Patent - U.S. Serial No. 60/238,070 filed 10/05/2000

A NETWORK BASED ENTERTAINMENT ON DEMAND SYSTEM BASED ON CONVENTIONAL DVD-PLAYER ARCHITECTURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to improvements in the digital video disc Player or DVD-Player and particularly to improving the versatility and accessibility to enriched content and capabilities.

2. Brief Description of the Prior Art.

Digital versatile discs resemble compact discs (CDs) however they store more data, are faster and can contain cinema quality video, better-than-CD audio, and additional data. Both DVDs and CDs store information as a pattern of pits formed on a substrate. Light patterns reflected from the surface when struck by a laser beam are interpreted as information, such as text, sound and pictures. In DVDs the pits are smaller, the tracks are closer together, the data layer is a different distance from the surface, the modulation is different and the error correction coding is improved. DVD-Players operate a platform independent navigation engine for playing interactive content. Specifically, each DVD-Video disc typically contains a main directory, which contains two types of files extensions, .IFO and .VOB files. During playback, these files are used to form title sets, which are groupings of files required to play a DVD title (i.e., a movie). Each movie is composed of one .IFO file and one or more .VOB files.

The .VOB file contains the actual video/audio data. The location and format of the .VOB files are contained in the .IFO file. The .IFO files contain navigational data necessary for proper playback.

SUMMARY OF THE INVENTION

An integral DVD-Drive satisfies content requirements in the present invention. In particular, encoded data found on the disc satisfies the requirements of a navigation engine. The interactive coordination between a remote control and the navigation engine allows consumers to navigate within the title.

As will be discussed in detail herein, advantages of the present invention include:

1. The use a device (i.e., a DVD-Player) with modifications to retrieve content from another computer with the use of additional network components.

2. Content can now reside on a remote server and can be generated dynamically from alternate data sources. The navigational engine does not know or care that the navigational data was dynamically generated.

3. Add additional software to achieve very thin client capabilities within the DVD-Player.

4. Aggregate multiple sources of data within the modified DVD-Player in order to use less capable network topologies. For example, supplement the network data with the data retrieved from the integral DVD-Drive to minimize network requirements.

BRIEF DESCRIPTION OF THE DRAWINGS

The document and advantages of the invention will be better understood by referring to the accompanying drawings.

FIG. 1 is a block diagram of one embodiment in accordance with the present invention illustrating the elements comprising a DVD-Player system including DVD-Drive and accompanying computer with software components installed therein.

FIG. 2 is a modification to the block diagram of fig.1 illustrating the elements comprising a DVD-Player system to include and possibly exclude certain sub-systems.

FIG. 3 is a logical diagram of the elements comprising a Server Content System.

FIG. 4 illustrates the use of multiple data sources.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings in detail, wherein like reference numerals indicate like elements throughout the several views, there is illustrated in the figures an embodiment of an a network based entertainment on demand system in accordance with the present invention. In a present preferred embodiment, the system is based on a conventional DVD-player architecture. Software contained within a typical DVD player accesses .IFO files locally on a DVD disc. The IFO files contain menus and other information about the video and audio. The video and audio files are contained in .VOB files (for DVD-Video) and .AOB files (for DVD-Audio). These files are MPEG-2 program streams with additional packets containing navigation and search information. MPEG stands for Moving Picture Experts Group, which is the name of a family of standards used for coding audio-visual information (e.g., movies, video, music) in a digital compressed format. MPEG-2 is used in digital video disc and digital broadcast video. It is a scalable compression standard offering several levels of audio quality and a

variety of frame sizes and transfer rates. An alternate content retrieval mechanism can be accomplished by incorporating network components within the DVD player or client.

Network access would allow the client access to an aggregate of static and dynamic IFO/Video/Audio files contained on a server. Only remote clients that have the additional network circuitry may access these files. The physical network connectivity can be accomplished using conventional wired and/or wireless solutions.

In the present embodiment, very thin client support can be accomplished by integrating a thin client solution, such as any commercially available protocol, for example, the Citrix Independent Computing. An advantage is that the bulk of the data processing can occur at a centralized location, such as by a server. As a result, the client design can be more simplified and especially small where desired. Support for additional devices like a keyboard, mouse, and game port could be added in order to have an enhanced thin client operation. Thin client access would provide access to Windows and non-Windows applications from the client.

Consistent, reliable high quality network access to enriched video/audio content has been prohibitive by the sheer requirements placed on the network infrastructure. Movies and audio saved in the MPEG format are highly compressed and consume much less disk space than would normally be required, however the resultant size is still too big to transmit on a non-broadband network. For example it would take days to download the contents of a single DVD using a 56k modem, hours on a T1 line. MPEG variants like MPEG4 address the reduced QOS (quality of service) on the network by reducing the quality of the content.

In accordance with the present embodiment, an alternate approach would be to redistribute the content. Consider a client that had access to additional local storage, for example, a local DVD (17GB) drive. This disk can contain a portion or the data necessary to reconstruct the original video/audio content. It's also possible to achieve a larger degree of compression as to allow more than one movie per disc. The result of this approach would be an entertainment on demand system that would have reduced network requirements. In addition the server would contain less data. The tradeoff is that additional resources are required in the client to seek, read, cache, and process locally. A logical separation of the video content can be made within the Discrete Cosine Transformation (DCT) data contained in I, B, and P frames. I frames are Intra-coded pictures that are coded in such a way that they can be decoded without knowing anything about the other pictures in the video sequence. B frames are Bi-directionally coded pictures that use information from other pictures (past or future). P frames are Predictive coded pictures that use information from frames displayed earlier. DCT uses the Joint Photographic Expert Group (JPEG) algorithm for compression. A logical separation of data can be made with the DCT area. This data can be split between high frequency coefficients and low frequency coefficients. In other words the content may be split between high and low detail counterparts. A lower bandwidth stream would contain the headers and the low detail counterparts and the supplemental stream would contain the high detail counterparts retrieved another way.

FIG. 1 illustrates the dominant components of a DVD-Player in accordance with an embodiment of the present invention. The DVD-Drive 1 receives a disc containing compressed and encoded content, which has been authored in accordance to the DVD 1.0 specifications for read-only discs. The DVD-Drive may read up to 17.08 gigabytes of content (AKA title). The CPU 4 includes a driver in Software 8 for enabling the control and retrieval of data from the drive 1. In this embodiment, an infrared receiver 7 receives commands from the remote control (not shown) to navigate and perform playback of the content contained on the disc. The Front Panel 6 can also be used to perform the same (limited) and also displays information about the current title and the state of the DVD-Player. The decoders 2, 3 facilitate the display rendering and playback of audio.

FIG. 2 illustrates the addition of Network Components 5; in particular these components allow data to come from a source other that the DVD-Drive 1,for example, from a server (not shown). The Network Components 5 can be comprised of conventional and/or custom hardware components, such as by way of illustration, Ethernet, cable modem, DSL line, as examples. Additional driver software, such as any commercially available product, can also be provided for enabling the control and communications to/from the inter-networked devices.

FIG. 3 illustrates the logical construction of the dynamic content. The server 10 may use data from a number of sources; for example, from a Web server, database, and/or application server. Connectivity to remote data can be achieved in a number of different ways, such as by way of illustration, through a local area network (LAN), wide area network (WAN), and the Internet. This generation 11 is preferably done by software resident on the server. The software can combine static and dynamic .IFO files 12 to accomplish the necessary data structure for proper navigation. The .VOB files 13 are typically static and are received by the server through the LAN, WAN, satellite or secure Internet connection. A third party thin-client server component 14 accommodates client connectivity. Remote DVD-Players 15 communicates with the server.

FIG. 4 illustrates the utility of retaining the optional DVD-Drive 20 within the modified DVD-Player. Data 21 from the DVD-Drive 20 and data 24 from the Network Components 23 are combined by the DVD-Player Circuitry 25. The combination of the two data streams is equivalent to a high quality audio/video retrieved by just one of the data providers (20, 23). To reiterate-the purpose of this configuration is to reduce the requirements of the network infrastructure between the DVD-Player and the server.

The terms “server”, "computer", "computer system", or “system” as used herein should be broadly construed to include any device capable of receiving, transmitting and/or using information including, without limitation, a processor, microprocessor or similar device, a personal computer, such as a laptop, palm PC, desktop or workstation, a network server, a mainframe, an electronic wired or wireless device, such as for example, a telephone, an interactive television, such as for example, a television adapted to be

connected to the Internet or an electronic device adapted for use with a television, a cellular telephone, a personal digital assistant, an electronic pager, and a digital watch.

It is understood, therefore, that the present invention is susceptible to many different variations and combinations and is not limited to the specific embodiment shown in this application. In addition, it should be understood that each of the elements disclosed all do not need to be provided in a single embodiment, but rather can be provided in any desired combination of elements where desired. It will also be appreciated that a system in accordance with the invention can be constructed in whole or in part from special purpose hardware or from conventional general purpose hardware or any combination thereof, any portion of which may be controlled by a suitable program. Any program may in whole or in part comprise part of or be stored on a system in a conventional manner, or remain whole or in part be provided into the system over a network or other mechanism for transferring information in a conventional manner. Accordingly, it is understood that the above description of the present invention is susceptible to considerable modifications, changes and adaptation by those skilled in the art, and that such modifications, changes and adaptations are intended to be considered within the scope of the present invention, which is set forth by the appended claims. The invention having been described, it will be apparent to those skilled in the art that the same may be varied in many ways without departing from the spirit and scope of the invention. Any and all such modifications are intended to be included within the scope of the following claims.

Claims

1. A method to utilize the existing DVD-Player architecture where the DVD-Drive becomes optional and additional network circuitry is added so the content may be accessed remotely.

2. A method to generate navigation data (IFO) and video/audio (VOB) content dynamically on a server and have this data be accessed by remote clients.

3. A method to accomplish thin client integration using conventional DVD-Player architecture. Thin client support allows applications to run remotely although they look, feel and perform as though they are running locally in the DVD-Player.

4. A method to reduce network infrastructure requirements dictated by high quality video/audio content.

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Abstract

To network enable a typical DVD-Player so content can be accessed from a remote computer (server)**.** The resultant system (client) would now be a network based entertainment system based on DVD-Player architecture.

Generate the remote content dynamically on the server to enrich the network based entertainment system. Dynamic content would allow the consumer to do purchase products and services, play games, select entertainment (movies, music, etc.), and surf the web via the modified DVD-Player.

Very thin client support may be accomplished by incorporating thin client software in the DVD-Player software. An optional wireless keyboard/mouse can be added to enhance the utility of the thin client software.

In order to receive high quality video/audio content on an unsuitable network the content can be separated into two or more data sources or streams. The client would be responsible for retrieving data from these sources and reconstructing the original content.

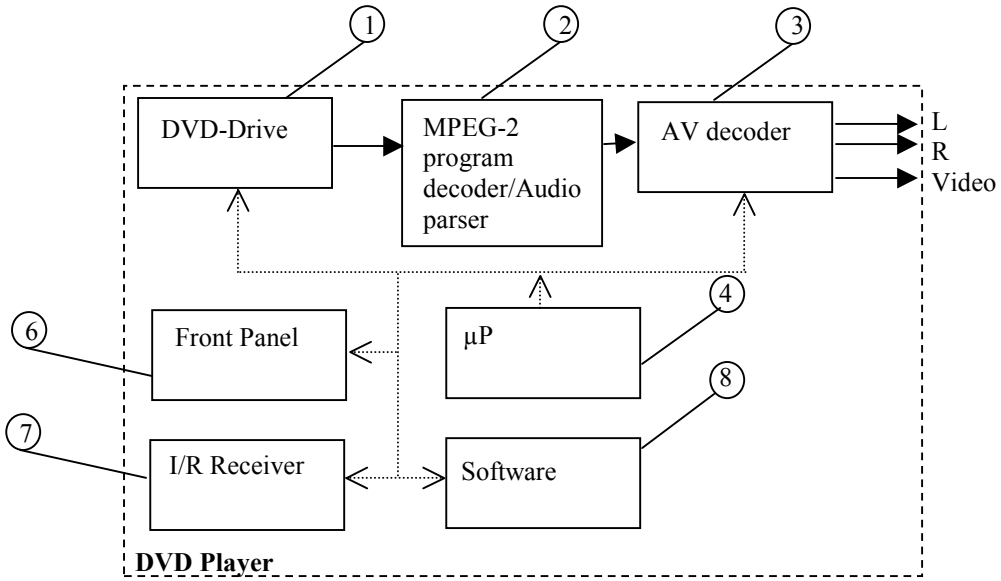

Figure 1

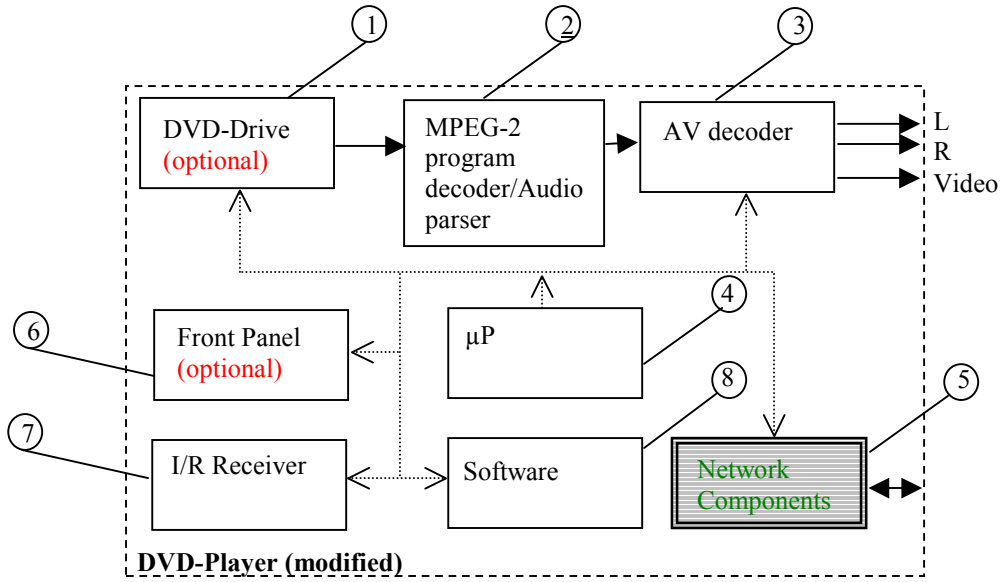

Figure 2

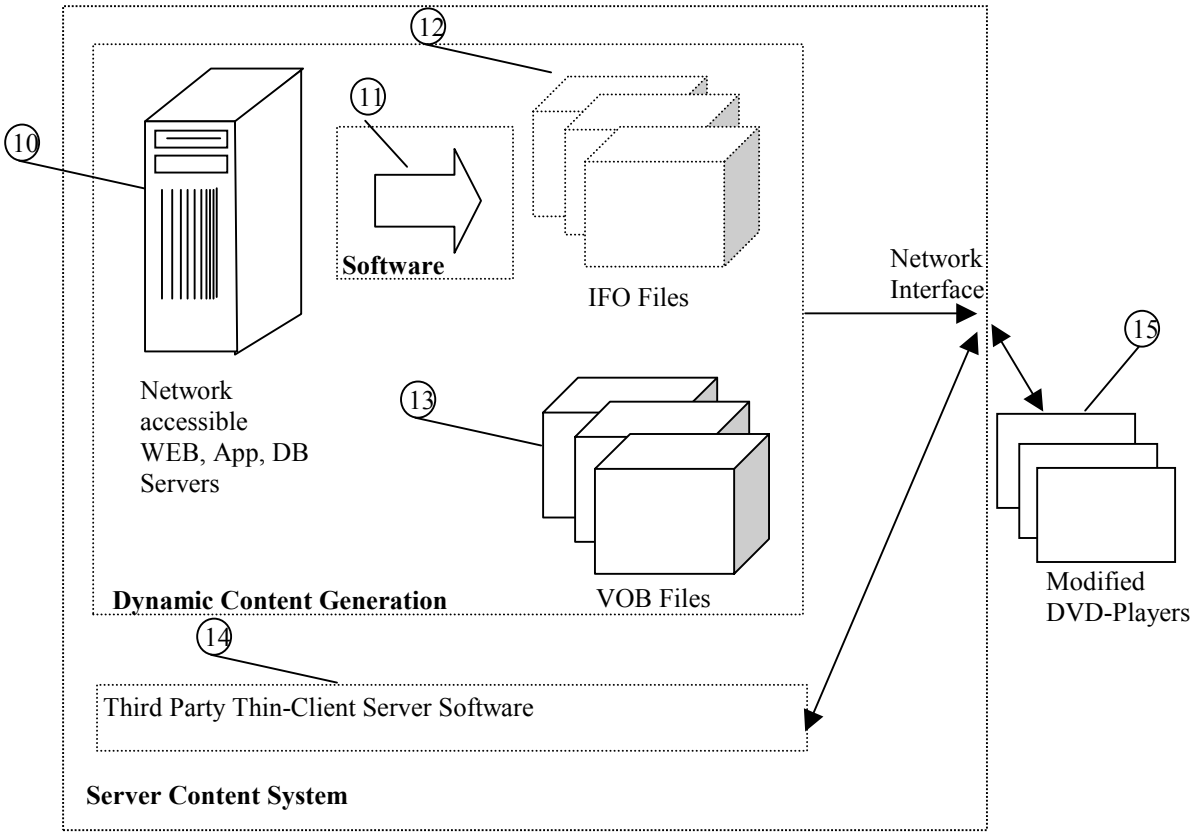
12
11
10
Software
IFO Files
Network
Interface
15
Network
accessible
WEB, App, DB
Servers
13
Modified
DVD-Players
Dynamic Content Generation
VOB Files
14
Third Party Thin-Client Server Software
Server Content System

Figure 3

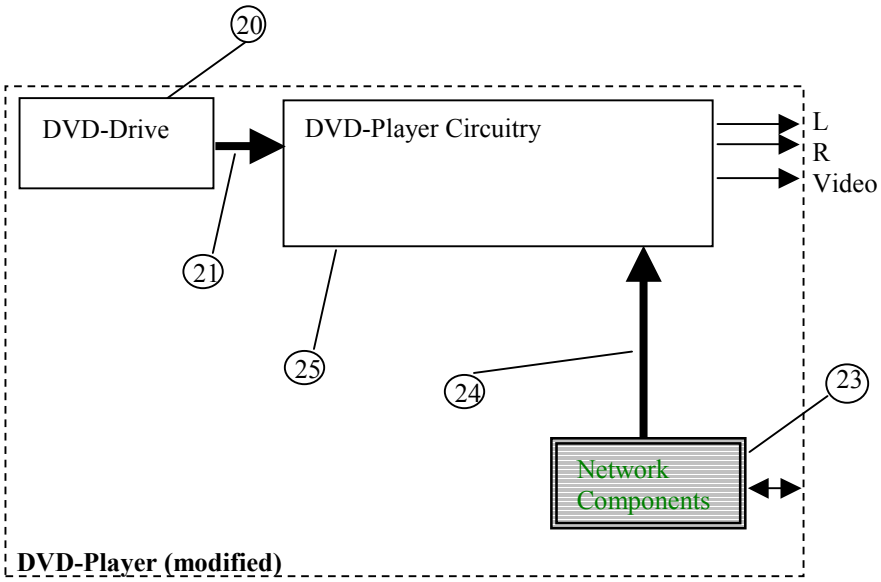
20
DVD-Drive
DVD-Player Circuitry
L
R
Video
21
25
24
23
Network
Components
DVD-Player (modified)

Figure 4