The Sixteenth Annual Interactive Audio Conference
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Group Report: Cloud Music Services

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Brief statement of the problem(s) on which the group worked

In a world where ultra-wideband wireless network connectivity is completely ubiquitous, how will people listen to music? How can a system be designed that provides universal access for consumers while satisfying the technology and business needs of stakeholders?

A brief statement of the group's solutions to those problems

The group's solution is based on the following assumptions:

1. Local storage of audio files on physical media will become increasingly irrelevant.
2. Streaming will become the dominant method for accessing music, rather than downloading audio files.
3. Subscription services will become the dominant method for listening to music, as opposed to à la carte purchasing.
4. Ultra wideband connectivity will become ubiquitous.

A multi-layered system for transparent delivery of music to consumers was envisioned.

Music Content Producers:
Record labels, Artists, DJs, etc. They create content, market their brands, and receive royalties based on an accurate account of the number of times a music file has been accessed.

Music Storage Providers:
Maintain Cloud server farms. Content Producers rent space on the servers to store their music files.

The MNS Consortium:
A non-profit organization that maintains the Music Name Service (MNS), which is analogous to the Domain Name Service for music files. The MNS consists of a universal unified database cataloging all music content in the Cloud, plus additional information, such as the number of times a particular file has been accessed (used to determine royalty payments). It is supported by fees paid by member companies and organizations.

Music Access Services:
Makes content on Cloud servers available to anyone, on demand, via an open source abstraction layer API. They collect music usage and demographic information, for sale to data analysis companies, marketing groups, and app developers.

Cloud Access:
Provided by the carriers, like ISP companies today. Eventually, we would expect Cloud access to become a municipal utility, like power or water, or available by corporate sponsorship.

Client Apps:
Multiple access portals for listening to music. Many opportunities for innovation and branding. Provides numerous differentiating services like social music networks, recommendation and discovery, music games, merchandising, media tie-ins and promotions, etc.

Server components to apps:
Larger and more complex systems (such as Facebook or Pandora) that provide access to music, based on social interactions and other criteria.

Music Playback Devices:
A wide variety of form factors with speaker systems, including mobile devices, home and car stereos, PC, TV, and gaming consoles, earpods, etc.

Expanded problem statement

In a world where ultra-wideband wireless network connectivity is completely ubiquitous, how will people listen to music? How does fast, reliable, access to vast libraries of streaming music files stored on Cloud servers, change the current pay-per-download business models? If you can listen to any song on the Internet, at any time, from anywhere, how many gigabytes of local storage do you need to carry around in your pocket? (Answer: none!)

Current stakeholders, such as Apple's iTunes, will be highly resistant to change over to this new method of "radio on-demand" technology, but it seems inevitable that such a system will be developed, in part because we are already seeing rudimentary versions of it in services like Pandora and Spotify. The current generation of users, accustomed to owning large numbers of audio files on disk drives and mobile devices (if not physical storage media like CDs and vinyl) may be unhappy about giving up the idea of music ownership in favor of an playlist of selections on a server, but new users growing up with the system will simply take it for granted that streaming Cloud music servers are just "the way it works".

Many problems exist getting from here to there. How does music media get aggregated, so that users can access any and all available music in the Cloud? How does everyone in the streaming media business get paid? Where does the money come from, particularly when users are unwilling to purchase information that is perceived to be freely available?

1. How can a system be designed that:
   a) prevents monopolization by any one company,
   b) prevents balkanization of music services which confuses and frustrates consumers,
   c) enables innovation at multiple levels in the technology chain of access,
   d) provides compelling user experiences that foster differentiation of products and services,
   e) facilitates artist branding, and marketing opportunities.

Expanded solution description

There was a fair amount of discussion about how music subscription services would be paid for, and who would be collecting the money. A three-tiered method was proposed:

1. All You Can Eat -- unlimited access to all music in the Cloud for a flat monthly fee.
2. à la carte -- limited access by file or group of files, on a per purchase, on demand, basis.
3. Free -- unlimited access, supported by advertising.

It was argued that the Music Access Services companies would be in charge of collecting customers' credit card information, and determining bandwidth usage. This would allow for increased competition between services. Possibly Cloud Access providers (i.e. carriers) or Client Apps might also provide additional services for monthly subscription fees.

However, others in the group felt that eventually, all music royalties would be paid for by a "Cloud access utility" tax levied on all citizens (as with roads, firefighting, police, etc). This method provides the most transparent music listening user experience, and thus is the most desirable, supporting free (as in unrestricted) and legal access to any music file available in the Cloud, and financed in an inconspicuous, seamless manner.

Items from the brainstorming session that the group thought were worth reporting

In the year 2061:

Music will be organically distributed throughout the environment and the appropriate music will be played at the appropriate times, anywhere you go, automatically, based on preset preferences, and determined by past usage. The Cloud knows where you are, what you want to hear, when you want to hear it, and simply plays it without even being asked to do so.

Music content producers will be highly respected and appreciated. Their output will be directly accessed from the Cloud by nanobots in your brain, so no physical devices, and no speakers, are required. Payment is based on the number of times people have listened to a particular piece, which can be shared with your social network simply by thinking about it. Recommendations for new music will be completely on target, because they will be based on a wide variety of criteria, including all your friends recommendations, brain function models, cultural identifiers, etc.

New digital audio art forms and performances will be based on groups of dancer/musicians playing motion capture instruments. You'll will be able to play with virtual musicians that accurately model playing styles based on Zenph-type analysis of their recorded works. Instruments will be able to morph into multiple forms during performance, and be able to produce previously unheard of tones. Given downloadable memories and enhanced education techniques, the usual ten thousand hours of practice required to master an musical instrument will be reduced to two and a half weeks. Genetic modifications will produce super talented musicians and composers.

However, sometimes, things will go horribly wrong. Beamed speaker systems, used to send audio advertising at specific targets, will be used for direct brain control ... and when they malfunction, will deafen entire populations. Even worse, in a perversion of sonic goodness, the military will use beamed acoustic emitters as a weapons capable of killing the entire crew of a battleship, while leaving the ship itself untouched. In the most incredible twist of fate, new virtual speaker/microphone systems comprised of force fields capable of measuring and modifying the movement of individual air molecules will feedback uncontrollably, creating a singularity in the space/time continuum, and releasing a ravaging horde of zombie dinosaurs!!

And yet, even after all these fantastic technology advances, MIDI will still sound bad ...