

Group: 3D'S
Project: Media Server
Document: SRS
Date: January 28 2005

1. Introduction

1.1 Purpose of this Document

We will create a server application to stream DVD/CD content to a client on a home network. We will also develop a recommendation system to keep track of viewing habits and make viewing recommendations based on this information as well as user input (i.e. I want to watch a comedy tonight). The media is stored on various hard drives throughout the network.

The products included are a customized database application that stores and serves a user's viewing history, as well as media information. There is also a streaming server that will stream the specified media upon request. Finally there is a client program that interfaces with the recommendation system, the media database and the appropriate streaming server.

1.2 Scope of the Development Project

We are developing a media server that will store media (DVD/CD content). This will only operate on a home network with windows machines. The amount of media stored is dependent on the network's free hard drive space.

There is a recommendation system to help indecisive viewers decide on what movie they wish to see or music to listen to.

Some benefits are that you can store the media on any computer on the network. Since you won't be using the actual disks they can be safely stored and media becomes readily accessible.

1.3 Definitions, Acronyms, and Abbreviations

Client Application: The system that the user interacts with to interact with the recommendation system, request media, and play back the streaming data.

Database Server: A server that runs a database containing information on movies, music files, and local media location.

IMDB: A website (<http://www.imdb.com>) that maintains a great database full of movie information.

Media: A movie or music data file.

Media Player: A program (implemented by a third party such as Windows Media Player) to play the media sent to it by the streaming server.

Recommendation System: A system that we will design, to make a good decision on what to recommend if a user would like the system to suggest a movie or an appropriate music playlist. This will analyze current preferences (i.e. I want to watch a comedy tonight) and the user's previous viewing practices to make a recommendation.

Streaming: The transfer of large amounts of data over a network. The receiving computer will then display the data, while it is coming in rather than saving it all.

Streaming Server: A server that streams media from the local hard drive to any other

computer.

Session: A session consists of a user starting the client program, logging in, either picking some media, or having one recommended, and enjoying the media.

1.4 References

IMDB: <http://www.imdb.com>

Java: <http://java.sun.com/j2se/1.4.2/docs/api/>

Microsoft MFC Library: http://msdn.microsoft.com/library/default.asp?url=/library/en-us/vclib/html/_mfc_Class_Library_Reference_Introduction.asp

<Streaming stuff>:

<Media conversion tool>:

<Media Player>:

<Database server – MySQL>:

1.5 Overview of Document

In Section 2, we discuss what the product does and its requirements from a high-level perspective. Section 3 we flesh out the details of the system..

2. General Description

2.1 User Personas and Characteristics

Mom: Watches movies with dad late at night. Competent computer user.

Dad: Buys a new movie every week. Heavily involved in the open source community

Little (Hacker) Billy: Watches movies when bored. Grew up with computers.

Suzy Q. Teenager: Only watches movies with friends (emphasis on Brad Pitt), listens to music when not asleep. Uses MSN Messenger and Word

2.2 Product Perspective

We will use a third party database server such as MySQL to maintain movie info/location and user history. The interface with this server will be via ODBC and SQL commands. We will use a third party media player to play the streamed media. A DVD drive and media recoding software will be used to copy the media to a hard drive.

We will respond to user requests via our client application.

Our system requires a home network a DVD drive in the machine that is running the database server. It will also require hard drive space sufficient to store the desired media.

No new hardware is required but ideally you would have a box that connects a TV to the home network and runs the client program.

2.3 Overview of Functional Requirements

- 1) Convert media to the desired format (if necessary).
- 2) Create and maintain the database containing the location of media and its description (i.e. actor, time, genre, etc.).
- 3) Locate the best location on the network to save the media. It may be necessary to create space by deleting little used files.
- 4) Create and maintain user profiles (past viewing history).
- 5) Make recommendations to a user based on past viewing history and current viewing preferences.
- 6) Stream the media from it's storage location to the users computer. If the media is stored locally, allow the user to view it directly.

2.4 Overview of Data Requirements

Inputs:

- 1- The DVDs and CDs that will be stored on the home network.
- 2- What movie to watch or what criteria needed to recommend a movie to watch.

Stored Data:

- 1- Past viewing history
- 2- Media file locations
- 3- Media information (Actor, Genre, Rating, etc...)

Outputs:

- 1- Recommendations for movies to watch.
- 2- Streaming media into the computer.

2.5 General Constraints, Assumptions, Dependencies, Guidelines

There must be a high-speed home network installed.

All computers providing services (database server, or streaming servers) are running when the system is in use.

There is sufficient hard drive space to save the desired media.

We will use Windows Media Player to play the streaming media, which will limit the system to Microsoft Windows.

Due to copyrights, we may have some limits imposed on us.

2.6 User View of Product Use

The user will start the client application and identify them self through a login (so we know whose viewing history to reference and update). They can either choose to use the recommendation system, or to select media from the available list. Finally they can watch/listen to the media via Windows Media Player.

2.6.1 User Interface Style Guide

Located at http://www.cs.utah.edu/~arichard/3DS_UI.html

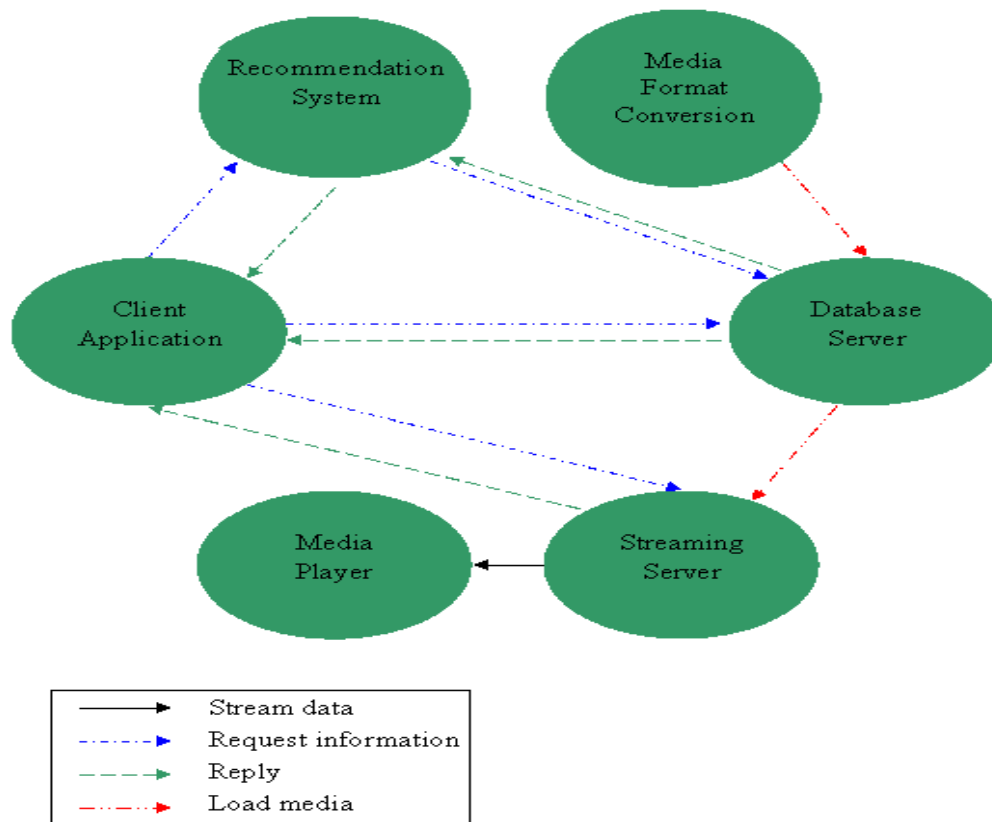
3. Specific Requirements

3.1 External Interface Requirements

User interacts with the client program to request media via either a wizard style interface or an explorer type interface.

User interacts with the database server to add media to the system via a wizard style interface.

This is a graphical representation of how our system interacts.



3.2 Detailed Description of Functional Requirements

3.2.template

purpose	a description of the functional requirement and its reason(s)
inputs	which inputs; in what form/format will inputs arrive; from what sources input will be derived, legal domains of each input element
processing	describes the <i>outcome</i> rather than the <i>implementation</i> ; include any validity checks on the data, exact timing of each operation (if needed), how to handle unexpected or abnormal situations
outputs	the form, shape, destination, and volume of the output; output timing; range of parameters in the output; unit measure of the output; process by which the output is stored or destroyed; process for handling error messages produced as output

3.2.1

purpose	Convert media to desired format.
inputs	DVD/CD content, desired format.
processing	Done by a third party application.
outputs	A file to be stored in the system.

3.2.2

purpose	Create and maintain the database containing the location of media and its description.
inputs	1- Converted file name and location. 2- Identifying media information (i.e. Name).
processing	Retrieve information from IMDB.
outputs	Save info into the database.

3.2.3

purpose	Locate the best location on the network to save the media. It may be necessary to create space by deleting little used files.
inputs	1- Media file size 2- Free space on hard drives 3- Amount of media on each hard drive.
processing	Black box for now...
outputs	Saves the location of the file in the database. Recommendations on what file to delete (if necessary). Copies the file to that location.

3.2.4

purpose	Create and maintain user profiles (past viewing history).
inputs	1- Username. 2- Current media choice.
processing	Handled by database.
outputs	Past history.

3.2.5

purpose	Make recommendations to a user based on past viewing history and current viewing preferences.
inputs	Request for a recommendation (using user's input preferences).
processing	Black box.
outputs	A list of suggested media.

3.2.6

purpose	Stream the media from it's storage location to the users computer. If the media is stored locally, allow the user to view it directly.
inputs	Computer and filename locations. Client computer location.
processing	Stream the requested file. If the requested movie is not on this computer, return error.
outputs	The media content.

3.3 Performance Requirements

Our system does not need to support a large number of connections, since it is intended to run exclusively on a home network. This means that at any given time there will be 10 or fewer people using the system. Of these users, we hope to support at least 3 people receiving media from a given Media Server, and perhaps even the same file. This will most likely be limited more by disk and network bandwidth than anything else.

Network latency is minimal since we're on a home network, and all programs should not take a perceivable amount of time to execute, except perhaps for the recommendation system, which should take no more than 15 seconds to produce results.

The number of files and the size of each individual file will be limited by the operating system on which the streaming server is running. The total size of the media files will be proportional to the amount of free hard drive space on each computer. The database size will depend mostly on the history record (the media entries will be at most 1K each) It will keep at most one year of history or 1000 entries, whichever is smaller.

The number of database transactions will be minimal, since they only take place at the beginning of each session. In the simple case where a person knows what movie they want to watch, playing a movie will require 3 database transactions (login, retrieve movies, retrieve location). The recommendation system will require more transactions, but certainly less than 50.

3.4 Quality Attributes

Since this system runs on a home network, it is assumed that security is in place between the home network and the Internet, such as a firewall. Computers and users will be trusted. The system should be very available. At most we hope to have to restart the servers once a week. Maintenance of our software system should be simple. Apart from occasionally restarting some of the servers (provide scripts to do this?), there should be no problems.

3.5 Other requirements

None at this time.