μMMD

History

- Started as a crazy idea during hacking sessions at /tmp/lab in Paris
- Experiments at CNAM in Paris in 2010
  - Small testbed with 8 nodes in Ad-Hoc mode
  - Audio USB sticks/speakers plugged on Fonera2
  - MP3 streams from a laptop in RTP using VLC
  - Output on the devices with Ffmpeg cmdline
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Problems

• Tested several audio/multimedia tools
  • Pulseaudio, gstreamer, Ffmpeg...
• Tested different codecs and formats
  • AAC, AC3, MPEG...

Nothing really fitted our needs...
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Birth of µMMD

• Needed a stripped-down multimedia daemon
• Able to record and play sound streams to/from the network and audio devices
• Remote control capabilities
• Efficient and flexible sound distribution with multicast
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« I'am here » message

A1 → R → A2 → R → A3 → Controller
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« joining a sound stream »

Controller

Join audio stream command for A3

A3 joins the multicast group
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Basic architecture

- Multiple audio sources (network, soundcard, files...)
- Multiple audio destinations (network, soundcard, files...)
- Audio sources and destinations can be altered using filters (adding effects, mixing...)

Sources > Filters > Destinations
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Goals

- Record at some locations and playback somewhere else
- Scale to an arbitrary number of nodes
- Control all nodes from a central location
- Apply effects depending on devices interactions (signal strength, traffic, proximity, mesh topology changes...)
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Where we are now

- Early stages of development (80% complete ;)
- Still not sure which codecs, transports, formats to use: embedded devices should be able to encode and decode audio streams
- Still not sure how many multicast streams mesh networks can sustain simultaneously
- Still not sure which hardware to use
Conclusions

- Is a ground-breaking framework to experiment with audio, multicast and mesh
- Is available on github
  https://github.com/psycho-nico/ummd
- Needs more audio and networks specialists

- Questions?