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CSE 403 — LCO

1 Operational Concept

Rhythmic synchronizes music through multiple computers, making them act like distributed speakers. This way you can walk from room to room without any disjoint jump in the music you hear. Also standing between rooms, you will hear a single audio stream rather than two separate overlapping streams. You can get this behavior with a standard radio. You should be able to get the same functionality with your digital music.

Ultimately, Rhythmic should be able to connect several computers so that controlling the music at any of them will simultaneously control the music at the others.

2 System Requirements

2.1 Stage One

Rhythmic synchronizes multiple computers playing digital audio files that are uniformly accessible to each participating computer.

At this stage Rhythmic must:

- Play a specified audio file
- Synchronize starting to play the file
- Optionally split the song into smaller segments and synchronize the segments

2.2 Stage Two

Rhythmic synchronizes multiple computers playing digital audio files that may only be accessible on a single computer.

In addition to the Stage One requirements, Rhythmic must send the necessary digital audio data from the computer owning the file to the other speaker clients.

3 System and Software Architecture

One possibility is to implement Rhythmic in Java using the Java Media Framework, which includes support for playing digital media (including mp3 data) and also provides an implementation of RTP (Real Time Protocol) which can be used to synchronize the streams.

Other implementation possibilities exist, using different languages and libraries, but this appears to be the most promising.

4 Life-Cycle Plan

Rhythmic is useful for everyday home situations as well as party situations. In normal home use, it simply allows you to wander about your house without any break in your musical experience. Often, when you go between rooms you notice that the audio from one room is slightly out of sync from the music in the other. Rhythmic synchronizes the music to create a highly consistent musical experience.

At a party, there is typically one stereo in the living room with the volume turned up to eleven so that the music can be heard everywhere in the house. In this case, the music is excessively loud in the living room, making conversation impossible. On the other hand, the music is muffled and unclear in the other rooms of the house. With Rhythmic, you can have music playing through every computer in the house so that no room is too loud and the music is clearly audible everywhere.

Rhythmic is perfect for any music lover who doesn't want to pay for expensive hardware solutions to their distributed digital music needs.

5 Feasibility Rationale

Hardware solutions currently exist for playing your digital media on your home entertainment system, but these are too costly for the average music enthusiast. Also, these products typically don't synchronize multiple audio systems in different rooms. Rhythmic has the opportunity to provide a less expensive, superior solution appealing to a wide audience. The demand for this product exists, though it seems to have been largely unnoticed until now. The technology to make this happen also exists, but because the demand has gone unnoticed, no prior solution has been presented.