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(54) Title: INTELLIGENT DEVICE CONNECTION FOR WIRELESS MEDIA ECOSYSTEM

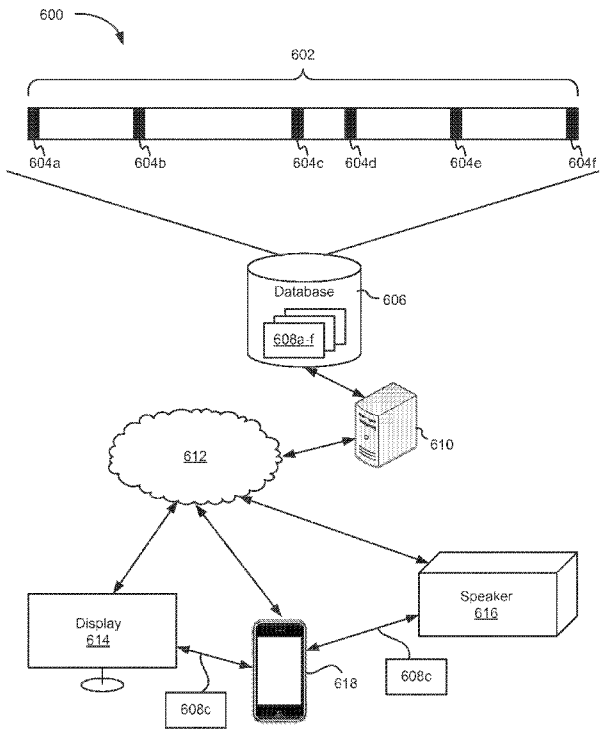


FIG. 6

(57) Abstract: Techniques associated with intelligent device connection for wireless media ecosystem are described, including receiving, by a media device, a first control signal from another media device implementing a connection awareness device, the first control signal configured to cause the media device to access data associated with playing a media content being played by the other media device, obtaining marker data from the other media device, the marker data representing a marker associated with the media content, retrieving content data from using the marker data, the content data configured to play the media content starting at a point indicated by the marker data, and sending a second control signal to the other media device, the second control signal configured to indicate a completion of synchronization with the other media device.

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# INTELLIGENT DEVICE CONNECTION FOR WIRELESS MEDIA ECOSYSTEM

## FIELD OF THE INVENTION

The invention relates generally to electrical and electronic hardware, computer software, wired and wireless network communications, and computing devices. More specifically, techniques for intelligent device connection for wireless media ecosystem are described.

## BACKGROUND OF THE INVENTION

Media content consumers are increasingly mobile, and yet conventional solutions for playing media, such as movies, music and other media content, typically are not well-suited for seamless enjoyment of such media across compatible devices (i.e., devices capable of playing the same media and communicating using a common protocol). In order to enjoy media content across conventional speakers, televisions, tablet computers, other mobile computing devices and portable media devices, manual download of the content is usually required, as well as manual switching of devices (i.e., turn one device or application on, turn another device or application off) and play control (i.e., start, stop, pause, rewind, fast forward). Not only does this require a user to consciously make the decision to switch from one device to another, such as switching from watching a movie on a mobile computing device to watching it on a larger screen television upon entering a room with such a television, but also requires significant manual manipulation of devices by the user in order to stop watching on the one device and to continue watching on another device from where the user left off.

Conventional solutions for playing media also are typically not well-suited for automatic, intelligent set up across a user's compatible devices. Typically, every time a user begins using a device, a manual process of setting up a user's account and preferences is required. Although there are conventional solutions for saving a user's account in the cloud, and downloading content and preferences associated with the account across multiple devices, such conventional solutions typically require a user to download particular software onto a computer (i.e., laptop or desktop), and to synchronize such data manually. A conventional device for playing media typically is not configured to automatically and intelligently communicate user account information, preferences, and current media playing activity information, to another conventional device.

Many conventional devices used for playing media also are used for receiving telephone or video conference calls, and in any given house or office, there can be multiple devices and types of devices configured to receive and connect telephone calls. However, such conventional devices are not well-suited for dynamically determining the availability of compatible devices and transferring automatically the audio and video data for a call from one device to another.

Thus, what is needed is a solution for an intelligent wireless media ecosystem without the limitations of conventional techniques.

## BRIEF DESCRIPTION OF THE DRAWINGS

Various embodiments of the invention are disclosed in the following detailed description and the accompanying drawings:

FIGs. 1A-1B illustrates an exemplary system of intelligent wireless media devices;

FIG. 2 illustrates another exemplary system of intelligent wireless media devices

FIG. 3 illustrates an exemplary architecture for a connection awareness device;

FIG. 4A illustrates an exemplary architecture for an intelligent communication facility;

FIG. 4B illustrates an exemplary synchronization of two devices for handing off an operation;

FIG. 5 illustrates an exemplary computing platform disposed in or associated with an connection awareness device;

FIG. 6 illustrates a diagram depicting an exemplary ecosystem of intelligent wireless media devices configured to exchange synchronization data;

FIG. 7 illustrates a diagram depicting another exemplary ecosystem of intelligent wireless media devices configured to exchange synchronization data; and

FIG 8 illustrates a flow for synchronizing a performance of an operation among intelligent wireless media devices.

Although the above-described drawings depict various examples of the invention, the invention is not limited by the depicted examples. It is to be understood that, in the drawings, like reference numerals designate like structural elements. Also, it is understood that the drawings are not necessarily to scale.

## DETAILED DESCRIPTION

Various embodiments or examples may be implemented in numerous ways, including as a system, a process, an apparatus, a user interface, or a series of program instructions on a computer readable medium such as a computer readable storage medium or a computer network where the program instructions are sent over optical, electronic, or wireless communication links. In general, operations of disclosed processes may be performed in an arbitrary order, unless otherwise provided in the claims.

A detailed description of one or more examples is provided below along with accompanying figures. The detailed description is provided in connection with such examples, but is not limited to any particular example. The scope is limited only by the claims and numerous alternatives, modifications, and equivalents are encompassed. Numerous specific

details are set forth in the following description in order to provide a thorough understanding. These details are provided for the purpose of example and the described techniques may be practiced according to the claims without some or all of these specific details. For clarity, technical material that is known in the technical fields related to the examples has not been described in detail to avoid unnecessarily obscuring the description.

In some examples, the described techniques may be implemented as a computer program or application ("application") or as a plug-in, module, or sub-component of another application. The described techniques may be implemented as software, hardware, firmware, circuitry, or a combination thereof. If implemented as software, then the described techniques may be implemented using various types of programming, development, scripting, or formatting languages, frameworks, syntax, applications, protocols, objects, or techniques, including ASP, ASP.net, .Net framework, Ruby, Ruby on Rails, C, Objective C, C++, C#, Adobe® Integrated Runtime™ (Adobe® AIR™), ActionScript™, Flex™, Lingo™, Java™, Javascript™, Ajax, Perl, COBOL, Fortran, ADA, XML, MXML, HTML, DHTML, XHTML, HTTP, XMPP, PHP, and others. Software and/or firmware implementations may be embodied in a non-transitory computer readable medium configured for execution by a general purpose computing system or the like. The described techniques may be varied and are not limited to the examples or descriptions provided.

Techniques for intelligent device connection for a wireless media ecosystem are described. As described herein, a wireless device may be implemented with a connection awareness device to dynamically connect (i.e., establish a connection using an available connection path, as described herein) with compatible devices, and seamlessly (i.e., substantially continuously or without interruption) transfer a function (e.g., audio or video input/output, media play control, or the like) from one compatible device to another. As used herein, "compatible media device" and "compatible device" may be used interchangeably to refer to one or more devices configured to communicate using at least one common communication protocol (i.e., IEEE 802.11a/b/g/n (WiFi), other wireless local area network (WLAN), WiMax, ANT™, ZigBee®, Bluetooth®, ultra wideband, near field communication (NFC), mobile broadband (e.g., 4G, 3G or the like), other cellular networks, and the like), and to support at least one common operation, for example, outputting audio and/or video from a telephone call or media file. In some examples, a compatible device may be configured to play at least one common media type or format (e.g., AVI, FLV, WMV, MOV, MP3, MP4, MSV, WAV, SWF, M4V, MJPEG, or the like). In another example, a common operation may be outputting audio from a telephone call. In some examples, a connection awareness device, as described herein, may be

configured to determine compatibility, as well as a proximity and location, of a compatible device. In some examples, a connection awareness device also may determine whether various other wireless devices are available and well suited for performing a function associated with an operation (e.g., telephone call, playing a media content, or the like) being performed by a compatible device, and to exchange data associated with said function to said wireless devices and said compatible device to seamlessly transfer said function from one device to another.

FIGs. 1A-1B illustrate exemplary systems of intelligent wireless media devices. Here, system 100 includes network 102, speaker 104, data-capable band (hereinafter "band") 106, mobile device 108, car 110, connection awareness device 112, display 114, and server 116. Here, speaker 104 may include connection awareness device 112 configured to detect proximity and location of a compatible media device and to automatically connect, and exchange data, with the compatible media device, as described herein (see FIGs. 3-4). In some examples, speaker 104 may be implemented as any device configured to output audio, and may include other functional capabilities (e.g., communication functions, device control functions, sensor functions, or the like), as described herein. In some examples, speaker 104 may be configured with a microphone to receive or capture audio input. In some examples, connection awareness device 112 may be configured with various sensors to capture a wide range of environmental data associated with a location of speaker 104, as described herein. In some examples, using connection awareness device 112, speaker 104 may be compatible with band 106, mobile device 108, and display 114. In some examples, speaker 104, band 106, mobile device 108, and various devices in car 110 (e.g., radio, Bluetooth® controller, or other input/output devices) may communicate with each other either directly, or using network 102 (e.g., cloud, Internet, local area network (LAN), cellular, satellite or the like). In some examples, connection awareness devices (not shown) similar to connection awareness device 112 may be implemented in each of data-capable band 106, mobile device 108, car 110, and display 114. In other examples, the quantity, type, function, structure, and configuration of the elements shown may be varied and are not limited to the examples provided.

In some examples, mobile device 108 may include both communication and computing capabilities, as well as media playing capabilities, and be configured for data communication using various types of communications infrastructure, including a wireless network connection (e.g., a wireless network interface card, wireless local area network ("LAN") card, or the like). For example, mobile device 108 may be configured to receive and carry telephone or video conference calls. In another example, mobile device 108 also may be configured with an operating system configured to run various applications (e.g., mobile applications, web

applications, and the like), including playing media content (e.g., radio, playlist, other music, movie, online video, other video, and the like) using various types of media players.

In some examples, band 106 may be configured as a portable (i.e., wearable) data capture device. In some examples, band 106 may be configured for data communication using various types of communications infrastructure, including a wireless network connection (e.g., a wireless network interface card, wireless local area network ("LAN") card, or the like). In some examples, band 106 may include various types of sensors (e.g., accelerometer, altimeter/barometer, light/infrared ("IR") sensor, pulse/heart rate ("HR") monitor, audio sensor (e.g., microphone, transducer, or others), pedometer, velocimeter, global positioning system (GPS) receiver, location-based service sensor (e.g., sensor for determining location within a cellular or micro-cellular network, which may or may not use GPS or other satellite constellations for fixing a position), motion detection sensor, environmental sensor, chemical sensor, electrical sensor, or mechanical sensor, and the like) for collecting local sensor data associated with a user. In some examples, band 106 may communicate sensor data to connection awareness device 112 and/or mobile device 108 for use in generating or modifying a set of user preferences (i.e., preferences associated with playing media or receiving telephone calls) associated with a user.

In some examples, a user may be moving from one area (i.e., car 110) to another area (i.e., a room with speaker 104 and display 114), while listening to, watching, or otherwise enjoying or participating in a media content. In system 100, the user may continuously enjoy or participate in the media content from one compatible device to another compatible device without interruption using connection awareness device 112, and other connection awareness devices that may be implemented on compatible devices, which may determine a proximity and location of a compatible device using a radio antenna and an intelligent communication facility, as described herein (see FIGs. 3-4). For example, a user may begin playing a playlist of songs in car 110 using mobile device 108 (e.g., mobile device 108 may play a playlist stored on mobile device 108, mobile device 108 may be accessing a playlist stored on server 116 using network 102, or the like) while driving. In this example, when a user exits car 110 and a connection between mobile device 108 and car 110 is lost (i.e., power in car 110 is turned off or mobile device 108 exceeds a threshold distance away from car 110), mobile device 108 may continue to play the playlist without interruption (i.e., substantially continuously, continuing at the same or substantially similar point in the playlist as when mobile device 108 lost a connection with car 110), for example, using speakers implemented on mobile device 108 or other output device (e.g., headphones, headset, or the like). In this example, a connection awareness device (not

shown), similar to connection awareness device 112 and other connection awareness devices described herein, may prompt the continuous, or substantially continuous, play of the playlist and direct the audio output to an available output device (e.g., said speakers, headphones, headset, or the like) automatically upon a loss of connection between mobile device 108 and car 110.

In another example, as a user carries mobile device 108 into a room while playing said playlist (or other media content) and comes within a threshold proximity of speaker 104, connection awareness device 112 may determine a proximity and a location of mobile device 108, and also may determine that mobile device 108 is a compatible device. In some examples, connection awareness device 112 also may determine that mobile device 108 is playing media content (i.e., the playlist) suitable, or better suited, to be played by speaker 104, and communicate with speaker 104 and mobile device 108 to continue playing the playlist on speaker 104 without interruption (e.g., connection awareness device 112 may send data to speaker 104 prompting speaker 104 to play the playlist beginning at a point in the playlist directly after or substantially at a point in the playlist to which mobile device 108 already has played, connection awareness device 112 may send data to mobile device 108 prompting mobile device 108 to discontinue outputting the media content to a prior output device (e.g., speakers implemented on mobile device 108, headphones, headset, or the like), connection awareness device 112 may receive data associated with the media content from mobile device 108, and/or connection awareness device 112 may send and receive other data to and from mobile device 108 and speaker 104). In some examples, a determination that speaker 104 is better suited to play media content may include determining whether there is another media content already being played by speaker 104, whether there are other compatible devices also in close proximity playing different media content, and/or whether other compatible devices also in close proximity are sending data to speaker 104 for output. In yet another example, a user may carry mobile device 108 into a room with speaker 104 and display 114 while playing video content suitable, or better suited, to be played by display 114. In this example, connection awareness device 112 may obtain data from mobile device 108 associated with the media content being played, and send data to display 114 prompting display 114 to turn on and to continue playing said video content without interruption. In this example, connection awareness device 112 also may send data to mobile device 108 prompting mobile device 108 to discontinue outputting the video to its own display. In other examples, some or all of these functions may be performed by another similar connection awareness device implemented on mobile device 108, in cooperation with speaker 104.

In still another example, a user may carry mobile device 108 into a room with speaker 104 while carrying on a telephone or video conference call using mobile device 108. Connection awareness device 112 may determine that mobile device 108 is within a threshold proximity to speaker 104 and/or display 114, and also may determine that mobile device 108 is a compatible device. In some examples, connection awareness device 112 also may determine that that speaker 104 and/or display 114 may be better suited to output the audio and/or video from the telephone or video conference call being conducted using mobile device 108, and may communicate with mobile device 108 speaker 104 and/or display 114 to output the call audio and/or video to speaker 104 and/or display 114 (e.g., connection awareness device 112 may send and receive data associated with audio and video output associated with the call to and from mobile device 108, connection awareness device 112 may send data associated with said audio and video output to speaker 104 and display 114, and connection awareness device 112 may send and receive other data associated with the call to and from mobile device 108, speaker 104 and display 114). In still other examples, the quantity, type, function, structure, and configuration of the elements shown may be varied and are not limited to the examples provided.

FIG. 1B illustrates another exemplary system of intelligent wireless media devices. Here, system 120 includes user 122, mobile device 124, car 126, cell tower 128, house 130, WiFi router 132, television 134, speaker 136, connection awareness devices 138-142, communications facility 144, satellite 146 and application 148. Like-numbered and named elements may describe the same or substantially similar elements as those shown in other descriptions. In some examples, television 134 and speaker 136 may be implemented as any device capable of audio, video and/or other output (i.e., output devices). In some examples, connection awareness device 138 may be coupled to television 134, and connection awareness device 140 may be coupled to speaker 136. In some examples, connection awareness device 142 may be implemented in mobile device 124, and may include communications facility 144. In some examples, communications facility 144 may be implemented similarly to an intelligent communication facility (e.g., intelligent communication facility 308 in FIG. 3, intelligent communication facility 400 in FIG. 4, or the like), as described herein. In some examples, mobile device 124 also may implement application 148, configured to perform an operation, for example, streaming satellite radio, that car 126 also is configured to perform. In some examples, user 122 may move through various zones, each zone providing a different device with different connection capabilities for performing an operation or function. For example, in Zone 1, car 126 may have various communication capabilities (e.g., satellite, Bluetooth®, NFC, or the like), and may be streaming radio using satellite 146. As user 122 moves away from car 126, mobile device 124 may detect

an increase in distance (i.e., decrease in proximity) from car 126, and using connection awareness device 142, may access data from car 126 to determine which media content is being played by car 126, for example, a satellite radio content. In some examples, said data from car 126 may include an indication of a point in the media content at which to pick up playing (e.g., using a marker, as described herein). In some examples, connection awareness device 142, using communication facility 144, may provide said data associated with said satellite radio content to application 148, which may be configured to access the same satellite radio station using a mobile broadband connection provided by cell tower 128 in Zone 2.

In another example, in Zone 3, house 130 may be equipped with WiFi router 132, using which television 134, speaker 136, and other devices in house 130, may access the Internet, satellite, or other remote data. As user 122 moves from Zone 2 into Zone 3, for example, into a room with speaker 136 and connection awareness device 140, connection awareness devices 140 and 142 may detect an increasing proximity between mobile device 124 and speaker 136. In some examples, connection awareness device 140 and/or 142 also may determine that speaker 136 is well suited to perform an operation (e.g., playing satellite radio content, and outputting audio, or the like) being performed by mobile device 124 using application 148, and that speaker 136 also has an available connection path (i.e., using WiFi router 132) for accessing remote data associated with said operation. In some examples, connection awareness device 140 and/or 142 may exchange data between mobile device 124 and speaker 136 to transfer said operation, for example, playing satellite radio content, from mobile device 124 to speaker 136, and to synchronize them (see FIG. 4B) for user 122's uninterrupted enjoyment of the media content.

In yet other examples, mobile device 124 may be using application 148 to play media content involving both video and audio output (e.g., a movie, television show, online video, or the like). User 122 may move into a room where mobile device 124 and television 134 come within a threshold proximity (e.g., close enough to exchange data associated with the media content being played), and connection awareness device 138 may detect the proximity and location of mobile device 124. In some examples, once connection awareness device 138 detects a proximity and compatibility of mobile device 124, connection awareness device 138 may be prompted automatically to exchange data with mobile device 124, as described herein, to determine whether mobile device 124 is performing an operation for which television 134 may be better suited to perform, and to access data from mobile device 124 to transfer said operation, for example, playing a video, from mobile device 124 to television 134, and to synchronize them (see FIG. 4B) for user 122's uninterrupted enjoyment of the media content. In other examples,

the quantity, type, function, structure, and configuration of the elements shown may be varied and are not limited to the examples provided.

FIG. 2 illustrates another exemplary system of intelligent wireless media devices. Here, system 200 includes room 202-208, speakers 210-212, display 214, connection awareness devices 216-220, users 222-224, mobile device 226 and headset 228. Like-numbered and named elements may describe the same or substantially similar elements as those shown in other descriptions. In some examples, user 222 may move from room to room (e.g., rooms 202-208) carrying mobile device 226, and experience media content being played using mobile device 226 on various output devices (e.g., speakers 210-212 and display 214) as user 222 comes into proximity with each of the various output devices. In an example, when user 22 walks from room 202 to room 204 and carries mobile device 226 within a threshold proximity of speaker 210, connection awareness device 216 may determine whether mobile device 226 is a compatible device, as described herein, further determine whether mobile device 226 is playing music (e.g., a playlist, album, or the like), and exchange data with mobile device 226 and speaker 210 to switch audio output for said music to speaker 210 (i.e., without interruption, as described herein). In another example, when user 222 walks into room 204 while on a telephone call using mobile device 226 with audio input/output to headset 228, connection awareness device 216 may exchange data with mobile device 226 to determine compatibility, as described herein, further determine there is no one else in room 204, and exchange data with mobile device 226 and speaker 210 to transfer the call's audio input/output function to speaker 210. In still another example, when user 222 walks into room 206 while on a video call using mobile device 226, connection awareness device 220 may exchange data with mobile device 226 to determine compatibility, as described herein, further determine there is no one else in room 204, and exchange data with mobile device 226 and display 214 to transfer the call's video input/output function to display 214 (i.e., without interruption, as described herein). In some examples, display 214 also may be configured with compatible audio input/output capabilities, in which case connection awareness device 220 also may exchange data with mobile device 226 and display 214 to transfer the call's audio input/output function to display 214 as well. In yet another example, when user 222 walks into room 208 while on a telephone call using mobile device 226 with audio input/output to headset 228, connection awareness device 218 may exchange data with mobile device 226 to determine compatibility, as described herein, and further determine that another person (i.e., user 224) is in the room. In some examples, connection awareness device 218 may be configured with one or more sensors (e.g., sensor 318 in FIG. 3) for determining a presence of another person in a room, as described herein. In other

examples, connection awareness device 218 may be configured to determine a presence of another person in a room by detecting a wireless device (not shown) configured with a user profile, as described below, associated with a different user (e.g., user 224). In some examples, connection awareness device 218 may determine based on a presence of user 224 in room 208 that speaker 212 is not well suited for outputting audio from user 222's telephone call. In other examples, connection awareness device 218 further may be configured to determine that speaker 212 already is in use (i.e., outputting other audio), and thus is not available or suitable to output audio associated with user 222's telephone call. In still other examples, the quantity, type, function, structure, and configuration of the elements shown may be varied and are not limited to the examples provided.

FIG. 3 illustrates an exemplary architecture for a connection awareness device. Here, connection awareness device 300 includes antenna 302, connection path module 304, media configuration module 306, intelligent communication facility 308, logic 310, memory 312, sensor 318, and may be configured to communicate with wireless device 314 and user interface 316. Like-numbered and named elements may describe the same or substantially similar elements as those shown in other descriptions. In some examples, antenna 302 may be configured to detect, sense or receive radio signals or energy (i.e., electromagnetic radiation), for example, emitted from wireless device 314 or other wireless device (e.g., mobile device 108, band 106 and display 114 in FIG. 1, speakers 210-212, display 214, mobile device 226 and headset 228 in FIG. 2, or the like). In some examples, wireless device 314 may be any device capable of communicating with another device using radio signals, including accessing a network (e.g., network 102 in FIG. 1). In some examples, wireless device 314 may be a compatible device, as described herein. In some examples, antenna 302 may be implemented as a receiver, transmitter, or transceiver, configured to detect and generate radio waves, for example, to and from electrical signals. In some examples, antenna 302 may be configured to detect radio signals across a broad spectrum, including licensed and unlicensed bands (e.g., WiFi, Bluetooth®, NFC, ultra wideband, or other bands). In some examples, antenna 302 may be configured to generate data associated with a radio signal or energy from wireless device 314, or other wireless devices (e.g., speaker 104, band 106, mobile device 108 and display 114 in FIG. 1, speakers 210-212, display 214, mobile device 226 and headset 228 in FIG. 2, and the like), including proximity data (i.e., data associated with a proximity of wireless device 314) and location data (i.e., data associated with a location (e.g., direction, position, either in a room or other environment, and the like) of wireless device 314). In some examples, antenna 302 may determine a proximity of wireless device 314 using a strength (i.e., intensity or magnitude) of a

radio signal or energy emitted by wireless device 314, for example, as may be caused by a wireless data exchange being performed by wireless device 314 (e.g., downloading an electronic mail message ("email"), receiving a push notification, sensing a Bluetooth® or WiFi signal, or the like). In some examples, antenna 302 may be configured to generate, and communicate to intelligent communication facility 308, data associated with a proximity and location of wireless device 314. As used herein, "facility" refers to any, some, or all of the features and structures that are used to implement a given set of functions (see, e.g., intelligent communication facility 400 in FIG. 4). In some examples, intelligent communication facility 308 may be configured to communicate with wireless device 314 automatically once wireless device 314 comes within a certain threshold proximity of connection awareness device 300, and makes this threshold proximity determination using data gathered by antenna 302.

In some examples, connection path module 304 may be configured to determine available connection paths (i.e., WiFi, other WLAN, WiMax, ANT™, ZigBee®, Bluetooth®, ultra wideband, NFC, mobile broadband, other cellular networks, and the like). As used herein, the terms "connection path" and "communication path" may be used interchangeably to refer to a path, mode, method, or protocol for sending, receiving, or otherwise exchanging data, for example, wirelessly. In an example, connection path module 304 may be configured to detect the availability of a WiFi network, Bluetooth® network, cellular network, or other wireless networks. In some examples, connection path module 304 may be configured to detect multipoint connection paths, for example, connection paths using two or more networks. For example, connection path module 304 may determine that connection awareness device 300 is in a Bluetooth® hotspot (i.e., a Bluetooth® network is readily accessible to connection awareness device 300), and also determine that another network (e.g., WiFi, ultra wideband, or the like), which may better serve the data exchange requirements of connection awareness device 300 (or another device coupled to connection awareness device (not shown)), may be accessible using the Bluetooth® network. In another example, NFC may be used to establish a Bluetooth® connection. In some examples, connection path module 304 may be configured to detect and adjust to changing connection paths when different connection paths become available to connection awareness device 300. For example, if a WiFi network disappears, but a different network becomes available (e.g., cellular, ultra wideband, or the like), connection path module 304 may dynamically change from a connection path to another connection path, including adjusting one or more connections in a multipoint connection path, as connection awareness device 300 continues to exchange or stream data.

In some examples, media configuration module 306 may be configured to generate, capture or otherwise obtain media preferences associated with a user. In some examples, a set of media preferences may be generated and stored (e.g., in memory 312 in FIG. 3, or in memory 506 or storage device 508 in FIG. 5, or the like) in association with a user account (i.e., with a user). A user account may include a user profile, which may include a user's media preferences. In some examples, identification data associated with a user also may be stored with a user profile or user account.

In some examples, media configuration module 306 may generate user preferences using user interface 316, which may be implemented on a device coupled to connection awareness device 300. For example, connection awareness device 300 may be coupled to a speaker (e.g., speaker 104 in FIG. 1, speakers 210-212 in FIG. 2, or the like) or other output device (e.g., display 114 or mobile device 108 in FIG. 1, display 214 or mobile device 226 in FIG. 2, or the like), which may implement user interface 316 using audio (e.g., questions asked and answered audibly, other noise prompts, or the like), visual (e.g., using LED, touchscreen or other types of interactive displays), or tactile (e.g., buttons, switches and the like) cues and prompts, or any combination thereof. In other examples, media configuration module 306 may be configured to receive data from intelligent communication facility 308 associated with wireless device 314, and with user preferences stored or accessed by wireless device 314. In this example, media configuration module 306 may be configured to determine automatically, using intelligent communication facility 308, whether wireless device 314 has access to any user preference data not already generated or captured by media configuration module 306 for a user, and to automatically download any such new user preference data. For example, when a user creates a playlist, or otherwise indicate new song preferences, using wireless device 314, media configuration module 306 may access or download said playlist and new song preferences using intelligent communication facility 308 when wireless device 314 comes within a threshold proximity of connection awareness device 300. In still other examples, media configuration module 306 may generate user preferences using sensor 318, which may include one or more sensors configured to capture data associated with a user's location and environment (e.g., light/infrared ("IR") sensor, audio sensor (e.g., microphone, transducer, or others), global positioning system (GPS) receiver, location-based service sensor (e.g., sensor for determining location within a cellular or micro-cellular network, which may or may not use GPS or other satellite constellations for fixing a position), motion detection sensor, environmental sensor, chemical sensor, or the like). For example, media configuration module 306 may use sensor 318 to determine that connection awareness device 300 is located in a user's home, and also to

capture data associated with various aspects of the user's home, including noise level, types of sounds, levels of light, motion activity, or other environmental characteristics. Such data also may be used by media configuration module 306 to inform various user media preferences (e.g., brightness level for playing video content, volume level for playing audio content, or the like). In some examples, user preferences generated, captured, downloaded, or otherwise obtained by media configuration module 306 may be saved in memory 312 or in other storage (e.g., memory 506 or storage device 508 in FIG. 5). In still other examples, the quantity, type, function, structure, and configuration of the elements shown may be varied and are not limited to the examples provided.

In some examples, intelligent communication facility 308 may be configured to communicate automatically with compatible devices, including determining whether another device (e.g., wireless device 314) is compatible. For example, intelligent communication facility 308 may receive data from antenna 302 indicating that wireless device 314 is within a threshold proximity of connection awareness device 300, or an output device (e.g., speaker 104 and display 114 in FIG. 1, speakers 210-212 and display 214 in FIG. 2, media player 418 in FIG. 4, or the like) coupled to connection awareness device 300, which may automatically prompt intelligent communication facility 308 to send data to wireless device 314 to determine compatibility (e.g., to determine whether wireless device 314 has common communication capabilities, which types of communication capabilities wireless device 314 has in common with connection awareness device 300, whether wireless device 314 and connection awareness device 300 (or any device coupled to connection awareness device 300) have any common operational capabilities (e.g., connecting a telephone or video call, outputting audio or video from a telephone or video call, playing a type of media, or the like), operate any common or compatible software, and the like). In some examples, upon determining wireless device 314 to be a compatible device, intelligent communication facility 308 also may be configured to exchange data automatically with wireless device 314 to determine any current operation being performed by wireless device 314 (e.g., a telephone or video call, playing music, playing a movie or other video, and the like), and also to determine whether another output device (e.g., speaker 104 and display 114 in FIG. 1, speakers 210-212 and display 214 in FIG. 2, media player 418 in FIG. 4, or the like) may be better suited to perform a function associated with the operation being performed by wireless device 314 (e.g., output audio, output video, connect a call to an ongoing conference call, or the like). In some examples, intelligent communication facility 308 may be configured to make a determination whether an available output device is better suited to perform a function associated with an operation being performed by wireless device 314 using

data generated by antenna 302, connection path module 304, media configuration module 306 and sensor 318. For example, antenna 302 may provide data indicating other wireless devices also are within a threshold proximity, which may prompt intelligent communication facility 308 to determine whether such other wireless devices are being used by different users, indicating a presence of other people. In another example, a presence of other people in a room may be determined using sensor 318, which may capture data indicating a high level of motion. In still other examples, the quantity, type, function, structure, and configuration of the elements shown may be varied and are not limited to the examples provided.

In some examples, upon determining that an available output device may be better suited to perform a function associated with an operation being performed by wireless device 314, intelligent communication facility 308 may be configured to exchange data with wireless device 314 and with an available output device (e.g., speaker 104 and display 114 in FIG. 1, speakers 210-212 and display 214 in FIG. 2, media player 418 in FIG. 4, or the like) to transfer said function from wireless device 314 to said available output device. For example, intelligent communication facility 308 may send data to said available output device to turn on a desired functionality, obtain output data from wireless device 314 associated with an operation being performed, and route said output data to said available output device. In some examples, intelligent communication facility 308 may be configured to use data from sensor 318 to determine a volume level, brightness level, or other characteristic associated with said output data being routed to said available output device. For example, sensor 318 may capture data associated with light and noise levels in a room, which may indicate a time of day or level of activity (e.g., if a noise level in a room is low, intelligent communication facility 308 may adjust a volume of audio output from a speaker, or if a light level in a room is low, intelligent communication facility 308 may adjust a brightness of video output from a display, and the like).

In some examples, logic 310 may be implemented as firmware or application software that is installed in a memory (e.g., memory 312, memory 506 in FIG. 5, or the like) and executed by a processor (e.g., processor 504 in FIG. 5). Included in logic 310 may be program instructions or code (e.g., source, object, binary executables, or others) that, when initiated, called, or instantiated, perform various functions. In some examples, logic 310 may provide control functions and signals to other components of connection awareness device 300, including to antenna 302, connection path module 304, media configuration module 306, intelligent communication facility 308, sensor 318, or other components. For example, logic 310 may be configured to send control signals to intelligent communication facility 308 to transfer, transmit, or receive data, to and from antenna 302, connection path module 304, media configuration

module 306, or a memory (e.g., memory 312, memory 506 in FIG. 5, or the like). In other examples, the quantity, type, function, structure, and configuration of the elements shown may be varied and are not limited to the examples provided.

FIG. 4A illustrates an exemplary architecture for an intelligent communication facility. Here, intelligent communication facility 400 includes device compatibility module 402, device proximity module 404, media preferences module 406, communication facility 408, media play controller 410, and may be configured to communicate or interface with antenna 412, wireless device 414, media configuration module 416 and media player 418. Like-numbered and named elements may describe the same or substantially similar elements as those shown in other descriptions. In some examples, device proximity module 404 may be configured to determine whether wireless device 414 (or other wireless device, as described herein) has crossed a threshold proximity, using data from antenna 412 (i.e., implemented in a connection awareness device, as described herein) indicating a proximity and/or location of wireless device 414. In some examples, device proximity module 404 may be configured to determine whether wireless device 414 is entering within a proximity threshold (i.e., coming closer) or exiting a proximity threshold (i.e., moving away). In some examples, device compatibility module 402 may be configured to compare data received from wireless device 414 associated with communication and operational capabilities of wireless device 414 with data associated with communication and operational capabilities of other available wireless devices coupled to intelligent communication facility 400 (e.g., media player 418, or other wireless devices, as described herein). For example, device compatibility module 402 may receive data indicating wireless device 414 has WiFi communication capabilities and compare such data with stored data indicating intelligent communication facility 400 also has WiFi communication capabilities to determine that intelligent communication facility 400 and wireless device 414 are compatible to exchange data. In another example, device compatibility module 402 may access data indicating wireless device 414 has an ability to play a video format and that media player 418 also has an ability to play a video format to determine that wireless device 414 and media player 418 are compatible to output video using said video format. In other examples, the quantity, type, function, structure, and configuration of the elements shown may be varied and are not limited to the examples provided.

In some examples, media preferences module 406 may be configured to exchange media preference data with media configuration module 416 (i.e., implemented in a connection awareness device, as described herein). In some examples, media preferences module 406 may be configured to obtain data associated with media preferences stored or accessible by wireless

device 414, and to route such data to media configuration module 416 for processing. In some examples, media preferences module 406 may be prompted by media configuration module 416 to exchange data associated with a user's media preferences with wireless device 414. In some examples, various exchanges of data between intelligent communication facility 400 and other devices (e.g., wireless device 414, media player 418, and the like) may be carried out using communication facility 408. For example, communications facility 408 may include a wireless radio, control circuit or logic, antenna, transceiver, receiver, transmitter, resistors, diodes, transistors, or other elements that are used to transmit and receive data. In some examples, communications facility 408 may be implemented to provide a wireless data communication capability to transmit digitally encoded data across one or more frequencies using various types of data communication protocols, without limitation.

In some examples, media play controller 410 may be configured to generate and send control signals to media player 418, the control signals configured to turn on and control desired functionality for playing media content. For example, media play controller 410 may obtain data from wireless device 414 associated with media content being played by wireless device 414, the data including a marker indicating a point in, or portion of, the media content being played by the wireless device. In some examples, media play controller 410 may be configured to send data to media player 418, the data including the media content and the marker, and configured to cause the media player to begin playing the media content at a point indicated by the marker. In some examples, media play controller 410 may exchange data with media player 418 through communication facility 408. In other examples, wireless device 414 may maintain play control of a media content being played, and communication facility 408 may be configured to route audio and video output data from wireless device 414 to media player 418. In still other examples, the quantity, type, function, structure, and configuration of the elements shown may be varied and are not limited to the examples provided.

FIG. 4B illustrates a diagram of an exemplary synchronization of two devices for handing off an operation. Here, diagram 420 includes speaker 422, mobile device 424, media content 426, media content portions 428 and 430, connection awareness device 432, and intelligent communications facility 434. In some examples, connection awareness device 432 may be coupled to, or implemented with, speaker 422. In some examples, speaker 422 may be implemented as any device operable to output audio data. In other examples, mobile device 424 may be synchronized with a different type of device, for example, a television, a display, or other output device. In some examples, connection awareness device 432 may be in data communication with mobile device 424, and may be configured to synchronize mobile device

424 with speaker 422 to seamlessly (i.e., without interruption) transfer the data streaming operation from mobile device 424 to speaker 422. For example, mobile device 424 may be streaming media content 426, and media content portion 428 may represent the portion of media currently being played by mobile device 424. In this example, data provided to mobile device 424 from the source of media content 426 may include a marker indicating a point in, or portion of, media content 426 represented by media content portion 428 (i.e., indicating a point in media content 426 being played, or about to be played (e.g., within a predetermined range of milliseconds, nanoseconds, picoseconds, or other predetermined range of time), by mobile device 424), or otherwise describing media content portion 428. In some examples, intelligent communication facility 434 may include a controller (e.g., media play controller 410, or the like) configured to send a control signal to speaker 422 to begin performing an operation, for example, streaming media content 426. In an example, speaker 422 may pick up streaming media content 426 at media content portion 430. In some examples, intelligent communication facility 434 may be configured to access data from mobile device 424 associated with media content portion 428 (i.e., including a marker associated with media content portion 428) and to synchronize the media content being streamed by speaker 422 (e.g., media content portion 430) with media content portion 428 (e.g., by delaying speaker 422's playing of media content portion 430 until a marker associated with media content portion 430 is reached by mobile device 424, or the like), such that speaker 422 picks up streaming the media content from mobile device 424 without interruption. In some examples, intelligent communication facility 434 also may be configured to send a control signal to mobile device 424 to stop playing and/or streaming said media content picked up by speaker 422. In other examples, the quantity, type, function, structure, and configuration of the elements shown may be varied and are not limited to the examples provided.

FIG. 5 illustrates an exemplary computing platform disposed in or associated with a connection awareness device. In some examples, computing platform 500 may be used to implement computer programs, applications, methods, processes, algorithms, or other software to perform the above-described techniques. Computing platform 500 includes a bus 502 or other communication mechanism for communicating information, which interconnects subsystems and devices, such as processor 504, system memory 506 (e.g., RAM, etc.), storage device 508 (e.g., ROM, etc.), a communication interface 513 (e.g., an Ethernet or wireless controller, a Bluetooth controller, etc.) to facilitate communications via a port on communication link 521 to communicate, for example, with a computing device, including mobile computing and/or communication devices with processors. Processor 504 can be implemented with one or more central processing units ("CPUs"), such as those manufactured by Intel® Corporation, or one or

more virtual processors, as well as any combination of CPUs and virtual processors. Computing platform 500 exchanges data representing inputs and outputs via input-and-output devices 501, including, but not limited to, keyboards, mice, audio inputs (e.g., speech-to-text devices), user interfaces, displays, monitors, cursors, touch-sensitive displays, LCD or LED displays, speakers, media players and other I/O-related devices.

According to some examples, computing platform 500 performs specific operations by processor 504 executing one or more sequences of one or more instructions stored in system memory 506, and computing platform 500 can be implemented in a client-server arrangement, peer-to-peer arrangement, or as any mobile computing device, including smart phones and the like. Such instructions or data may be read into system memory 506 from another computer readable medium, such as storage device 508. In some examples, hard-wired circuitry may be used in place of or in combination with software instructions for implementation. Instructions may be embedded in software or firmware. The term "computer readable medium" refers to any non-transitory medium that participates in providing instructions to processor 504 for execution. Such a medium may take many forms, including but not limited to, non-volatile media and volatile media. Non-volatile media includes, for example, optical or magnetic disks and the like. Volatile media includes dynamic memory, such as system memory 506.

Common forms of computer readable media includes, for example, floppy disk, flexible disk, hard disk, magnetic tape, any other magnetic medium, CD-ROM, any other optical medium, punch cards, paper tape, any other physical medium with patterns of holes, RAM, PROM, EPROM, FLASH-EPROM, any other memory chip or cartridge, or any other medium from which a computer can read. Instructions may further be transmitted or received using a transmission medium. The term "transmission medium" may include any tangible or intangible medium that is capable of storing, encoding or carrying instructions for execution by the machine, and includes digital or analog communications signals or other intangible medium to facilitate communication of such instructions. Transmission media includes coaxial cables, copper wire, and fiber optics, including wires that comprise bus 502 for transmitting a computer data signal.

In some examples, execution of the sequences of instructions may be performed by computing platform 500. According to some examples, computing platform 500 can be coupled by communication link 521 (e.g., a wired network, such as LAN, PSTN, or any wireless network) to any other processor to perform the sequence of instructions in coordination with (or asynchronous to) one another. Computing platform 500 may transmit and receive messages, data, and instructions, including program code (e.g., application code) through communication

link 521 and communication interface 513. Received program code may be executed by processor 504 as it is received, and/or stored in memory 506 or other non-volatile storage for later execution.

In the example shown, system memory 506 can include various modules that include executable instructions to implement functionalities described herein. In the example shown, system memory 506 includes a media configuration learning module 510 configured to determine media preferences using input from various sources, including sensors (e.g., sensors 314 in FIG. 3, or as may be implemented in band 106 in FIG. 1, or the like), manual input (i.e., using a user interface), or from compatible devices, as described herein. System memory 506 also may include intelligent communication module 512, which may be configured to provide one or more of the intelligent communication functions described herein (see, e.g., intelligent communication facilities 308 and 400 in FIGs. 3-4).

In some embodiments, speaker 104, band 106 and mobile device 108 of FIG. 1 can communicate (e.g., wired or wirelessly) with each other, or with other compatible devices. In some cases, mobile device 108, speaker 104, band 106, display 114, or any networked computing device (not shown) in communication with wearable device 106 or mobile device 108, can provide at least some of the structures and/or functions of any of the features described herein. As depicted in FIGs. 1-4 herein, the structures and/or functions of any of the above-described features can be implemented in software, hardware, firmware, circuitry, or any combination thereof. Note that the structures and constituent elements above, as well as their functionality, may be aggregated or combined with one or more other structures or elements. Alternatively, the elements and their functionality may be subdivided into constituent sub-elements, if any. As software, at least some of the above-described techniques may be implemented using various types of programming or formatting languages, frameworks, syntax, applications, protocols, objects, or techniques. For example, at least one of the elements depicted in FIGs. 1-4 can represent one or more algorithms. Or, at least one of the elements can represent a portion of logic including a portion of hardware configured to provide constituent structures and/or functionalities.

As hardware and/or firmware, the above-described structures and techniques can be implemented using various types of programming or integrated circuit design languages, including hardware description languages, such as any register transfer language ("RTL") configured to design field-programmable gate arrays ("FPGAs"), application-specific integrated circuits ("ASICs"), multi-chip modules, or any other type of integrated circuit. For example, intelligent communication module 512, including one or more components, can be implemented

in one or more computing devices that include one or more circuits. Thus, at least one of the elements in FIGs. 1-4 can represent one or more components of hardware. Or, at least one of the elements can represent a portion of logic including a portion of circuit configured to provide constituent structures and/or functionalities.

According to some embodiments, the term "circuit" can refer, for example, to any system including a number of components through which current flows to perform one or more functions, the components including discrete and complex components. Examples of discrete components include transistors, resistors, capacitors, inductors, diodes, and the like, and examples of complex components include memory, processors, analog circuits, digital circuits, and the like, including field-programmable gate arrays ("FPGAs"), application-specific integrated circuits ("ASICs"). Therefore, a circuit can include a system of electronic components and logic components (e.g., logic configured to execute instructions, such that a group of executable instructions of an algorithm, for example, and, thus, is a component of a circuit). According to some embodiments, the term "module" can refer, for example, to an algorithm or a portion thereof, and/or logic implemented in either hardware circuitry or software, or a combination thereof (i.e., a module can be implemented as a circuit). In some embodiments, algorithms and/or the memory in which the algorithms are stored are "components" of a circuit. Thus, the term "circuit" can also refer, for example, to a system of components, including algorithms. These can be varied and are not limited to the examples or descriptions provided.

FIG. 6 illustrates a diagram depicting an exemplary ecosystem of intelligent wireless media devices configured to exchange synchronization data. Here, diagram 600 includes media content 602, markers 604a-f, database 606, marker data 608a-f, server 610, network 612, display 614, speaker 616 and mobile device 618. Like-numbered and named elements may describe the same or substantially similar elements as those shown in other descriptions. In some examples, media content 602 may be stored as content data (not shown), for example, in database 606 or other storage (e.g., storage device 508 in FIG. 5, database 718 in FIG. 7, or the like), the content data being associated with markers 604a-f at predetermined points in media content 602. In some examples, media content 602 may include an audio track (e.g., for a song, a movie, or other audio content). In some examples, media content 602 may include a video track (e.g., for a movie, online video, or other video content). In other examples, content data associated with media content 602 may include other data (e.g., content metadata, or the like). In some examples, markers 604a-f may be evenly spaced with a same time interval between each marker. In other examples, markers 604a-f may be unevenly spaced, with two or more different time intervals between each marker, and may correspond to chapters or other logical or key points in

media content 602. In some examples, marker data 608a-f may include a timestamp associated with, or other indication of, a point in media content 602 corresponding to a marker. In some examples, marker data 608a-f also may include metadata associated with a marker. For example, marker data 608b may represent or describe a timestamp (i.e., associated with, or based on, a track for media content 602) for marker 604b, as well as indicate an amount of time to a next marker (i.e., marker 604c) and/or an amount of time to a previous marker (i.e., marker 604a). In another example, marker data 608a may represent or describe a timestamp for marker 604a, as well as a predetermined, static time interval between markers. In still another example, marker data 608a also may indicate marker 604a to be a start marker (i.e., a marker at the start of media content 602's track), and marker data 608f may indicate marker 604f to be an end marker (i.e., a marker at the end of media content 602's track). In other examples, the quantity, type, function, structure, and configuration of the elements shown may be varied and are not limited to the examples provided.

In some examples, display 614, speaker 616 and mobile device 618 may be configured to retrieve both content data and marker data using network 612 and server 610. In some examples, mobile device 618, or an application implemented thereon, may be configured to play media content 602 by streaming content data (e.g., associated with media content 602, other media content stored in database 606, other media content accessible using network 612 (not shown), or the like). In some examples, said content data may be associated with marker data (e.g., marker data 608a-f) indicating one or more of markers 604a-f. In some examples, mobile device 618 may be configured to provide marker data to speaker 616 or display 614 indicating a marker associated with a point in media content 602 at which mobile device is playing, such that speaker 616 or display 614 may retrieve content data starting at said marker, for example, without retrieving any additional data from a synchronized backend track or from an extensive synchronizing buffer (e.g., jitter or de-jitter buffer, or the like). In eliminating the need for exchanging large amounts of data associated with a synchronized backend track or an extensive synchronizing buffer, one or more of marker data 608a-f may be exchanged efficiently (i.e., without causing perceptible delays) between wireless devices in an ecosystem (e.g., display 614, speaker 616, mobile device 618, and the like) using existing networks (i.e., short-range, such as Bluetooth®, NFC or ultra wideband; or longer-range, such as WiFi or mobile broadband), for example, without creating an overlay or other additional network to synchronize playing of media content by two or more devices. For example, as mobile device 618 passes or crosses within a threshold proximity of speaker 616, and determines (i.e., using a connection awareness device, as described herein) speaker 616 to be a preferred device for playing media content 602,

mobile device 618 may provide marker data 608c to speaker 616 substantially at (e.g., within an allowable range of milliseconds, nanoseconds, picoseconds, or other range) a time when mobile device 618 will reach marker 604c in playing media content 602. Techniques associated with selecting a preferred device for performing an operation is described in copending U.S. Patent Application No. XX/XXX,XXX, entitled "Intelligent Device Connection for Wireless Media Ecosystem," filed March XX, 2013 (Attorney Docket No. ALI-191CIP1) and in copending U.S. Patent Application No. 13/831,529, entitled "Intelligent Connection Management in Wireless Devices," filed March 14, 2013 (Attorney Docket No. ALI-251), all of which are incorporated by reference herein in their entirety for all purposes. In this example, in response to receiving marker data 608c from mobile device 618, speaker 616 may be configured to retrieve content data associated with media content 602 at marker 604c to begin playing media content 602 where mobile device 618 is leaving off. Similarly, in another example, mobile device 618 may send marker data 608c to display 614, for example, upon determining using a connection awareness device, as described herein, display 614 to be a preferred device for playing media content 602. In response to receiving marker data 608c, display 614 may be configured to automatically retrieve content data associated with media content 602 at marker 604c to begin playing media content 602 where mobile device is leaving off. In other examples, the quantity, type, function, structure, and configuration of the elements shown may be varied and are not limited to the examples provided.

FIG. 7 illustrates a diagram depicting another exemplary ecosystem of intelligent wireless media devices configured to exchange synchronization data. Here, diagram 700 includes room 701-702, user 703, band 704, mobile device 706, speakers 708-710, display 712, network 714, server 716, database 718, data 720, and content data 720a-b. Like-numbered and named elements may describe the same or substantially similar elements as those shown in other descriptions. In some examples, band 704, mobile device 706, speakers 708-710 and display 712 may be configured to communicate with each using short-range communication paths or longer-range communication paths, as described herein. In some examples, band 704, mobile device 706, speakers 708-710 and display 712 also may be configured to communicate with network 714 (i.e., to access data from server 716) using longer-range communication paths (e.g., WiFi, mobile broadband, or the like). In some examples, speaker 708 may be configured to play media content associated with data 720, being stored in database 718, and to retrieve data 720 from database 718 using network 714 and server 716. In some examples, data 720 may include content data 720a-b associated with one or more portions of a media content being associated with one or more markers, as described herein. In some examples, speaker 708 may be

configured to implement a connection awareness device (e.g., connection awareness devices 112 and 138-142 in FIG. 1A-1B, connection awareness devices 214, 216 and 218 in FIG. 2, connection awareness device 300 in FIG. 3, connection awareness device 432 in FIG. 4B, and the like) to determine compatibility of band 704 or mobile device 706, and whether they are passing within, or out of, a proximity threshold, as described herein. In other examples, speaker 708 may be configured to play a media content using an application (not shown) implemented on mobile device 706, and may receive content data (e.g., content data 720a, or the like) from database 718 using mobile device 706. In some examples, a connection awareness device (not shown) implemented in either speaker 708, band 704 or mobile device 706 may be configured to detect user 703 leaving room 701 (i.e., using a proximity threshold and an antenna generating proximity data associated with band 704, mobile device 706 and speaker 708), and may cause speaker 708 to provide mobile device 706 with marker data indicating where (i.e., a marker) in the media content mobile that device 706 should pick up playing. For example, a connection awareness device implemented in mobile device 706 may query speaker 708 for marker data associated with speaker 708's playing of media content, and speaker 708 may provide mobile device 706 with marker data associated with content data 720a substantially at a time when speaker 708 will begin to play media content associated with content data 720a, along with a control signal causing mobile device 706 to access content data 720a using said marker data and to begin playing said media content where speaker 708 is leaving off. In another example, a connection awareness device implemented in speaker 708 may determine mobile device 706 to be exiting or crossing out of a proximity threshold from speaker 708, and may cause speaker 708 to send marker data associated with content data 720a substantially at a time when speaker 708 will begin to play media content associated with content data 720a, along with a control signal causing mobile device 706 to access content data 720a using said marker data and to begin playing said media content where speaker 708 is leaving off. In other examples, the quantity, type, function, structure, and configuration of the elements shown may be varied and are not limited to the examples provided.

In some examples, when user 703 crosses into room 702 wearing band 704 and/or carrying mobile device 706, speaker 710, display 712, band 704 and mobile device 706, each may be configured to implement a connection awareness device configured to determine compatibility and proximity of other devices in room 702. In some examples, said connection awareness device also may be configured to select a preferred device for playing a media content associated with data 720. For example, said connection awareness device may determine display 712 to be a preferred device for playing a media content being played by mobile device 706 as

user 703 is walking into room 702 carrying mobile device 706, and then may prompt or cause mobile device 706 to provide marker data associated with a point in said media content that mobile device 706 will be reaching. For example, as mobile device 706 is about to play content associated with content data 720b, mobile device 706 may send marker data to display 712 indicating a marker associated with content data 720b, causing display 712 to access content data 720b to begin playing said media content at a point where mobile device 706 will leave off playing. In other examples, speaker 710 may be determined as a preferred device, and mobile device 706 may share said marker data with speaker 710 to cause speaker 710 to begin playing said media content at a point where mobile device 706 will leave off playing. In still other examples, band 704 may be configured to provide marker data to speaker 710 or display 712. In yet other examples, the quantity, type, function, structure, and configuration of the elements shown may be varied and are not limited to the examples provided.

FIG 8 illustrates a flow for synchronizing a performance of an operation among intelligent wireless media devices. Here, flow 800 begins with receiving, by a media device, a first control signal from another media device, the first control signal configured to cause the media device to access data associated with playing a media content being played by the another media device (802). In some examples, said another media device may implement a connection awareness device (e.g., connection awareness devices 112 and 138-142 in FIG. 1A-1B, connection awareness devices 214, 216 and 218 in FIG. 2, connection awareness device 300 in FIG. 3, connection awareness device 432 in FIG. 4B, and the like) configured to determine compatibility and proximity of said media device. In some examples, said connection awareness device also may be configured to select a preferred device for playing the media content, for example, selecting said media device as a preferred device. In some examples, said another media device may be configured to send a first control signal to said media device automatically upon determining said media device to be a preferred device. Once a first control signal is received, a media device may obtain marker data from the another media device, the marker data representing a marker associated with the media content (804). In some examples, obtaining marker data may include sending a query to the another media device in response to receiving a first control signal, the query requesting the marker data. Said another media device may send the requested marker data in response to said query. In other examples, a connection awareness device implemented in the another media device may be configured to automatically send the marker data to said media device immediately or soon after sending said first control signal. In some examples, said marker data also may be configured to synchronize the media device with the another media device, for example, by indicating a timestamp, a time period until a next or

upcoming marker, a time period between a previous (i.e., last) marker and said marker (i.e., current marker), and the like. Once marker data is obtained, content data may be retrieved from a source using the marker data, the content data configured to play the media content starting at a point indicated by the marker data (806). In some examples, the marker data may be sent within a predetermined range of time (e.g., a range of milliseconds, nanoseconds, picoseconds, or other acceptable unit of time) prior to a time when the another media device is reaching a point in playing the media content indicated by the marker, such that when said media device retrieves said content data and begins playing at a point indicated by the marker, said media device will be synchronized with said another media device. Once synchronization is complete and the media device has started playing the media content, a second control signal may be sent to the another media device, the second control signal configured to indicate a completion of synchronization to the another media device (808). In some examples, the second control signal also may be configured to indicate to the another media device that the media device has begun playing the media content. In some examples, the second control signal or another control signal may be sent to the another media device and configured to cause the another media device to stop playing the media content. In other examples, the above-described process may be varied in steps, order, function, processes, or other aspects, and is not limited to those shown and described.

The foregoing description, for purposes of explanation, uses specific nomenclature to provide a thorough understanding of the invention. However, it will be apparent to one skilled in the art that specific details are not required in order to practice the invention. In fact, this description should not be read to limit any feature or aspect of the present invention to any embodiment; rather features and aspects of one embodiment can readily be interchanged with other embodiments. Notably, not every benefit described herein need be realized by each embodiment of the present invention; rather any specific embodiment can provide one or more of the advantages discussed above. In the claims, elements and/or operations do not imply any particular order of operation, unless explicitly stated in the claims. It is intended that the following claims and their equivalents define the scope of the invention. Although the foregoing examples have been described in some detail for purposes of clarity of understanding, the above-described inventive techniques are not limited to the details provided. There are many alternative ways of implementing the above-described invention techniques. The disclosed examples are illustrative and not restrictive.

What is Claimed Is:

1. A method, comprising:

receiving, by a media device, a first control signal from another media device implementing a connection awareness device, the first control signal configured to cause the media device to access data associated with playing a media content being played by the another media device;

obtaining, by the media device, marker data from the another media device, the marker data representing a marker associated with the media content;

retrieving content data from a source using the marker data, the content data configured to play the media content starting at a point indicated by the marker data; and

sending a second control signal to the another media device, the second control signal configured to indicate a completion of synchronization to the another media device.

2. The method of claim 1, wherein obtaining the marker data from the another media device comprises:

sending a query to the another media device requesting the marker data; and

receiving the marker data from the another media device.

3. The method of claim 2, wherein receiving the marker data from the another media device occurs within a predetermined range of time prior to a time when the another media device is reaching a point in the media content indicated by the marker.

4. The method of claim 1, wherein the marker represents a point in the media content.

5. The method of claim 1, wherein the marker data comprises a timestamp.

6. The method of claim 1, wherein the marker data comprises a time period until a next marker.

7. The method of claim 1, wherein the marker data comprises a time period between the marker and a previous marker.

8. The method of claim 1, wherein the first control signal comprises metadata associated with the media content.

9. The method of claim 1, wherein the second control signal further is configured to indicate playing of the media content by the media device.

10. The method of claim 1, wherein the marker data is configured to synchronize playing of the media content by the media device with the another media device.

11. The method of claim 1, wherein the source comprises a server implementing a storage configured to store the content data.

12. The method of claim 1, wherein the source comprises a database configured to store the content data in association with the marker data.

13. A system, comprising:

a processor configured to receive a first control signal, the first control signal configured to cause a media device to access data associated with playing a media content being played by another media device, to obtain marker data from the another media device, the marker data representing a marker associated with the media content, to retrieve content data from a source using the marker data, the content data configured to play the media content starting at a point indicated by the marker data, and to send a second control signal to the another media device, the second control signal configured to indicate a completion of synchronization to the another media device;

a logic configured to generate the first control signal and the second control signal; and

a memory configured to store the marker data.

14. The system of claim 13, further comprising a connection awareness device configured to determine compatibility between the media device and the another media device.

15. The system of claim 13, further comprising a connection awareness device configured to determine a proximity between the media device and the another media device.

16. The system of claim 13, further comprising a connection awareness device configured to select a preferred device for playing the media content.

17. The system of claim 13, further comprising a database configured to store the media content and the marker data.

18. A computer program product embodied in a computer readable medium and comprising computer instructions for:

receiving, by a media device, a first control signal from another media device implementing a connection awareness device, the first control signal configured to cause the media device to access data associated with playing a media content being played by the another media device;

obtaining, by the media device, marker data from the another media device, the marker data representing a marker associated with the media content;

retrieving content data from a source using the marker data, the content data configured to play the media content starting at a point indicated by the marker data; and

sending a second control signal to the another media device, the second control signal configured to indicate a completion of synchronization to the another media device.

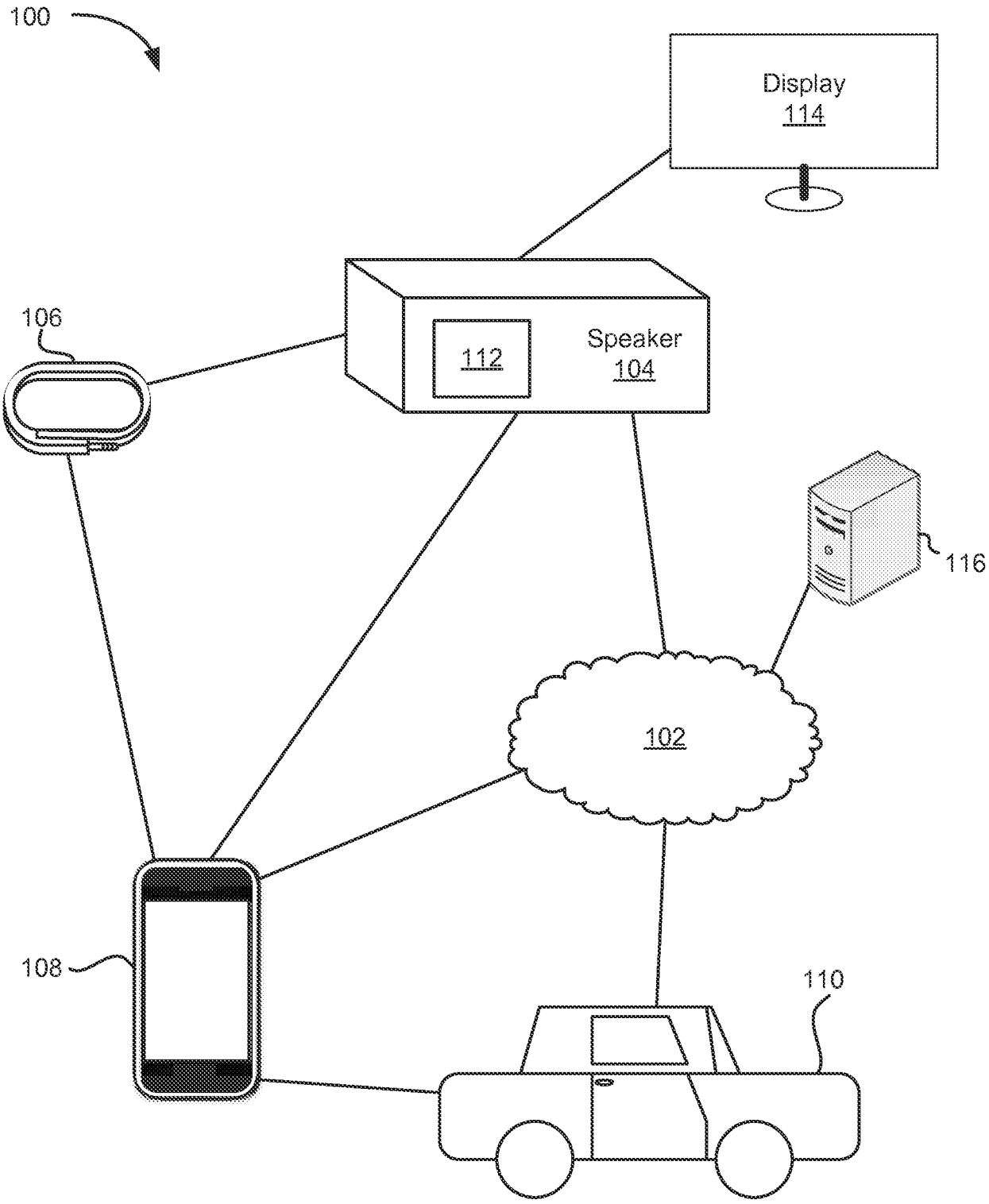


FIG. 1A

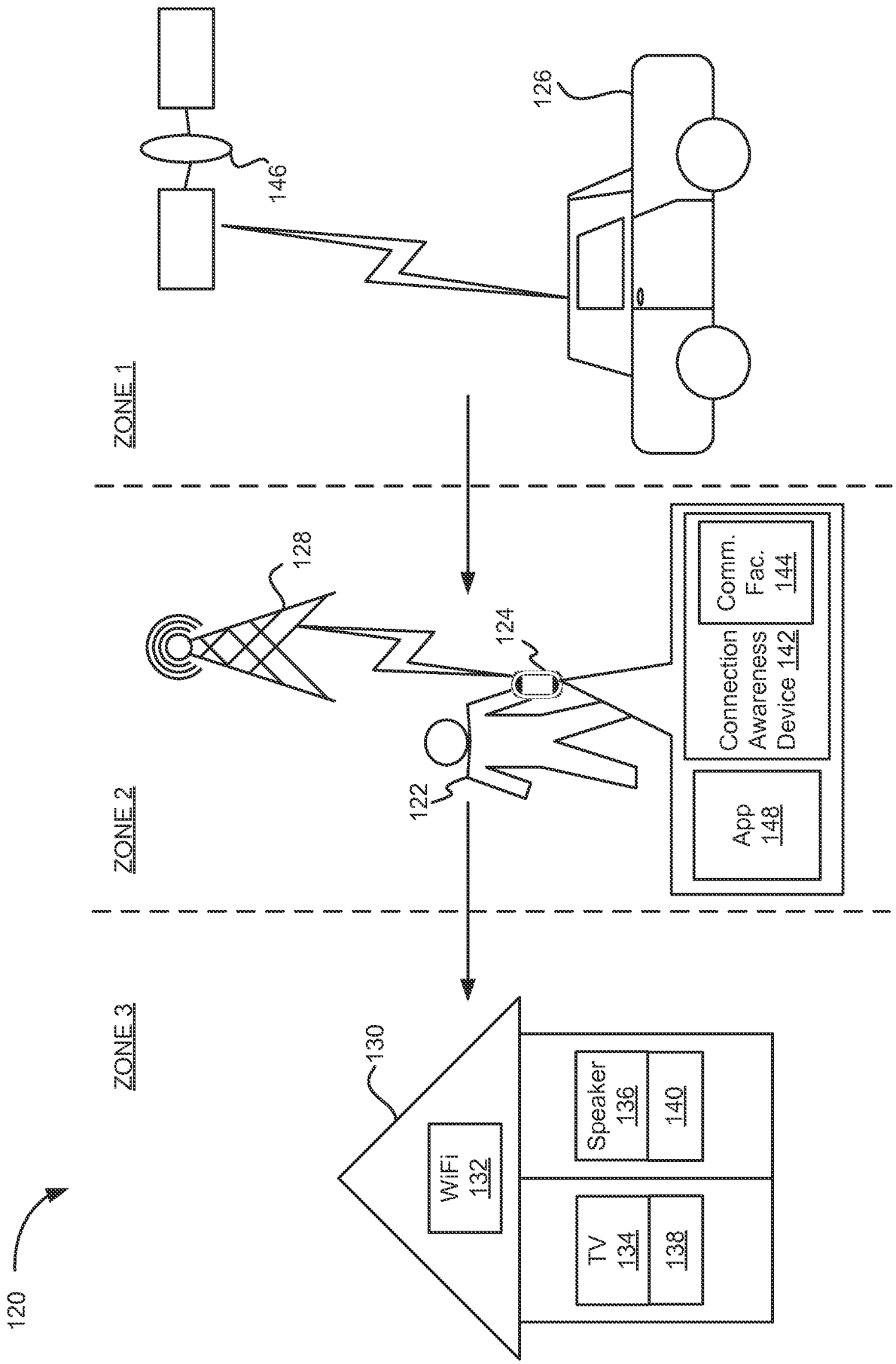
120
ZONE 3
ZONE 2
ZONE 1
130
WiFi 132
Speaker 136
140
TV 134
138
122
124
128
146
126
Connection Awareness Device 142
Comm. Fac. 144
App 148

FIG. 1B

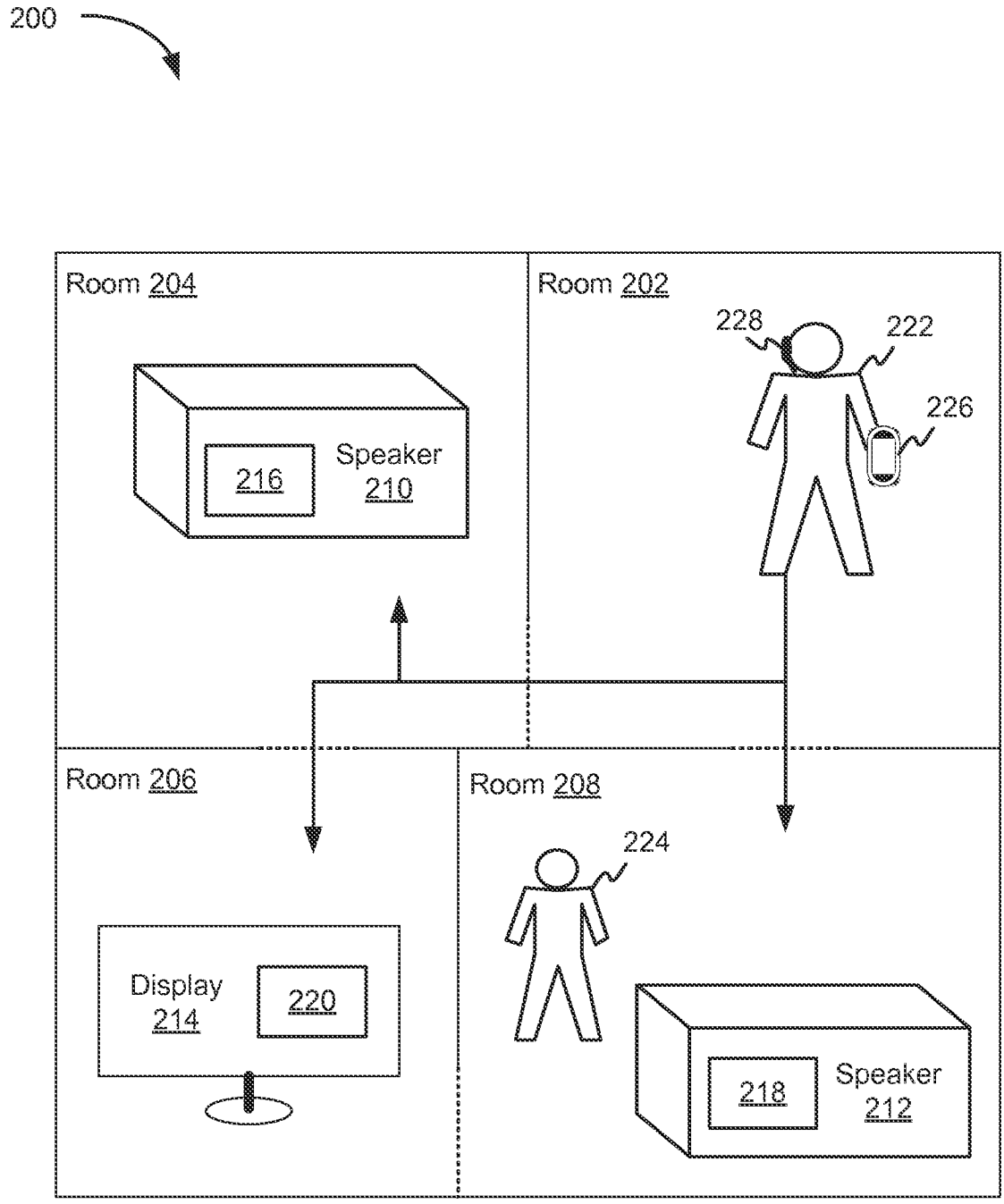
200
Room 204
Room 202
228
222
226
216
Speaker
210
Room 206
Room 208
224
Display
214
220
218
Speaker
212

FIG. 2

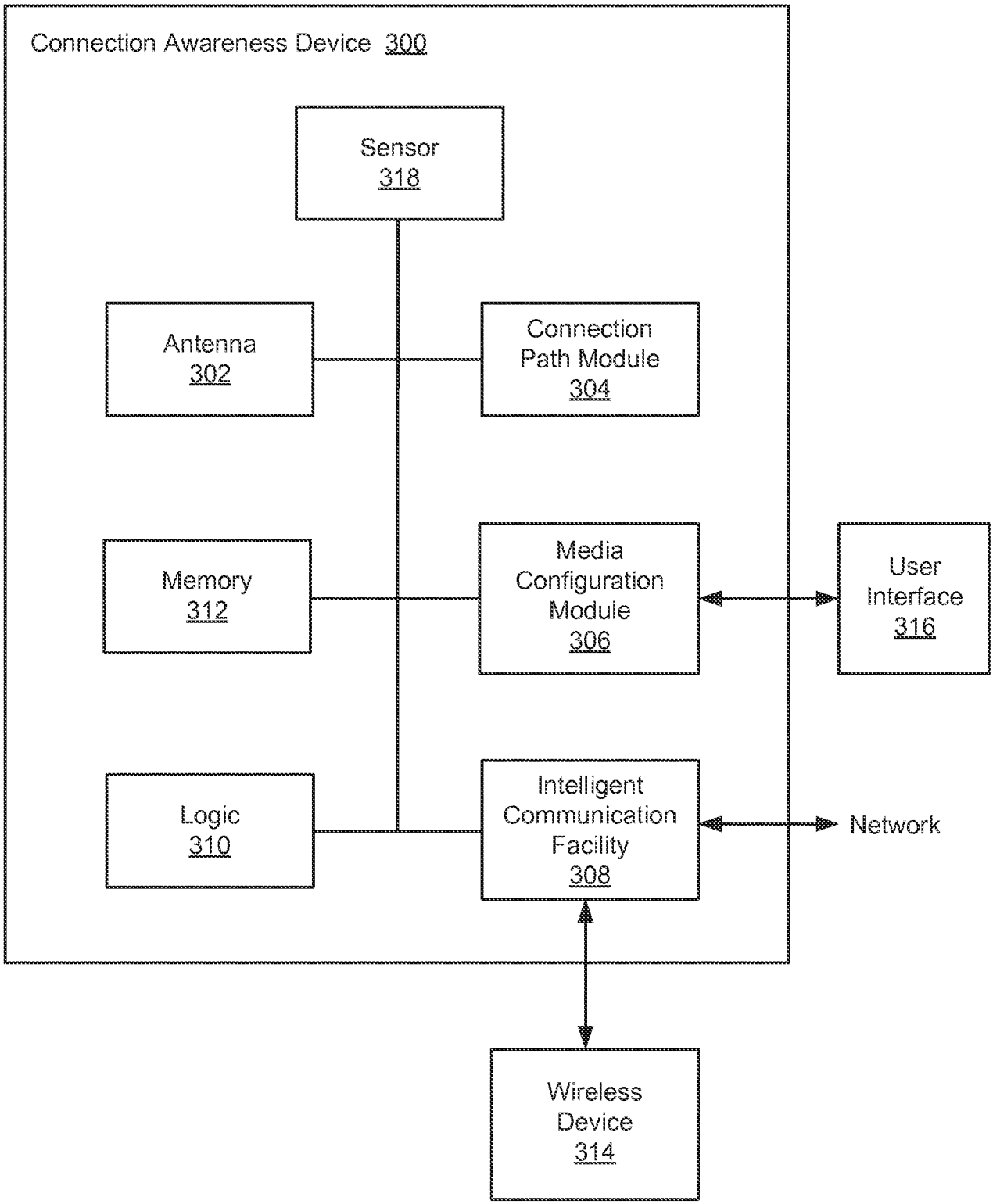
Connection Awareness Device 300
Sensor 318
Antenna 302
Connection Path Module 304
Memory 312
Media Configuration Module 306
User Interface 316
Logic 310
Intelligent Communication Facility 308
Network
Wireless Device 314

FIG. 3

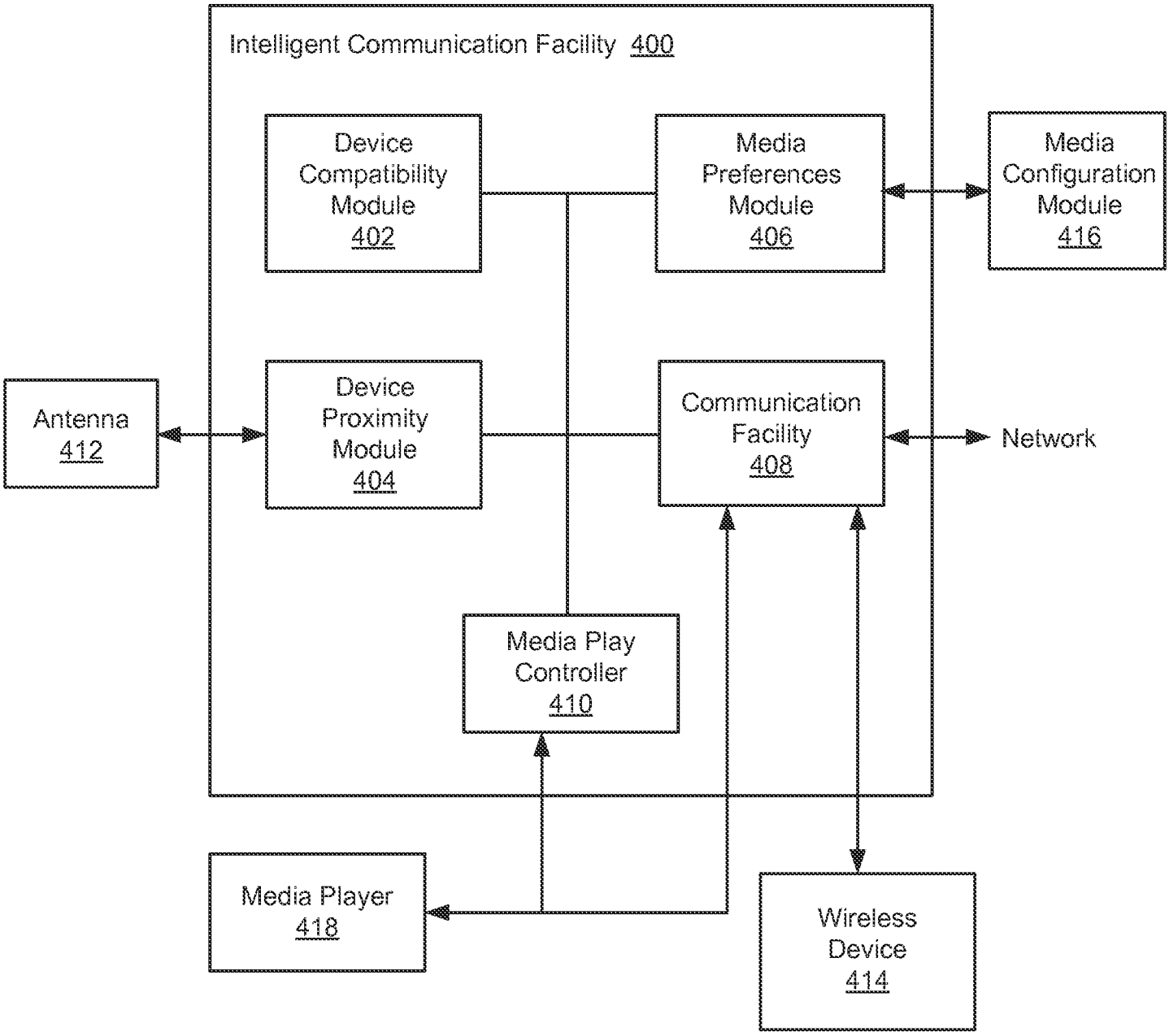
Intelligent Communication Facility 400
Device Compatibility Module 402
Media Preferences Module 406
Media Configuration Module 416
Antenna 412
Device Proximity Module 404
Communication Facility 408
Network
Media Play Controller 410
Media Player 418
Wireless Device 414

FIG. 4A

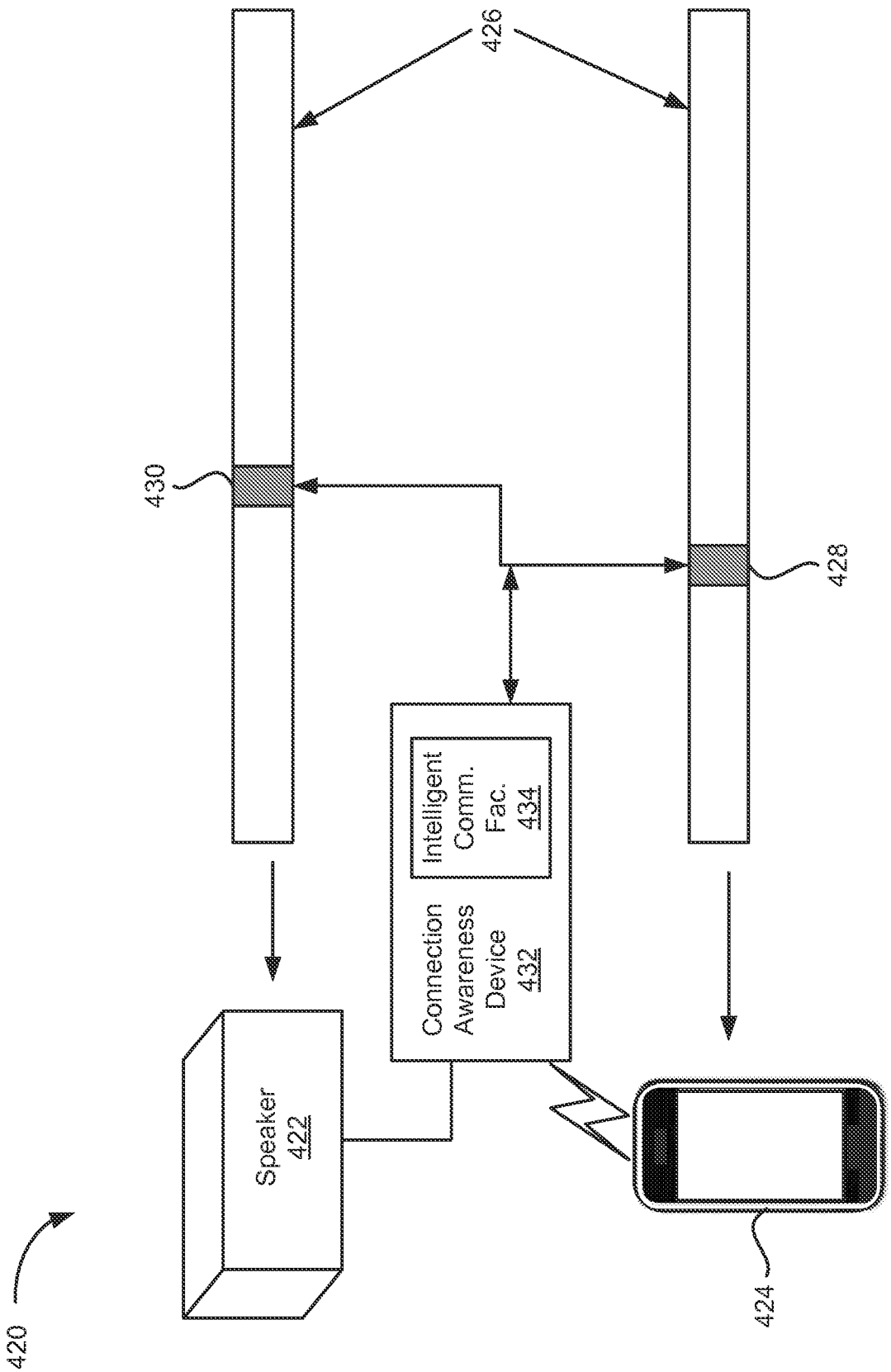
420
Speaker
422
Connection
Awareness
Device
432
Intelligent
Comm.
Fac.
434
424
426
428
430

FIG. 4B

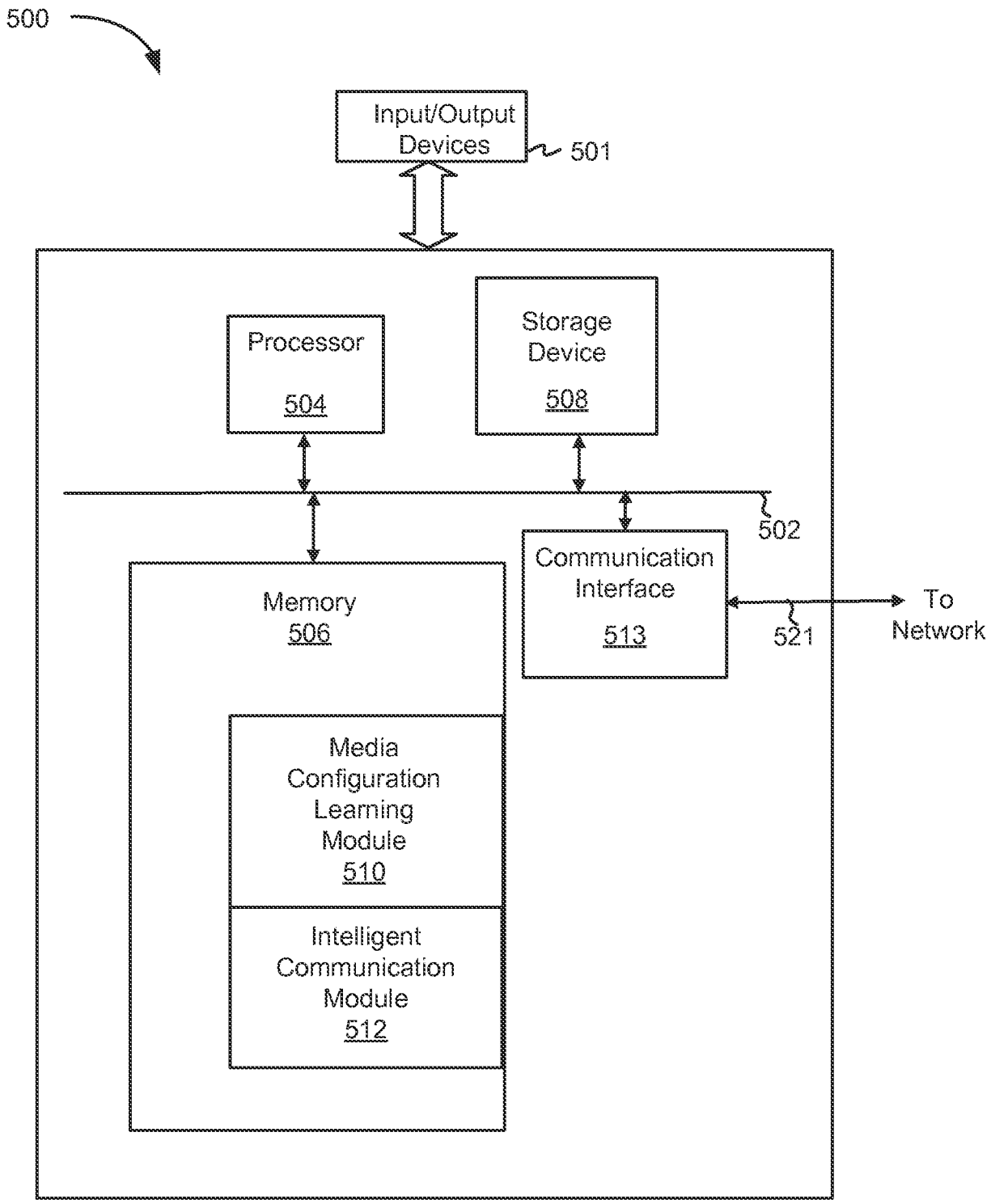
500
Input/Output Devices
501
Processor
504
Storage Device
508
502
Memory
506
Communication Interface
513
521
To Network
Media Configuration Learning Module
510
Intelligent Communication Module
512

FIG. 5

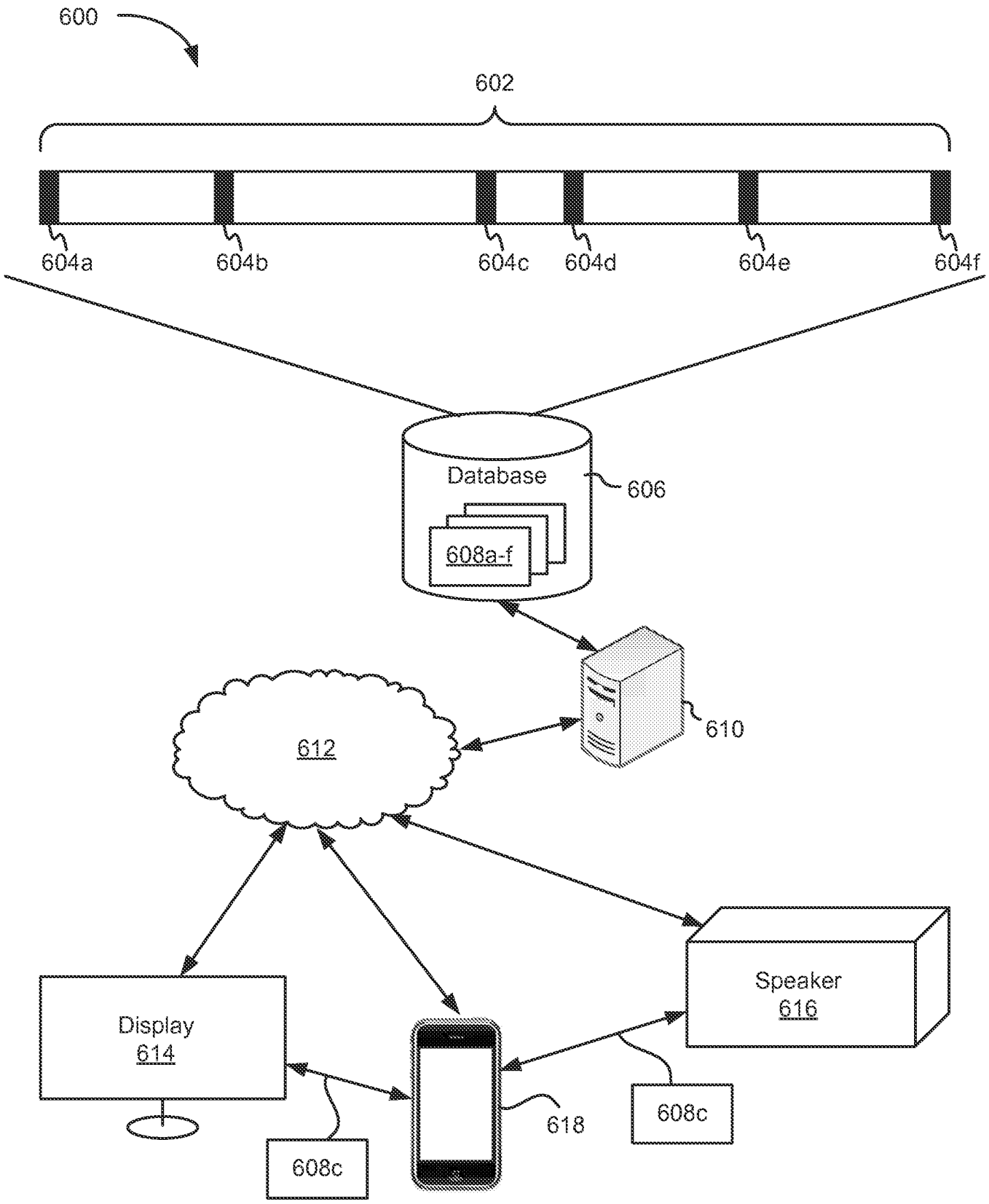
600
602
604a
604b
604c
604d
604e
604f
Database
606
608a-f
610
612
Display
614
Speaker
616
618
608c
608c

FIG. 6

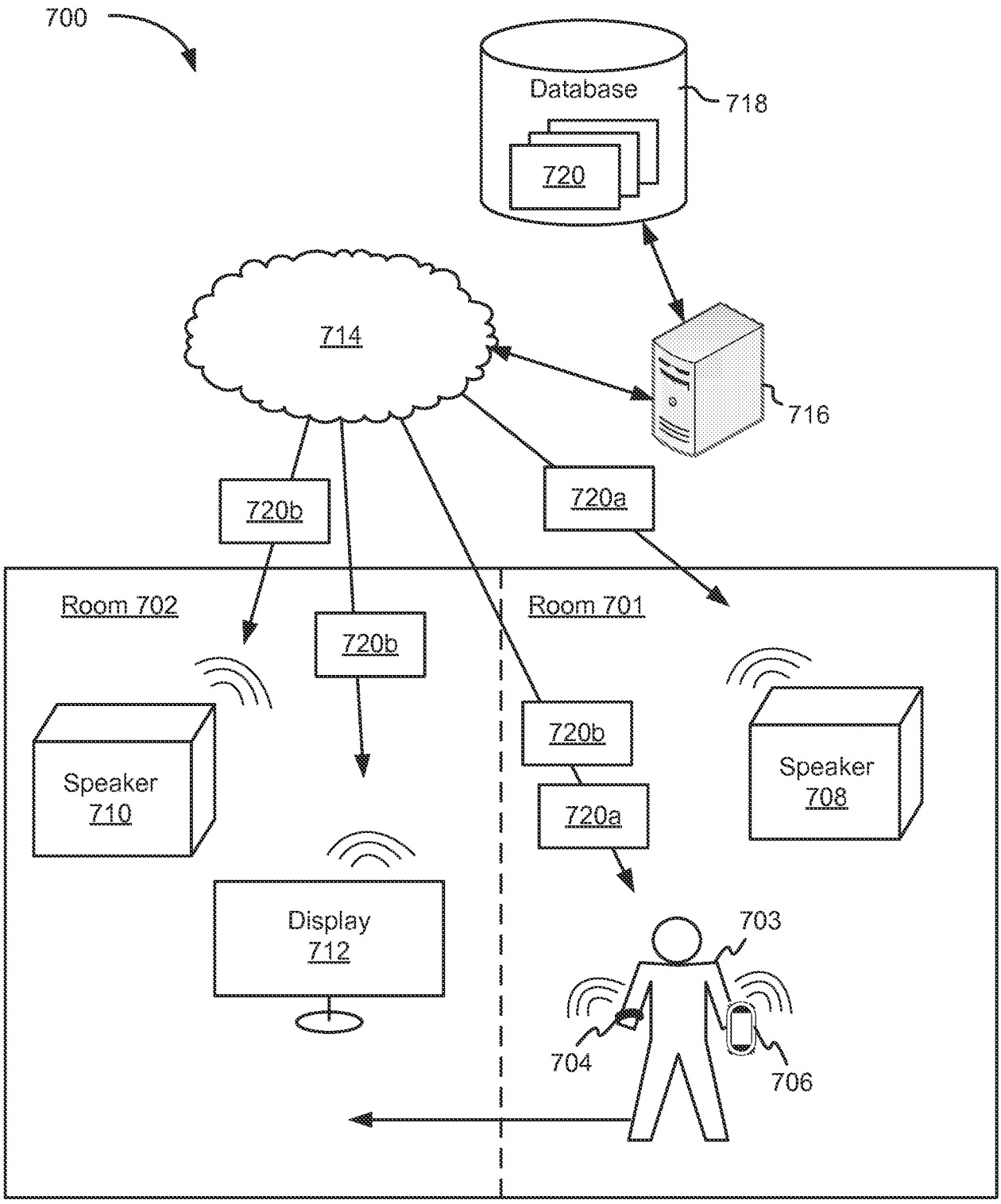
700
Database
718
720
714
716
720b
720a
Room 702
Room 701
720b
720b
720a
Speaker
710
Speaker
708
Display
712
703
704
706

FIG. 7

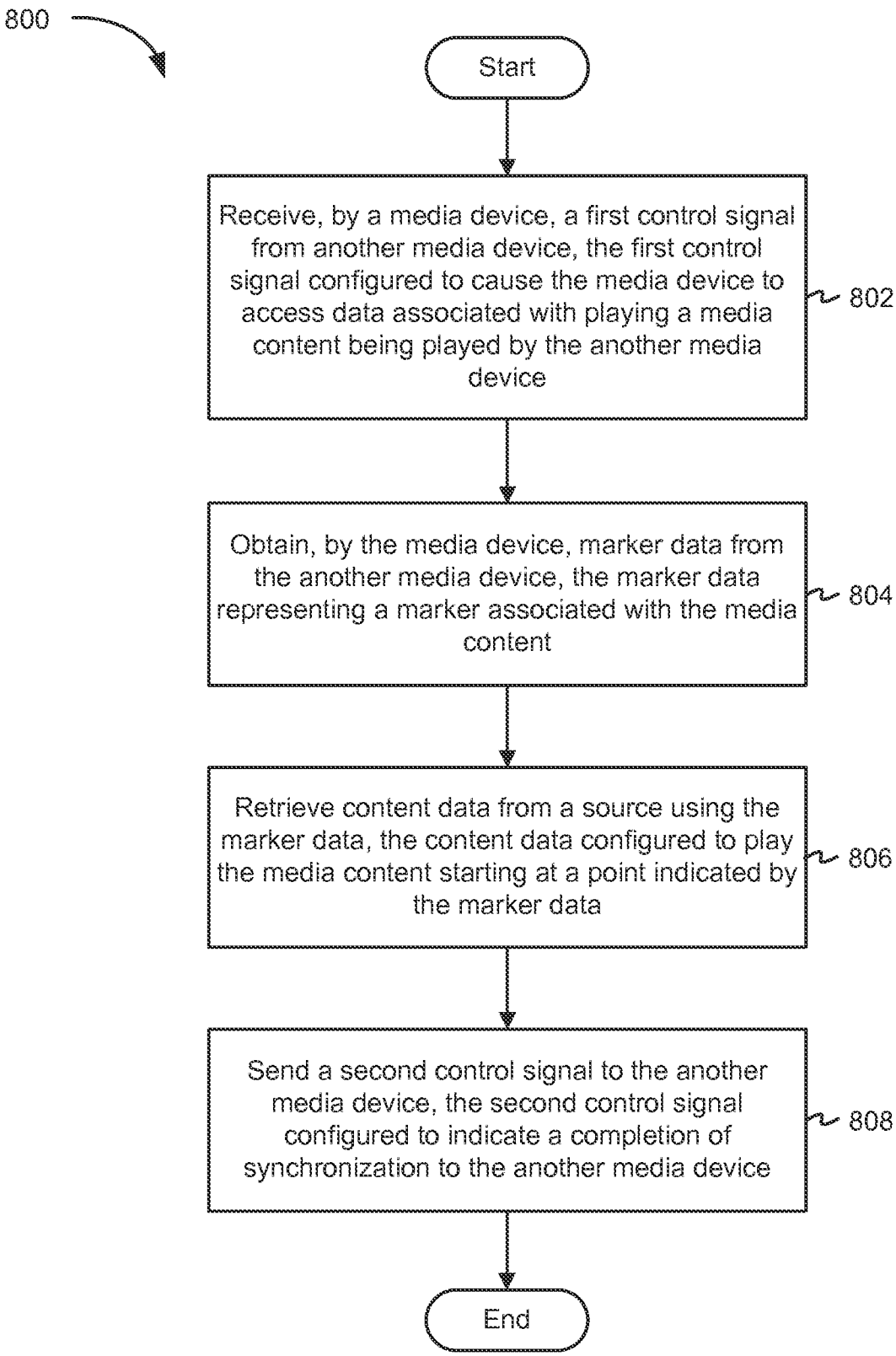
800
Start
Receive, by a media device, a first control signal from another media device, the first control signal configured to cause the media device to access data associated with playing a media content being played by the another media device
802
Obtain, by the media device, marker data from the another media device, the marker data representing a marker associated with the media content
804
Retrieve content data from a source using the marker data, the content data configured to play the media content starting at a point indicated by the marker data
806
Send a second control signal to the another media device, the second control signal configured to indicate a completion of synchronization to the another media device
808
End

FIG. 8