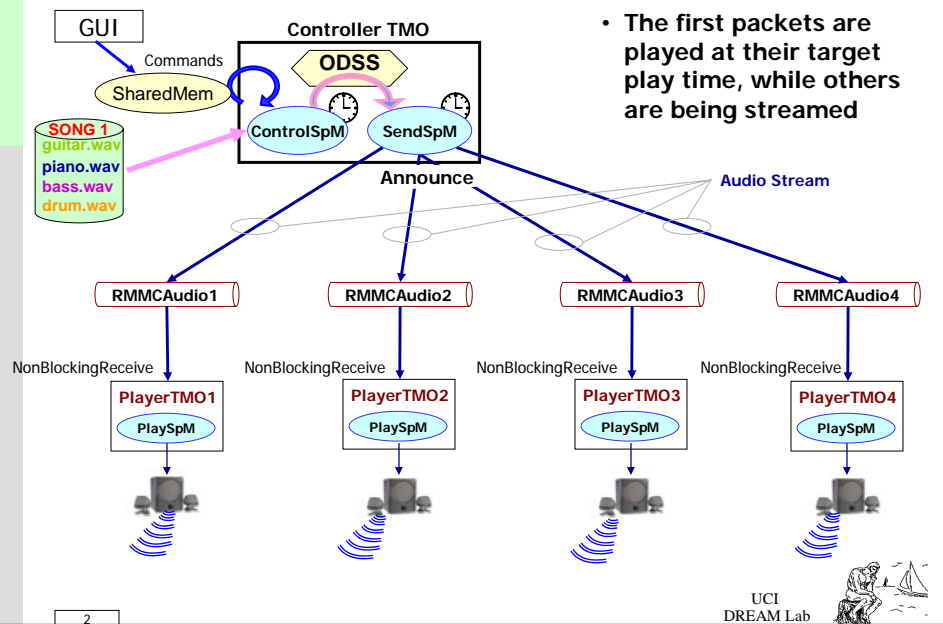


Selection and Adjustment of Timing Parameters in Applications Structured as TMO Networks

Example 1. Digital Music Ensemble

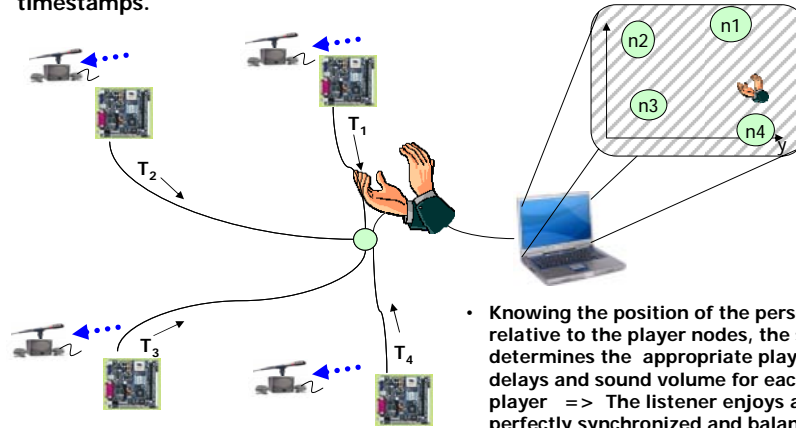


Digital Music Ensemble



Handclaps-Based Localization

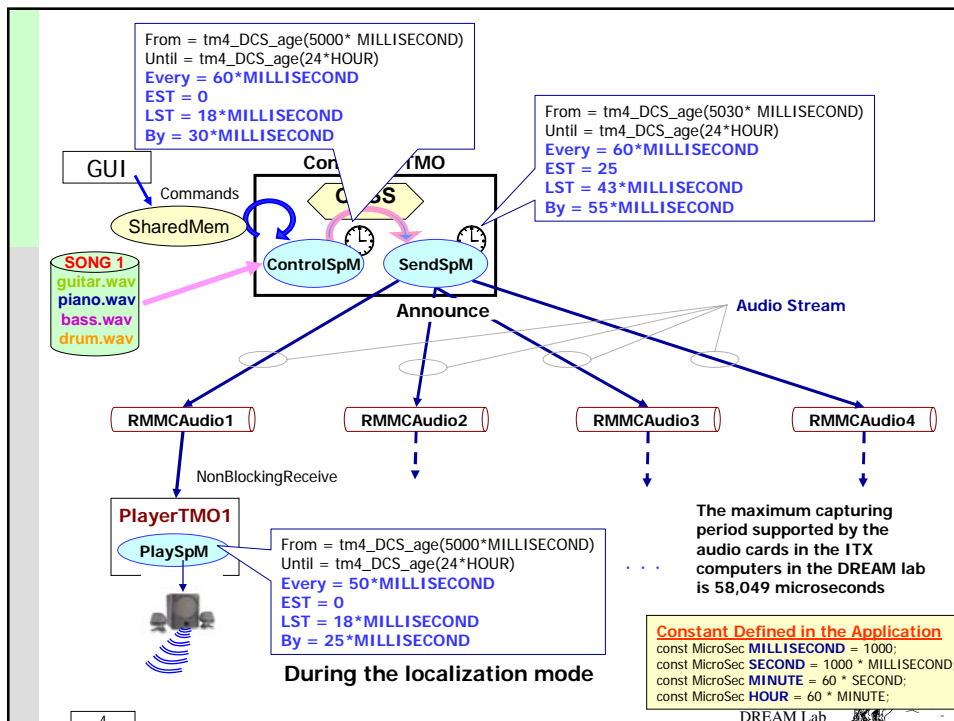
- The player nodes are ordered to "listen" and the listener claps once.
- Each player sends to the server node the time at which it captured the handclap sound signal
- The server node calculates the position of the person using the collected timestamps.



- Knowing the position of the person relative to the player nodes, the server determines the appropriate play delays and sound volume for each player => The listener enjoys a perfectly synchronized and balanced music where he stands

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Capturing Period and SpM's Period

- The Linux-version player program uses the Advanced Linux Sound Architecture (ALSA)
- The handle of the ALSA capture device (i.e., `SND_PCM_STREAM_CAPTURE`) is configured as a non-blocking handle (i.e., `SND_PCM_NONBLOCK`)
 - => When `snd_pcm_readi(...)` is called, it returns immediately either
 - With the captured sound data and the number of bytes read, or
 - With a code indicating the current situation of the audio buffer (e.g., buffer is empty)
- One configuration parameter of the ALSA capture device is the capturing period (CP) in microseconds
 - Every CP microseconds the audio card inserts into the input buffer the audio samples captured by it.
- To avoid buffer overflow the SpM that reads the captured data must have a period equal to or smaller than CP
 - SpM's every \leq CP

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Capturing Period and SpM's Period

- The maximum capturing period supported by the audio cards in the ITX computers in the DREAM lab is 58,049 microseconds
- Therefore, we chose the value of 50 milliseconds as the period of the SpM

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