

End System Multicast

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End System Multicast is a client and server software set that allows multimedia content to be streamed over the internet. ESM has been under development for two years by Carnegie Mellon University. One of the major advantages ESM has over other multicast solutions is that it works on the existing structure of the Internet and requires no special hardware (such as multicast enabled network routers).

Most video and audio content servers require that the host have access to a large amount of bandwidth, due to the nature of unicast broadcasting. ESM avoids this requirement by using a multicast structure which involves all of the clients who connected to a broadcast in the distribution of the content. A similar swarming technique to this is used with Bittorrent, where a server distributes parts of a file to multiple clients, who then distributes the parts they have received to other clients until they disconnect or the download is completed [1]. This architecture reduces the server load by involving end users in the transmission of content to other end users.

To facilitate multiple bandwidth capacities, ESM broadcasts include a high (300kbps) and a low (100kbps) quality stream. The ESM client analyzes the client side connection as the presentation begins and automatically chooses which stream to play and adjusts the connection accordingly[2]. This method of scalable content encoding and transmission ensures that a broadcast will reach a wider audience by reducing the minimum requirements of the client systems.

For content playback, the ESM client launches either Quicktime or VLC. Streaming sessions are established using the Session Description Protocol (SDP). A SDP file is “a text file that describes what will be streamed and gives the information needed to tune in”[3]. During the broadcast, the client sends reports back to a centralized ESM server with session statistics. Transmission of multimedia content is done using RTP and reporting is done over TCP.

The ESM software is very easy to use, setting up a stream requires launching the software and pointing it to any video file, audio file or DVD on your local PC and then hitting the broadcast button. The client software is equally simple to use, all available public streams are on the ESM broadcast website and streams begin immediately after a user chooses a broadcast and a playback program (Quicktime or VLC). Currently, the ESM client has ports for Windows, Mac OS and Linux. The ESM server is currently only available for the Windows platform.

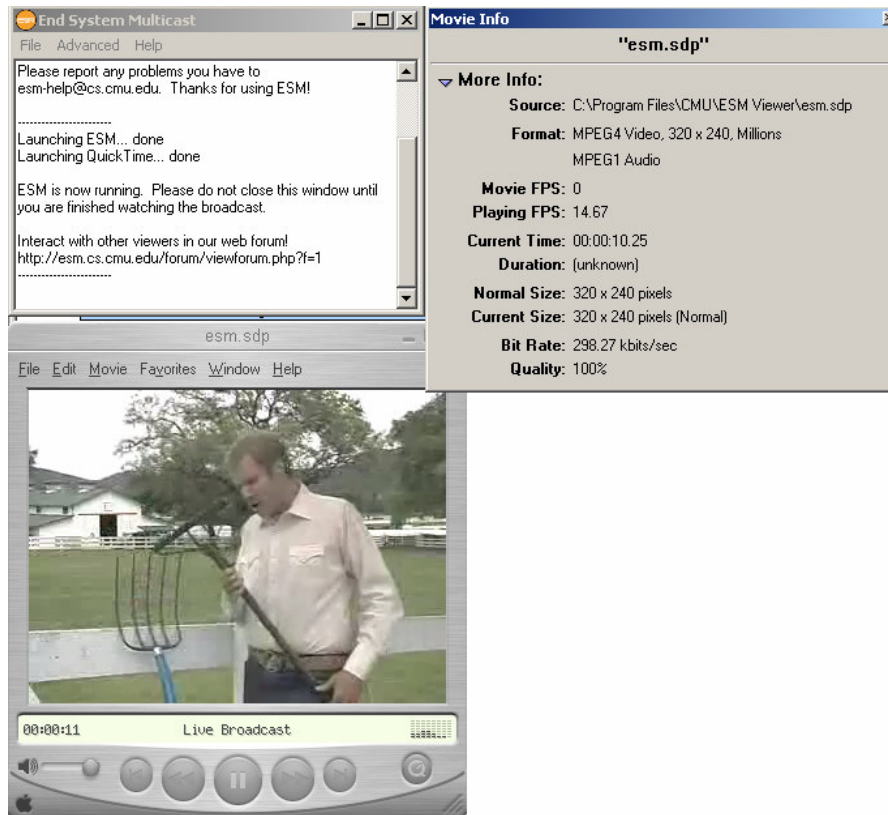


Figure 1 - ESM Client with Quicktime streaming

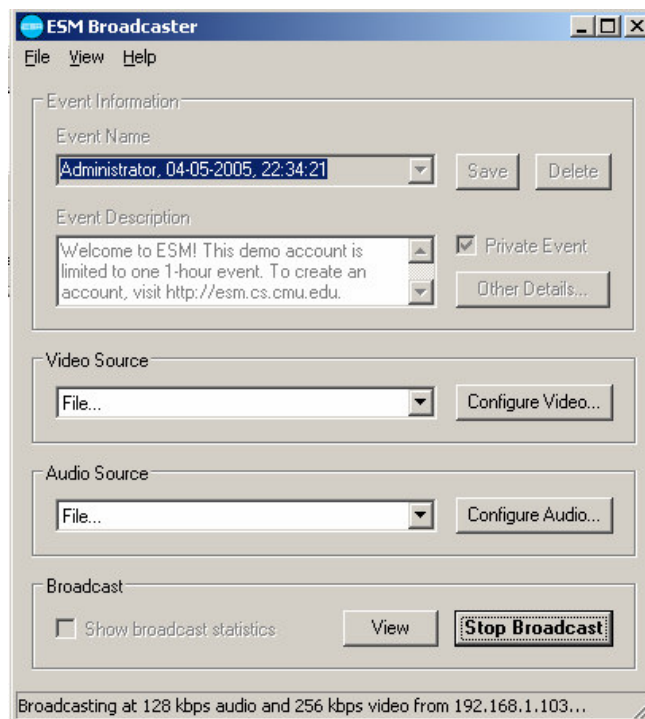


Figure 2 - ESM Server

References:

- 1 – Official Bittorrent Protocol Documentation - <http://www.bittorrent.com/protocol.html>
- 2 – End System Multicast Technology - <https://esm.cs.cmu.edu/technology/>
- 3 – QuickTime for the Web: For Windows and Macintosh, Third Edition. Steven Gulie. Pg 146.