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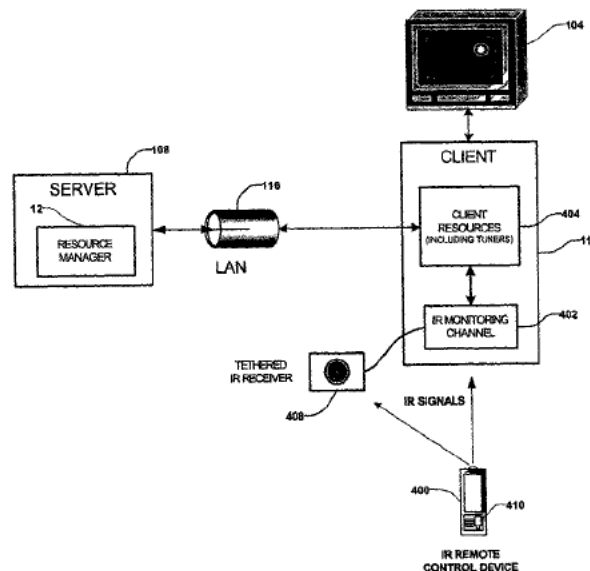
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(54) Title: CENTRALIZED RESOURCE MANAGER WITH PASSIVE SENSING SYSTEM



(57) Abstract: A centralized resource manager (300) for distributed networks manages resources available on the network, such as network bandwidth, CPU allocation, TV tuners (48), MPEG encoders (114), disk bandwidth, and input/output devices. The centralized resource manager (300) also allocates the resources of network clients (46) and a network-associated media server (14), in response to requests for media services via the distributed network. The centralized resource manager may include means for discovering when devices are added or removed from the network; a current, IR, or electromagnetic Field sensing system for determining when video devices are turned off so that resources associated with any device not in use may be reallocated elsewhere; or a power switching system (307) for controlling the ON or OFF state of such devices so that resources associated with any device in the OFF state may be reallocated elsewhere.



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# CENTRALIZED RESOURCE MANAGER WITH PASSIVE SENSING SYSTEM

## PRIORITY CLAIM

5 The present patent application claims priority of the following co-pending, commonly owned patent applications:

60/323,618 filed September 20, 2001 (Atty. Dkt. UCN-016);  
60/350,431 filed January 19, 2002 (Atty. Dkt. UCN-019); and  
10 60/372,490 filed April 12, 2002 (Atty. Dkt. UCN-032).

## INCORPORATION BY REFERENCE

15 The present application for United States Patent claims the benefit of and incorporates herein by reference the contents of the following commonly owned U.S. Patent Applications:

09/365,726 filed August 3, 1999, entitled "Multi-Service In-Home Network With an Open Interface";

09/809,770 (Atty. Dkt. UCN-006) filed March 16, 2001, entitled "Home  
20 Area Network Including Arrangement for Distributing Television Programming Over Local Cable";

60/193,813, filed March 31, 2000, entitled "Home Area Network";

60/313,209 (Atty. Dkt. UCN-011), filed August 17, 2001, entitled  
"Delivering Multimedia Over Home Area Networks";

25 60/313,228, filed August 17, 2001, entitled "Web Services Provisioning Architecture";

60/327,627 (Atty. Dkt. UCN-012), filed October 5, 2001, entitled "Home Area Network Centralized Video Recorder";

60/345,966 (Atty. Dkt. UCN-017), filed November 7, 2001, entitled "Digital Video Recording System Supporting Concurrent Playback Using Advanced Program Information";

5 10/017,675 (Atty. Dkt. UCN-018) filed December 15, 2001, entitled "Centralized Digital Video Recording and Playback System Accessible To Multiple Reproduction And Control Units Via A Home Area Network";

10/032,218 (Atty. Dkt. UCN-015) filed December 21, 2001, entitled "Digital Video Recording and Reproduction System And Method Suitable For Live-Pause Playback Utilizing Intelligent Buffer Memory Allocation";

10 60/323,618 (Atty. Dkt. UCN-016) filed September 20, 2001, entitled "Home Network Platform, Architecture and System";

60/350,431 (Atty. Dkt. UCN-019) filed January 18, 2002, entitled "Home Area Network Traffic Management with a Networked Personal Video Recorder";

15 60/350,431 (Atty. Dkt. UCN-032) filed April 11, 2002, entitled "Centralized Resource Manager.

### **FIELD OF THE INVENTION**

The present invention relates generally to home networks having multiple digital content storage, access and/or display elements, and in particular, relates  
20 to a centralized resource manager that utilizes a passive sensing mechanism to control, allocate and otherwise manage distributed network resources in such home networks.

### **BACKGROUND OF THE INVENTION**

25 The concept of linking multiple digital entertainment devices in a home network infrastructure has become widely accepted. It is now possible to interconnect a plurality of these devices -- including televisions and video recording devices, audio recording and playback devices, personal computers,  
30 and telephony devices -- in a network having sufficient bandwidth to distribute

media content (e.g., movies, audio/stereo) and data throughout a home, as desired by the individual users, so that the resources of the devices may be shared. However, the sharing of these multiple devices in a home-based network presents new problems in allocating and managing the resources of the various devices in an efficient manner.

Members of the Home Audio Video Interactive (HAVi) alliance have developed a protocol for dealing with distributed devices across a bus architecture (typically IEEE 1394 or FireWire), using concepts of resource management and reservation. Under the HAVi protocol, certain devices will allow partial or total reservation of their resources. These devices include their own local resource manager component. A device wishing to reserve resources will communicate with the local resource manager associated with that device. If another device has reserved these resources, the device requesting these resources may negotiate with the resource holder by communicating messages through the local resource manager of the device in question.

However, the HAVi methodology is limited in several ways. First, the device wishing to establish a complete media pipeline/session is responsible for establishing the reservations with each of the components. This is inefficient, and can possibly result in deadlock timing situations from competing reservation requests. Second, only devices on the network providing local resource managers may be reserved. There is no proxy device for reserving the resources of "dumb" devices (i.e., devices having no local resource manager associated therewith) on the network. Third, the distributed nature results in added complexity for each device that must support a local resource manager.

UPnP and Jini are similar resource discovery and control tools. Both of these lack any robust resource management tools. They are also implemented in a manner similar to HAVi, in that all devices are responsible for supporting the protocol, and support distributed, not centralized, interaction.

In addition, Tivo, ReplayTV, and others have developed personal video recording (PVR) products, which allow a user to digitally store television

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