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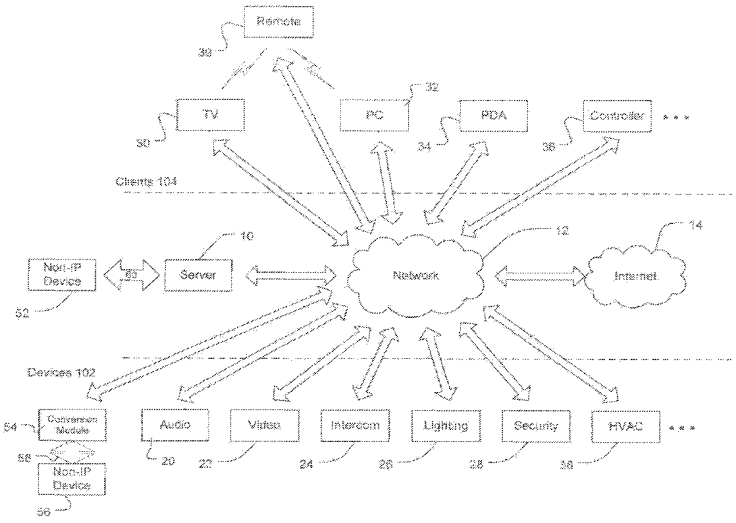
(54) Title: AUTOMATION CONTROL SYSTEM HAVING A CONFIGURATION TOOL AND TWO-WAY COMMUNICATION WITH A TOUCH-SCREEN DISPLAY



(57) Abstract: An automation system and process of operating an automation system in a Web Service environment, includes providing at least one client and at least one device, the at least one client and the at least one device configured with a web services for devices stack protocol, connecting a network includes at least one server with the web services for devices to the at least one client and the at least one device, and transmitting automation-based control and communication between the at least one client and at least one device, wherein the at least one client comprises one of a touch screen display and a handheld controller and the at least one device comprises an audio system, a video system, an intercom system, a lighting system, a security system, a link, and a HVAC system.

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AUTOMATION CONTROL SYSTEM HAVING A CONFIGURATION TOOL AND TWO-WAY COMMUNICATION WITH A TOUCH-SCREEN DISPLAY

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The invention is directed to multiple device control and convergence, and more particularly to multiple device addressing, discovery, description, control, eventing, and convergence in a Web Service environment, and control through an input device.

2. Related Art

[0002] Household, academic and/or business spaces now more commonly have more than one audio or video device such as CD/DVD player, portable MP3 player, tuner, preamp, power amp, speakers, VCR, DVR, computers running media players or connected to some other source of audio or video (e.g., Internet radio, satellite radio and the like), etc. Typically, a CD/DVD player from one company comes with its own remote control and an amplifier by an entirely different company comes with its own remote control. The same space may have a PC with its keyboard and mouse, and yet another company's portable MP3 player with its own control switches. While each audio device is doing precisely what it was designed to do, each operates completely independent from the others with the possible exception of the portable MP3 player that may be connected to a PC for synchronization. As a result, a user ends up going from one keypad to another or juggling a series of remote controls in order to control the devices.

[0003] Since these audio/video and similar devices are not designed to communicate with each other or their communication is very limited, access to these audio/video devices is limited by their physical locations. For example, it is difficult to play an MP3 file saved in a PC hard disk drive in one room or area (a child's bedroom) on speakers located in another room or area (an entertainment room). Thus, in order for a user to enjoy music of his or her choice whenever and wherever he or she wants, each room needs to be equipped with all the necessary audio/video equipment and digital audio/video content.

[0004] Also, the audio/video devices are not designed to communicate with other devices (e.g., TV, lighting, security system, etc.). Thus, it is difficult, if not impossible, to converge the devices for common control for certain occasions. For example, in order to watch a movie, the user must turn on a TV, a DVD player and an audio amplifier by using three different remote controls. Then the user must set the TV to receive a video signal

from the DVD player, set the audio amplifier to receive an audio signal from the DVD player and use another control unit to adjust the lighting of the room. Even when a user utilizes a universal remote, as is known in the art, the result is a plurality of devices that are separately operated and are operated separately from a single universal remote. These devices do not converge as described above because the devices lack any ability to easily connect and effectively communicate with each other, and be controlled by a single input device.

[0005] Accordingly, there is a need for a solution for the aforementioned accessibility, connectability and convergence issues to allow devices to connect, communicate and be controlled.

SUMMARY OF THE INVENTION

[0006] The invention meets the foregoing needs using an automation specific IP based automation protocol, which results in a significant increase in discovery and communications between devices along with an IP based input device and other advantages apparent from the discussion herein.

[0007] Accordingly, in one aspect of the invention, a process of operating an automation system in a Web Service environment includes the steps of providing at least one client and at least one device, the at least one client and the at least one device configured with a web services for devices stack protocol, connecting a network includes at least one server with the web services for devices to the at least one client and the at least one device, and transmitting automation-based control and communication between the at least one client and at least one device, wherein the at least one client comprises one of a touch screen display and a handheld controller and the at least one device comprises an audio system, a video system, an intercom system, a lighting system, a security system, a link, and a HVAC system.

[0008] One of the touch screen display and the handheld controller may include at least one of a LCD display, processor, wireless interface, wired interface, IR interface, audio system, inputs, support base, and knob. The at least one client further may include one of a TV, a personal computer, a personal digital assistant, and a game controller. The web services for devices stack protocol may include a services tier that provides communication via at least one of HTTP and UDP wherein the communication via HTTP and UDP may include information contained in SOAP packets, and a logical interface with the at least one client, and the web services for devices stack protocol may include a web service for each at least one device. The web services for devices stack protocol may include a service provider configured as a generic host for web services. The web

services for devices stack protocol further may include one of a component configured to host multiple services, and a controller configured to communicate with the at least one device and wherein the web services for devices stack protocol further may include a device bridge configured to translate commands for the devices. The controller may be configured to send feedback from the at least one device to the at least one client. The web services for devices stack protocol may be configured to communicate with the at least one device in a native format and the native format may include at least one of HTTP, TCP, UDP, and serial protocols. The web services for devices protocol may be configured to discover the at least one client and the discovery may include one of multicast announcements, multicast query requests, and unicast responses. The web services for devices protocol may be configured for description and the description may include at least one of WS-Metadata exchange, web services description language, and simple object access protocol/XML protocol. The web services for devices protocol may be configured for eventing and wherein the eventing may include at least one of web services description language for detailed events, a configuration for client subscription to events, and a configuration for the at least one device to push events to the at least one client.

[0009] Accordingly, in another aspect of the invention, a machine-readable medium includes instructions stored therewith, which, when executed by a processor cause the processor to establish an automation system in a Web Service environment, the machine-reachable medium includes instructions for providing automation-based control and communication between at least one client and at least one device, the at least one client and the at least one device configured with a web services for devices stack protocol configured to the at least one client and at least one device, and instructions for configuring a network includes at least one server to be connected to the at least one client and the at least one device with the web services for devices, wherein the at least one client may include one of a touch screen display and a handheld controller and the at least one device may include an audio system, a video system, an intercom system, a lighting system, a security system, a link, and a HVAC system.

[0010] One of the touch screen display and the handheld controller may include at least one of a LCD display, processor, wireless interface, wired interface, IR interface, audio system, inputs, support base, and knob. The at least one client further may include one of a TV, a personal computer, a personal digital assistant, and a game controller. The web services for devices stack protocol may include a services tier that provides communication via at least one of HTTP and UDP wherein the communication via HTTP and UDP comprises information contained in SOAP packets, and a logical interface with

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