has a preloaded USB stick attached that contains the configuration, playlists and music files required for the system to operate without further contact with any outside systems. As required, a new configuration USB stick can be sent to a store for staff to simply plug in to the device.



IP Distribution in retail – offline configuration



Factors affecting the choice of system

This chart provides a clear comparison for what is required and what is possible via each option. In some cases you may use streaming at some locations and download or offline service at the locations that cannot receive streams. No matter the approach, Barix hardware works in every case, making upgrades and costs quite simple to manage.

FACTORS	Streaming	Download	Offline
Requirements			
Constant Internet connectivity	●		
High-availability IT infrastructure requirement	●		
Limited Internet Connectivity		●	
Capabilities			
Live streaming	●		
Real time ad insertion	●		
Multiple-channel failover support	●		
Local backup capability (USB)	●		
Firmware update capability	●		
VPN Multicast capability	●		
Supports mp3 and AAC+	●		
Lowest royalty payments	●		
Real time performance monitoring/alerting	●	●	
Content distribution using standards (FTP/HTTP)		●	
File update time / period scheduled per location		●	
Intelligent sync updating of local content		●	
Playlist volume configurable		●	●
Local music copies		●	●
Manual content update		●	●
Time based playback scheduling		●	●
Date / Day of the Week playback scheduling support		●	●
Upgradable to other solutions		●	●
USB backup content encryption	●	●	●
Realtime local/central PA integration	●	●	●

Components for in-store music systems

This chart lists the various components needed to create an IP-based audio system with Barix technology.

COMPONENTS	Streaming	Download	Offline
Barix Receiving / Decoding Hardware			
Exstreamer 100	•	•	•
Exstreamer 110 with display and IR remote	•	•	•
Exstreamer 200 with built-in amplifier and IR remote	•	•	•
Exstreamer 1000 with higher-quality audio and contact closures	•	•	•
Barionet (for stream replication on the sending-side)	•		
Barix Firmware			
Streaming Client Firmware	•		
FTPMP3 player (ABCL application)		•	•
Audio Source Stream			
In-house or Outsourced CDN and media server	•		
In-house or Outsourced CDN and Barix Instreamer w/audio	•		
Locally held / downloaded audio files		•	•
Server Software			
MP3 / WMA streaming media server	•		
Barix ad insertion software (optional)	•		
Barix RTP stream replicator software	•		
FTP or HTTP server		•	
.len system for file download authentication		•	
FTPMP3 file server application		•	•

Next we will describe these components in greater detail.

HARDWARE:

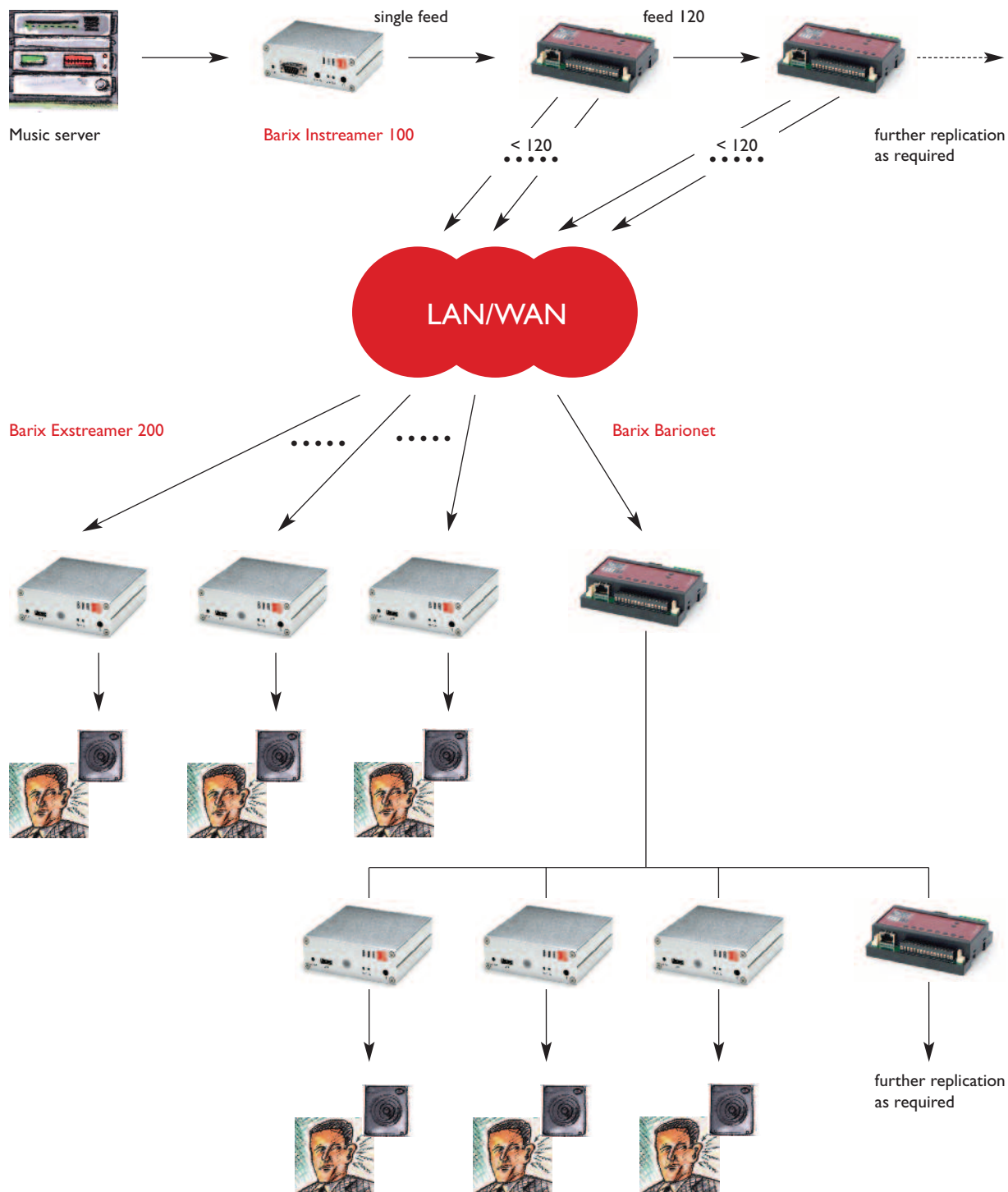
Barix Exstreamer family

All of the Barix Exstreamer devices can support audio playback in all of the scenarios mentioned in this document, each model with various characteristics that make them suitable in different environments.

- **Exstreamer 100:** The entry-level model, a stereo network audio decoder with a USB interface for local audio playback capability. The audio outputs need amplifying. This is a reliable device you can place in the equipment room and forget about.
- **Exstreamer 110:** in addition to the 100's features, the 110 model has a two-line LCD display, built in IR remote (allowing users to select between multiple channels or control volume), and a relay port that allows you to control an attached device such as an amplifier.
- **Exstreamer 200:** in addition to the 100's features, the 200 model has a built in IR remote and integrated stereo amplifier (2*25W), making it ideal for small outlets with no existing PA system.
- **Exstreamer 1000:** this model has a better quality DSP (processor) than the other Exstreamers, and it has both analogue and digital audio outputs, making the 1000 model ideal for premium locations. It also has 4 digital inputs and 4 relay outputs, which can be set according to the device's state.

Barix Barionet

The Barionet is an intelligent network automation component that in certain situations can be used on the "sending" side of the distribution chain in place of an audio source server. Ordinarily it is used to monitor and control an environment, but in this scenario it can be used for its fast and reliable operation, to take and replicate a single audio stream many times.



RTP replication with Barix Barionet.

BARIX FIRMWARE

Exstreamer Firmware

Each Exstreamer supports the 'streaming client' and the 'FTPMP3' firmware, and you can update between the two firmware versions as needed for a given location.

- **Streaming Client:** the streaming client firmware was originally designed for professional broadcast use, but is also in use in 1000's of shops worldwide. The firmware can play MP3, AAC+, and WMA streams using various protocols. Up to three stream sources can be defined, enabling streaming with automatic fail-over, if one of the sources is set to the local USB stick. The software seamlessly integrates with Barix PA over IP systems and the Barimon monitoring and alerting system.
- **FTPMP3 player:** this application has a long history of Retail use and has benefited greatly from user feedback, becoming a feature-rich standalone music player. All aspects of the system can be configured, from how often the device contacts the central music server for updates, to which days of the week to play files on. It also seamlessly integrates with Barix PA over IP systems and the Barimon monitoring and alerting system.

Barionet Firmware

- **Barionet Replicator:** this application receives a single network audio feed via RTP and then replicates it in real time, producing up to 100 copies of the original stream. This is a low cost, PC-free, reliable solution for retailers who rely upon their existing live streaming infrastructure and do not want PC based servers in the loop. Of course, the retailer's infrastructure must provide the bandwidth to support all of the produced streams.

AUDIO SOURCE STREAM

There has to be a music source! For a streaming branded radio solution, most retailers rely upon an external company (a CDN or content distribution network) for professional stream distribution to their locations. This has become a standard for efficient distribution. The output from such a provider is typically a Shoutcast or Icecast MP3 stream or Windows Media stream.

Some companies manage their own distribution networks. In these cases, it is also possible to use a Barix Barionet RTP solution to replicate streams.

SERVER SOFTWARE

Live streaming

- **MP3 / WMA streaming media server (in CDN facility):** this is the server software running the audio source stream. If you don't operate your own CDN, these commercially-available Media packages generate the source stream and best ensure mission-critical delivery to your locations.
- **Barix/MOH ad insertion software:** this optional server application, called ADIOSYS (Ad Input Output System), works with an MP3 (Shoutcast or Icecast) audio source stream. Locations and ad scheduling can be managed via a web interface. Each location has the ability to receive a customized ad schedule with the ads inserted directly into the source stream. This highly-flexible system empowers you to manage brands, ads, and messages among all locations, even allowing multi-brand support using identical source streams. Barix offers a hosted version of the service in conjunction with partner StreamGuys. See <http://www.instorestreaming.com/> for more details.
- **Barix RTP replicator software:** this server application (UDPRep) has the advantage that it will run on a standard server and requires no special hardware setup, it can be run 'in house', or on a hosted server. Additionally, Barix partner StreamGuys (<http://www.streamguys.com/>) offer the Barix stream replication service as part of their hosted platform. The RTP replicator software is also available as a hardware-based replicator solution for live streaming. In this case, the Barix RTP replicator software runs on a Barix Barionet. It allows replication of a single RTP stream up to 120 times, in real time and with a < 20ms propagation delay. The software is format-agnostic; whatever format

the audio stream is in, it can be replicated. Each Barionet can be configured to automatically failover to a secondary stream, should the primary be lost for any reason, providing a source backup capability. With Barix technology replicating your stream, you can deliver the sound to any location you want.

Playback from file

- **Server:** the good news is: ... you can use any standard HTTP or FTP server – if you don't have one installed already, many are available (typically at no cost). You can also “rent” a server (hosted) if your devices connect over the internet.
- **.LEN serverside tool:** this tool can be used to provide the downloading client with a reliable information about the file size of the to-be-downloaded files. Enabling the ‘.len checking’ option, the length of every downloaded file is checked against the length of the file on the server, to ensure that files are downloaded in their entirety. The tool creates an extra download file for every music file to be distributed to the remote locations, containing the file length of the mp3 file. This information is then used by the FTPMP3 in-store application to check whether it has correctly downloaded the music file.
- **FTPMP3 File server application:** this optional application is used to convert playlists and filenames from ‘long’ filename format, to 8.3 format, including ‘obfuscating’ the song title. This means that a USB will not contain easily identifiable files. The current Barix hardware filesystem is FAT16 and does not support ‘long’ filenames.

USEFUL INFORMATION

Music Royalties

Anyone who broadcasts music, either streaming or from stored or downloaded files, must pay royalties directly to each artist/recording company, or to various agencies which may differ country-to-country. Companies that use Barix or any other music technology are ultimately responsible for ensuring payment for and compliance with royalty laws and regulations.

The way in which the music is played (live stream vs. playback from file) also affects the amount of royalties due. Stored and/or downloaded files, in which actual files are sent to the locations, can incur significantly higher royalty rates than streamed audio.

Content Providers

Content providers work with organizations to provide tailored music programming suitable to their customers. These providers normally include royalty coverage for using their content. Barix partners with several such companies and can readily make introductions.

IT infrastructure

Although streaming audio is basically straightforward, sometimes hosting isn't, so Barix supports customers who run everything themselves and also customers who outsource. The important thing to note is that each stream that you send out to one of your locations will require network bandwidth, both at each receiving end and (cumulatively) at the sending end.

For example, if you stream 128kbps audio to 200 locations, you will need 25.6 mbps (megabits per second) of dedicated and sustainable bandwidth at the sending end. This is the rough equivalent of about 16 or 17 "T1" Internet connections. This is one reason why many customers opt for a hosted CDN solution.

Conclusion

The new recipe for retail audio success is IP-based. Now is the time to phase out and replace old and expensive satellite technology with lower-cost Barix-based solutions. You can reclaim and brand the audio in your stores, offer the music and ambience that best drives sales, and (through in-store ad-placement agreements) start generating revenue from your audio.

Contact information

More information can be found at www.barix.com but if you have a specific question: presales@barix.com



© 2010 Barix AG

Barix AG
Seefeldstrasse 303
8008 Zurich
Schweiz

info@barix.com
T +41 43 43322 11
F +41 44 2742849

Barix Technology Inc.
USA
info@barix.com

T +1 866 8150866

Barix GmbH
Germany
info@barix.com

www.barix.com