(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) **International Patent Classification:**
H04L 12/28 (2006.01)   H04L 29/06 (2006.01)

(21) **International Application Number:**
PCT/EP2006/060138

(22) **International Filing Date:**
21 February 2006 (21.02.2006)

(25) **Filing Language:** English

(26) **Publication Language:** English

(30) **Priority Data:**
10 2005 011 333.8   11 March 2005 (11.03.2005)   DE

(71) **Applicant** *(for all designated States except US)*: **THOMSON LICENSING** [DE/DE]; 46, Quai A. le Gallo, F-92100 Boulogne-Billancourt (DE).

(72) **Inventors; and**
(75) **Inventors/Applicants** *(for US only)*: **WEBER, Michael** [DE/DE]; Domagkweg 49, 30627 Hannover (DE). **HÜTTER, Ingo** [DE/DE]; Karl-Simrock-Weg 15, 30982 Pattensen (DE).

(74) **Agent: SCHÄFERJOHANN, Volker**; Deutsche Thomson-Brandt GmbH, European Patent Operations, Karl-Wiechert-Allee 74, 30625 Hannover (DE).

(81) **Designated States** *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) **Title:** METHOD FOR TRANSMITTING DATA IN A NETWORK OF DISTRIBUTED STATIONS, AND NETWORK STATION
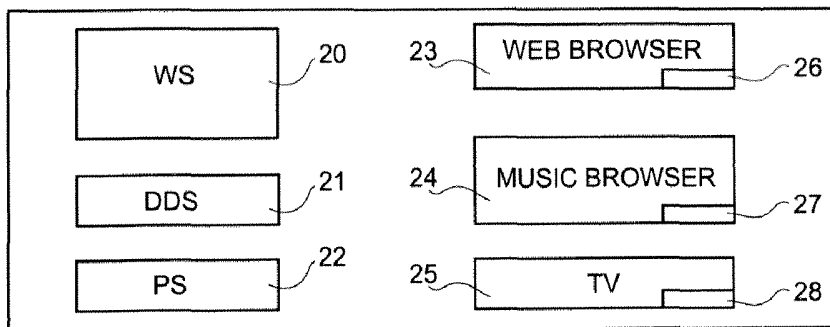
(57) **Abstract:** The invention relates to the technical field of home networks. A home network based on the present UPnP standard (Universal Plug and Play) allows data to be interchanged between network subscriber stations. A UPnP standard may have one or more control point devices (11, 12) . To allow profile information such as user profile or network profile to be interchanged, the invention proposes providing a control point device (11, 12) firstly with an expanded device ascertainment service (21) which can be used to find the other control point devices (11, 12) in the network and also with one or more additionally implemented profile services which allow the other control point devices in the network to be notified about change to profile information on a control point device (11, 12) .

Method for transmitting data in a network of distributed stations, and network station

The invention relates to the technical field of home
5   networks.

Background to the invention
A wealth of different standards have been elaborated,
in part with different aims, for networking devices in
10   the household. One of the systems provides for the
devices to be networked on the basis of the "Internet
protocol" IP. The system has become known by the
abbreviation UPnP, which stands for Universal Plug and
Play. A UPnP standard is currently available in version
15   1.1. More detailed information regarding the UPnP
system and the associated standard can be found on the
official Internet page of the UPnP consortium at
www.upnp.org.

20   The UPnP system has no restrictions regarding the
device types. This is intended to allow both devices
from the consumer electronics field, such as TV,
DVD player, set-top box, video recorder, camcorder
etc., and also other devices in the household, for
25   example washing machine, chillers, heating control,
coffee machines, lighting and shutter control, alarm
systems and others, to be networked. Personal computers
may likewise be regarded as belonging to the category
of consumer electronics devices. These are also covered
30   by the UPnP system and can also be integrated into the
network.

However, the UPnP system does not contain a
specification for the lower layers of the OSI/ISO
35   reference model for data communication. This concerns
particularly the physical layer and the data link
layer. The UPnP system therefore no longer contains a
specification regarding what transmission medium needs

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to be used to transmit the data which are to be interchanged. Different transmission standards are permissible in this case. Examples of suitable transmission standards are the Ethernet protocol, the

5   IEEE-1394 protocol, and even wireless transmission based on IEEE 802.11x, Bluetooth or Hiperlan/2 are likewise suitable.

The UPnP specification (see www.upnp.org) describes how
10   devices based on the UPnP standard are designed and how they can be controlled. One of the basic ideas of this specification is that it is possible to operate any UPnP device using a standard HTML browser. To this end, every UPnP device has a web server on which it is
15   possible to store the HTML pages for operating the device (the "presentation pages").

In the UPnP standard, the localization of UPnP devices in the network is the responsibility of "control point
20   devices". However, this involves the respective UPnP devices themselves registering with the control point devices. Equally, control point devices can look for UPnP devices in the network.

25   When a control point device has found a UPnP device, it fetches the device's description from the URL (Uniform Resource Locator) indicated during registration using the HTTP and TCP-IP protocols. The UPnP device provides the description in the form of an XML document. Using
30   the information which the control point has obtained from the device's description document, this device can now send "SOAP messages" (Simple Object Access Protocol) to the device's control URL in order to control said device.

35

Invention
Often, a UPnP network will contain not just one control point device but rather a plurality thereof. The user

interface for controlling a device frequently provides
an opportunity to create a network profile or user
profile. Such profile information may relate to the
preferred musical orientation in the case of an audio
5   device, for example, or to the preferred categories of
TV programmes or the favourite TV channels in the case
of a TV set. Other examples of such profile information
are a list of frequently used Internet pages or
particular setting states for devices in the household
10   for different times, such as a day, night or holiday
program.

It is an aim of the invention to allow profile
information to be interchanged between the various
15   control point devices in the network. To this end, the
control point devices first need to be provided with
the capability of localizing other control point
devices in the network. Although the UPnP standard
provides the control point devices with a device
20   identification service, they cannot use this service to
find any other control point devices in the network.
This is because the UPnP standard has no provision for
this. The invention therefore first of all proposes
providing an expanded device identification service on
25   the control point devices in the network. There is also
provision for a control point device to contain an
additionally implemented profile service which the
control point devices use to provide profile
information. This also allows profile information to be
30   interchanged.

The measures presented in the dependent claims permit
advantageous   developments   and   improvements.
Advantageously, the control point devices can be
35   notified about changed profile information using the
event messages provided in the UPnP standard (Event
Notification). To this end, the control point devices
register with the other control point devices in the

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network for notification in the event of the profile information being altered. If the profile information is stored as a variable, the event message is used to notify the other control point devices about any
5   alteration to this variable.

The profile information may advantageously relate to a user profile. Equally, the profile information may also relate to a network profile. The user profiles or
10   network profiles may differ according to time of day, day of the week, month or season, or a special time such as a holiday or business trip. When a control point device has been notified of changed profile information, this control point device can transfer the
15   new profile information to its own profile. In this regard, it is advantageous if the profile information is linked to currency-level information, in order to be able to check how current the profile information which has been communicated is. The profile information
20   communicated would advantageously be transferred only if it is found to be more current than the information which is still stored in the control point device's own profile.

25   Conversely, the profile information may be linked to transfer control information, possibly in addition to the currency-level information. This condition information is intended to indicate in the change notification that the new information is to be
30   transferred from the other control point devices in the network, possibly regardless of the currency-level information. The transfer control information is then advantageously information which the user himself has input, which means that he retains full control over
35   the profiles which are to be changed.

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Corresponding advantageous measures for a network station as control point device in the network are presented in Claims 11 to 20.

5   Drawings

Exemplary embodiments of the invention are shown in the drawings and are explained in more detail in the description below. In the drawings:

10   Figure 1

shows a basic diagram of the transmission of AV data between two network stations in line with version 0.83 of the UPnP-AV architecture;

15   Figure 2

shows an example network with UPnP-AV devices;

Figure 3

shows a first example of a control point device based 20   on the invention;

Figure 4

shows a first example of a profile service;

25   Figure 5

shows an example of a status variable for the profile service shown in Figure 4;

Figure 6 30   shows a second example of a control point device based on the invention;

Figure 7

shows further examples of profile services based on the 35   invention; and

Figure 8

shows an example of an XML device description for a
control point device based on the invention.

Exemplary embodiments of the invention

5   As part of the UPnP standardization, a specification
for transmitting AV data (audio/video data) between
network subscriber stations has also been drawn up, and
concluded in June 2002. The exact title of this
specification is: UPnP-AV architecture: 0.83 dated
10   12 June 2002. This specification defines three
different types of devices for transmitting AV data.
First, a "MediaServer"; this denotes that device which
is selected as the source of the AV data. Secondly,
there is the device type MediaRenderer, which is a
15   device which is used as a data sink for the AV data.
Thirdly, as a separate device type, the Control Point
type is also provided, which is called a control point
device below. As an example, a universal remote control
for the AV devices is regularly considered to be a
20   control point device. Alternatively, however, a
personal computer in the network can also perform this
task or else a TV set with a remote control may
likewise be suitable as a control device.

25   The control point device communicates with two other
UPnP devices which are suitable as a data source and a
data sink for a desired AV connection. The control
point device initializes and configures both devices
for the AV connection, so that the desired data stream
30   can also be set up. Hence, the task of a control point
device is typically to set up an AV connection between
two network subscribers, possibly to make changes to
the settings of the two devices, and, when the desired
AV data stream has been transmitted, to cut the
35   connection again, i.e. to ask both devices on the AV
connection to delete the data which characterize the
connection. However, control point devices in the UPnP
standard are not specified to the extent that a

complete API (Application Interface Program) is known
for this device type.

Figure 1 shows the basic classification of network
stations which are needed for an AV connection. The
MediaServer device contains or has access to an AV data
stream which, by way of example, is stored locally or
is received externally. The MediaServer device has
access to the AV data and is able to transmit an
associated AV data stream to another network station
via the network. In this case, the AV data stream is
transmitted using a transfer protocol in line with the
transmission medium which is provided in the network.
The data transmission formats supported by the
MediaServer are defined explicitly for every possible
resource in the content directory service. Typically,
the MediaServer device type can be assigned to one of
the following devices: digital video recorder, CD/DVD
player, camera, camcorder, PC, set-top box, satellite
receiver, cassette recorder etc. To select a particular
AV content, a module for a content directory is usually
implemented in the MediaServer in accordance with the
UPnP standard. Besides this, there is also a module
which is called a Connection Manager and which the
control point device uses to communicate with a
MediaRenderer when a connection is set up.

A MediaRenderer device receives the AV data stream sent
by the MediaServer and outputs it either as image
information or as audible information. Similarly, the
MediaRenderer device likewise contains an
implementation of the Connection Manager module for
communication with the control point device when a
connection is set up. In addition, a Rendering Control
module is implemented in the MediaRenderer device. This
module receives commands for setting reproduction
characteristics, such as volume, tone, definition,
contrast, brightness, colour etc., and implements them.

Cited examples of devices which should be assigned the device type MediaRenderer in the home network are a TV set, a stereo amplifier and an MP3 player. Depending on the transmission format implemented, the MediaServer or
5   the MediaRenderer also has an AV transport service which is used to control the data transfer and the reproduction (e.g. play, stop, fast forward etc.).

A control point device coordinates the data transport
10   between MediaServer and MediaRenderer. It is likewise used to implement the operating commands from the operator and to forward them to the appropriate devices on the AV connection. In this case, the commands play, stop, pause, fast forward, rewind are particularly
15   suitable examples. As mentioned at the outset, control point devices are also designed to find and control standard UPnP devices.

As Figure 1 shows, the transmission of the AV data in
20   line with the implemented AV transport protocol is independent of the communication with the control point device. The data stream is therefore transmitted even when the control point device has logged off from the network after the AV connection has been set up. Since
25   the known transport protocols are standardized, no further information is provided in this regard below.

Figure 2 shows a simple home network. All the devices in this network which are designed on the basis of the
30   UPnP-AV specification are shown. The reference numeral 10 denotes a DSL modem. This is used simultaneously as the DSL router and as a network switch. The DSL modem 10 has the individual network stations connected to it in star form. The network connection technology used is
35   Ethernet network technology. The reference numeral 17 denotes the telephone line to which the DSL modem is connected and which can be used to access the Internet. The DSL modem 10 may be configured as a UPnP Internet

gateway device within the context of the UPnP specification. The reference numeral 11 denotes a flat screen device, such as an LCD television set or a plasma television set. This device has two UPnP device types. First, the flat screen device 11 can be regarded as a MediaRenderer device and is likewise configured as such too. In this case, it is used to show video contents, and possibly audio contents if the device is equipped with its own loudspeakers. Secondly, the device is also used as a control point device for controlling the other network stations.

The reference numeral 12 denotes a personal computer. This also has the functionality of a control point device. This is the typical task of the computer in the network. Secondly, the personal computer can also adopt the functionality of a MediaServer and also that of a MediaRenderer.

The reference numeral 13 denotes a digital satellite receiver. This device is of the MediaServer type. The reference numeral 14 denotes a digital video recorder. This device is also configured as a MediaServer device. This is equally true of the DVD player 15 which is also present in the network.

In addition, an AV receiver 16 is also shown. This device is used firstly for radio reception, and secondly also for amplifying audio signals and for outputting the audio signals on connected loudspeakers. This device thus internalizes both functionalities, MediaServer and MediaRenderer.

In the example shown in Figure 2, not all of the devices shown need to be set up in one room. They may also be distributed over a plurality of rooms. By way of example, in practice it can be assumed that the flat screen device 11 and the personal computer 12 are

accommodated in different rooms. It is thus possible to access the network from different rooms. The output of audio contents is not limited to the room in which the AV receiver 16 is positioned. First, the connected loudspeakers may be accommodated in different rooms, and secondly it is also possible to output audio contents in the room in which the personal computer 12 is set up, for example.

In addition, it is assumed in the exemplary case shown in Figure 2 that both the personal computer 12 and the flat screen device 11 are equipped with an Internet browser. For a flat screen device, there is often a "digital signal processing box" in which the relevant module for the Internet browser may be arranged. The flat screen device 11 is operated using a typical remote control or conveniently using a radio keypad, for example. In the case of an Internet browser, it is normally possible to store frequently visited Internet pages as a favourites list or as a bookmark. If an entry is now added to the favourites list on one Internet browser, it may be desirable to transfer it automatically to the Internet browser of the other device in the network too.

It is similarly possible to access audio or video contents, stored either in the digital video recorder 14 or in the personal computer 12, both using the flat screen device 11 and using the personal computer 12. This also allows the user to create favourites lists or to store profile information, as in the case of particularly desired musical orientations or genre orientations in the case of video contents. Examples of categories of audio documents are classical, jazz, rock, pop, rock and roll, folk, country, techno etc. Examples of categories of video documents are action, comedy, adventure, science fiction, western, fantasy, thriller etc. The situation is similar for television

too. Nowadays, the user can often store his viewing habits likewise in a profile, which means that he can create favourites lists, for example, with particular TV channels or can have recommendation lists created

5   for particular categories of television programmes, such as news, reports, feature films, sport, culture etc.

An example of the way in which a recommendation list
10   for playback of audio contents can be constructed is found   in   the   earlier   patent   application EP 04 291 150.3.

The text below gives a more detailed explanation of how
15   it can be made possible for this profile information which is present in the network to be interchanged between the control point devices 11 and 12 in the example network in Figure 2. To this end, Figure 3 shows the necessary components in the control point
20   device. The design shown is valid for both control point devices 11 and 12 in the network. The reference numeral 20 denotes a web server. On this, the device provides a description of the device in the form of an XML document. This description contains information
25   about the manufacturer, the serial number, the URLs for control, events and the presentation. For each service which the device provides, commands and actions and also file types and a data range or variable types and a value range are specified. An example of such an XML
30   device description is shown in Figure 4. The device type indicated in row 8 is highlighted, said device type being set as ControlPoint and thus indicating that it is a control point device. In the list of available services which is presented further below, the service
35   for synchronizing the web browser is shown as an example. The other services for synchronizing the music browser and the favourites list of TV channels are merely indicated, but are also contained in the list.

The reference numeral 21 denotes a device identification service. According to the UPnP standard, this component is absolutely essential for a control point device. This service allows control points to look for UPnP devices in the network. This is the responsibility of the SSDP protocol (Simple Service Discovery Protocol). However, the UPnP standard contains no provision for the control point devices in the network also to register automatically with the other control point devices in the network when connecting to the network. Even in the event of a search request from the control point device to all the network stations which is provided in the SSDP protocol and is sent using a "multicast address" and port number 239.255.255.250:1900, the control point devices which are present in the network would not subsequently register.

In line with the invention, the device identification service 21 is expanded. In this case, a special device type and service type are stipulated for a control point device, which means that the control point devices likewise send an ssdp:alive message when connecting to the network, with its associated entry for the notification target NT. There is likewise support for a control point device to be able to search specifically for control point devices in the network. The appropriate search target is thus entered under the entry ST in the search request M-Search. The control point devices being sought would then register using the appropriate response message within the context of the discovery protocol. For further details in this regard, reference is made to the UPnP specification. This expanded device identification service 21 provides the individual control point devices with knowledge of one another and allows them to communicate with one another.

The reference numeral 22 denotes a profile service from the control point device. This supports the interchange of profile information. For every defined profile in the control point device, the profile service 22 contains at least one variable. Thus, by way of example, the preferred musical orientation can be characterized by a variable, which is then linked to a set of entries, for example jazz, pop, folk. For a favourites list for TV channels, a variable may likewise be made available which is then likewise again linked to a set of TV channel descriptors, for example ARD, ZDF, N3, RTL, SAT1, PRO7, WDR, Kabel1, Eurosport, DSF. A similar situation applies to the profile for the frequently called Internet pages. In this case too, a separate variable may be provided. The profile service is described in the associated XML document of the control point device, as mentioned previously. There is thus the possibility for the other control point devices in the network to register for the alteration in the variables of the profile service 22. This is done as prescribed in the UPnP standard, using the XML-based General Event Notification Architecture (GENA). In the UPnP standard, the procedure which can be used to register for state changes in a variable is called Eventing:Subscription.

Every time an alteration occurs in one of the registered variables, the control point device on which the alteration has occurred sends a message to inform the other control point devices which have registered about the altered state. This is done using an event message, which is called an Eventing:Event Messages:Notify message in the UPnP standard. In the case of the invention, only an alteration which has been brought about by the user is communicated, that is to say when the alteration has been made by the application program which sets up the user interface.

As application programs, Figure 3 also shows the application programs for an Internet browser 23, a music browser 24 and a user interface for a television

5   set 25. Within these applications, there are also separately highlighted areas in which the profile information, that is to say favourites list for Internet pages 26, preferred musical orientations 27 and preferred TV channels 28, are stored.

10

An example of a profile service is shown in Figure 5. This is an XML description for this service. There, the status variables listed are the variables Bookmarks, FavouriteMusicStyle and FavouriteTVChannels. These

15 serve to synchronize the profile information for the three applications 23 to 25. The respective beginning also contains a definition that the status variable is incorporated in the eventing method of UPnP, that is to say the communication of the changed variables to all

20 the subscribers.

A second example of a control point device based on the invention is shown in Figure 6. In contrast to the example shown in Figure 3, separate profile services

25 22, 29, 30 for each of the three applications are formed in this case.

The XML descriptions for the two separate services SyncWebBrowser and SyncMusicBrowser are shown in

30 Figure 7.

An example of an XML description of a status variable based on the invention is shown in Figure 8. This figure shows the status variable called Bookmarks for

35 the SyncWebBrowser service. Provision is made for the beginning to have time information providing information about the respective currency-level status of the variable. This should preferably show the time

and the date from a real-time clock. The two sync
options TimeStampSync and ForceSync can be used to
stipulate whether or not the communicated, altered
variable is to be transferred only using the time
information.

TimeStampSync = No
ForceSync = No

means that transfer of the communicated change is not
permitted.

TimeStampSync = Yes
ForceSync = No

means that transfer of the communicated change is
permitted if the time information is found to be more
current.

TimeStampSync = No
ForceSync = Yes

means that transfer of the communicated change is
absolutely necessary without considering the time
information.

TimeStampSync = Yes
ForceSync = Yes

is not defined and is available for future expansions.

In addition: this allows the control point devices,
which themselves have also stored appropriate profile
information, to compare whether their current profile
information is outdated in comparison with the newly
communicated profile information. If so, the latter is
transferred to their own profile. If not, the
communicated information can also be blocked out. If a

control point device contains no real-time clock of its own, it may be appropriate to omit the currency-level information.

5   As a further possibility, it would be desirable to allow the user to stipulate whether or not an alteration in the profile should actually be transferred to the other profiles. This transfer control information of the type Syncoption 1 and 2
10   would then also be transmitted to the control point devices when anything has changed in the profile and the control point devices which have received the new profile are then designed such that they evaluate the transfer control information and transfer the new
15   information only if the transfer control signal has been set. This means that the user retains full control over his created profiles.

In the lower part of the XML description of the status
20   variable Bookmarks in Figure 8, the various entries for the marked Internet pages are listed.

The invention is not limited to the exemplary embodiments mentioned. It can also be used for "network
25   profiles". These are profiles which are used to produce a particular state in the network or to monitor states in the network. By way of example, profiles for various times of day, day, night, for various days of the week, for various months, for various seasons or for various
30   special times such as a holiday or business trip are suitable. In this case, it is then possible to enter different states for particular control devices in the network. Examples of these are a shutter control, heating control, alarm system setting, warning control,
35   video recorder setting etc.

Claims

1.   Method for transmitting data in a network of
distributed stations (11 to 16), in which stations the
functionalities of a device to be controlled are
provided on a web server (20) in the form of one or
more information pages generated using a description
language and are selected by a control point device
(11, 12) in order to control a device (10, 13, 14 to
16) which is to be controlled, characterized in that an
expanded device ascertainment service (21) in a control
point device (11, 12) is used to find the other control
point devices in the network in order to transmit
profile information between two or more control point
devices (11, 12) in the network, with one or more
additionally implemented profile services (22) in a
control point device (11, 12) being used to send a
notification about changed profile information to the
other control point devices in the network.

2.   Method according to Claim 1, where the profile
service (22) sends the notification about changed
profile information to all those control point devices
which have been registered for notification about
changed profile information.

3.   Method according to Claim 1 or 2, where the
profile information relates to a user profile,
particularly a user profile about the preferably
desired musical orientation, the preferably desired TV
or radio channels or programmes, or a list of selected
Internet pages.

4.   Method according to Claim 1 or 2, where the
profile information relates to a network profile,
particularly in order to produce particular states in
the network or to monitor states in the network.

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5.   Method according to Claim 3 or 4, where the user profiles or network profiles differ according to time of day, day of the week, month or season, or a special time such as a holiday or business trip.

6.   Method according to one of Claims 2 to 5, where the control point device (11, 12) which has been notified about changed profile information transfers the new profile information to its own profile.

7.   Method according to one of the preceding claims, where the profile information is linked to currency-level information.

8.   Method according to Claim 7, where the new profile information is transferred to the control point device's own profile only if the currency-level information shows it to be more current than the information in the control point device's own profile.

9.   Method according to one of Claims 1 to 7, where the profile information is linked to transfer control information, which indicates whether the new profile information is to be transferred from the one or more other control point devices in the network regardless of any currency-level information which is present.

10.   Method according to one of the preceding claims, where the network of distributed stations is a network based on the UPnP standard, corresponding to Universal Plug and Play.

11.   Network station as control point device for performing the method according to one of the preceding claims, with one or more profile information items, characterized in that the network station has an expanded device ascertainment service (21) which can be used to find the other control point devices in the

network, and in that one or more additionally implemented profile services (22) are provided which are used to notify other control point devices in the network about changed profile information.

12. Network station according to Claim 11, characterized in that the network station has registration means which can be accessed by the other control point devices in the network in order to register for notification about changed profile information.

13. Network station according to Claim 11 or 12, characterized in that the profile information relates to a user profile, particularly a user profile about the preferably desired musical orientation, the preferably desired TV or radio channels or programmes or a list of selected Internet pages.

14. Network station according to Claim 11 or 12, where the profile information relates to a network profile, particularly in order to produce particular states in the network or to monitor states in the network.

15. Network station according to one of Claims 12 to 14, characterized in that the user profiles or network profiles differ according to time of day, day of the week, month or season, or a special time such as a holiday or business trip.

16. Network station according to one of Claims 11 to 15, characterized in that the control point device (11, 12) which has been notified about profile information transfers the new profile information to its own profile.

17. Network station according to one of Claims 11 to 16, characterized in that the profile information is linked to currency-level information.

5   18. Network station according to Claim 17, characterized in that it transfers the new profile information to its own profile only if it has been found to be more current than the information in its own profile.

10

19. Network station according to one of Claims 11 to 17, characterized in that the profile information is linked to transfer control information, which indicates whether the new information is to be transferred from

15   the one or more other control point devices in the network regardless of any currency-level information which is present.

20. Network station according to one of Claims 11 to

20   19, characterized in that the network station is designed on the basis of the UPnP standard, corresponding to Universal Plug and Play.

Fig.1

Fig.2

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```
┌─────────────────────────────────────────────────────────────┐
│   ┌──────────────┐                    ┌──────────────────┐    │
│   │              │   ╭20         23╮  │   WEB BROWSER    │╮26 │
│   │     WS       │   ╯               ╰─│              ▭   │╯   │
│   │              │                    └──────────────────┘    │
│   └──────────────┘                                            │
│   ┌──────────────┐   ╭21         24╮  ┌──────────────────┐    │
│   │     DDS      │   ╯               ╰─│  MUSIC BROWSER   │╮27 │
│   └──────────────┘                    │              ▭   │╯   │
│                      ╭22              └──────────────────┘    │
│   ┌──────────────┐   ╯         25╮    ┌──────────────────┐    │
│   │     PS       │╮               ╰───│   TV         ▭   │╮28 │
│   └──────────────┘╯                   └──────────────────┘╯   │
└─────────────────────────────────────────────────────────────┘
```

Fig.3

Service: SyncProfiles

```
<?xml version= "1.0"?>
-<scpd xmlns="urn:schemas-upnp-org:service-1-0">
   -<specVersion>
      <major>1</major>
      <minor>0</minor>
   </specVersion>
   -<actionList>
         ...
   <actionList>
   -<serviceStateTable>
      -<stateVariable sendEvents="yes">
         <name>Bookmarks</name>
         <dataType>String</dataType>

      </stateVariable>
      -<stateVariable sendEvents="yes">
         <name>FavouriteMusicStyle</name>
         <dataType>String</dataType>
      </stateVariable>
      -<stateVariable sendEvents="yes">
         <name>FavouriteTVChannels</name>
         <dataType>String</dataType>
      </stateVariable>
      </serviceStateTable>
   </scpd>
```

Fig.5

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CP Device Desription

```
<?xml version= "1.0"?>
<root xmlns="urn:schemas-upnp-org:service-1-0">
  <specVersion>
      <major>1</major>
      <minor>0</minor>
  </specVersion>
  <device>
      <deviceType>urn:domainxy:device:ControlPoint:v</deviceType>
      <friendlyName>short user-friendly title</friendlyName>
      <manufacturer>manufacturer name</manufacturer>
      <manufacturerURL>URL to manufacturer site</manufacturer URL>
      <model Desciption>long user-friendly title</modelDescription>
      <modelName>model name</modelName>
      <modelNumber>model number</modelNumber>
      <modelURL>URL to model site</modelURL>
      <serialNumber>manufacturer's serial number</serialNumber>
      <UDN>uuid:UUID</UDN>
      <UPC>Universal Product Code</UPC>
  <iconList>
      ...
  </iconList>
  <serviceList>
      <service>
          <serviceType>urn:domainxy:service:
              SyncWebBrowser:v</serviceType>
          <serviceID>urn:domainxy:serviceID:serviceID</serviceID>
          <SCPDURL>URL to service desription</SCPDURL>
          <controlURL>URL for control</controlURL>
          <eventSubURL>URL for eventing</eventSubURL>
      </service>
      ...
  </serviceList>
  <deviceList>
      ...
  </deviceList>
  <presentationURL>URL for presentation</presentationURL>
  </device>
</root>
```
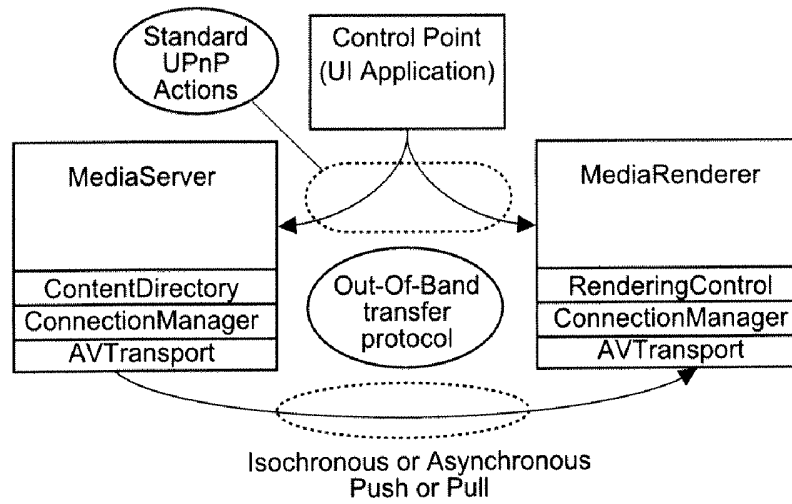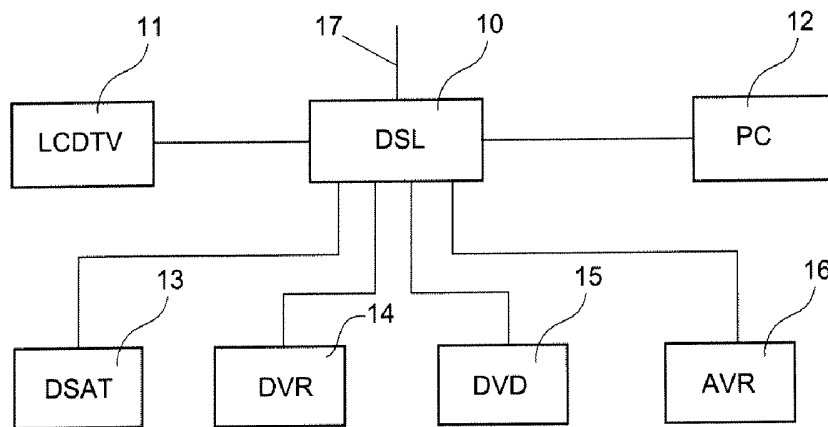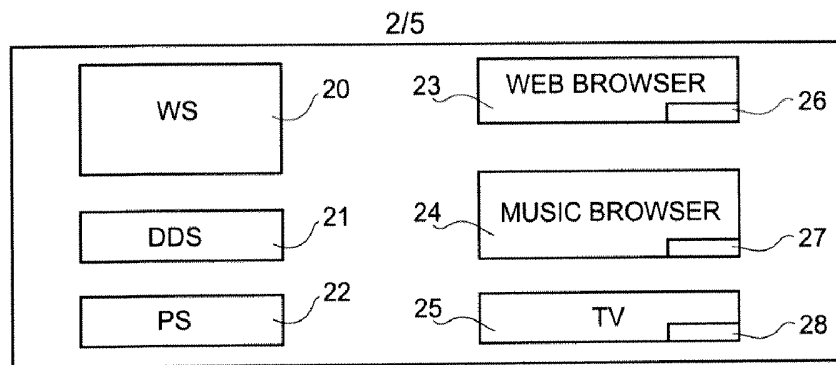
Fig.4

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Fig.6

```
= <bookmarks>
  = <sync>
        <timestamp>561651321</timestampstamp>
        <timestampsync>yes</timestampsync>
        <foresync>no</forcesync>
    </sync>
  = <bookmarklist>
      = <bookmark>
          <name>Domain</name>
          <description>Domaindescription</description>
          <url>http://www.domain.com</url>
        </bookmark>
      = <bookmark>
          <name>Domain 2</name>
          <description>Domaindescription 2</description>
          <url>http://www.domain2.com</url>
        </bookmark>
        ...
    </bookmarklist>
</bookmarks>
```
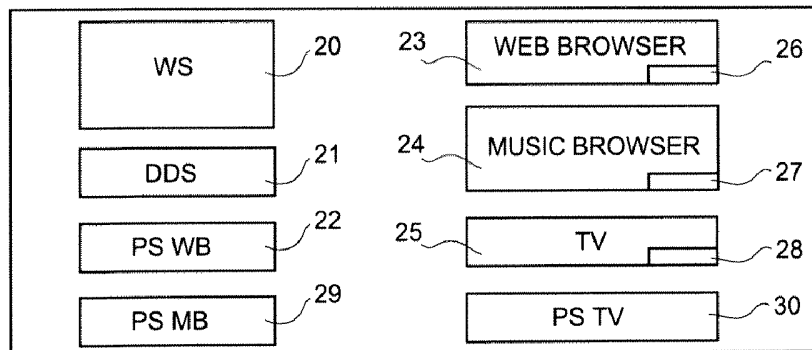
Fig.8

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Service: SyncWebBrowser

```
<?xml version="1.0"?>
-<scpd xmlns="urn:schemas-upnp-org:service-1-0">
   -<specVersion>
       <major>1</major>
       <minor>0</minor>
   </specVersion>
   -<actionList>
       ...
   </actionList>
   - <serviceStateTable>
      -<stateVariable sendEvents="yes">
          <name>Bookmarks</name>
          <dataType>String<dataType>
      </stateVariable>
      - </stateVariable sendEvents="yes">
          <name>BrowserConfiguration</name>
          <dataType>String</dataType>
      </stateVariable>
      </serviceStateTable>
   </scpd>
```

Service: SyncMusicBrowser

```
<?xml version="1.0"?>
-<scpd xmlns="urn:schemas-upnp-org:service-1-0">
   -<specVersion>
       <major>1</major>
       <minor>0</minor>
   </specVersion>
   -<actionList>
       ...
   </actionList>
   -<serviceStateTable>
      -<stateVariable sendEvents="yes">
          <name>FavouriteMusicStyle</name>
          <dataType>String<dataType>
      </stateVariable>
      </serviceStateTable>
   </scpd>
```

...

Fig.7

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2006/060138

A. CLASSIFICATION OF SUBJECT MATTER
H04L12/28　　H04L29/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 725 281 B1 (ZINTEL WILLIAM MICHAEL ET AL) 20 April 2004 (2004-04-20) paragraphs [0006], [0007], [0040], [0047], [0053], [0056], [0060], [0061], [0088], [0105], [0130], [0142], [0177], [0403], [0530]	1-20
Y	US 2004/100492 A1 (MERCS JAMES S) 27 May 2004 (2004-05-27) abstract paragraphs [0003], [0015], [0019], [0089]	1-20
A	US 2002/083143 A1 (CHENG DOREEN YINING) 27 June 2002 (2002-06-27) paragraphs [0011], [0018], [0023] – [0025], [0027], [0038], [0049], [0061] – [0065]	1-20

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| X | Further documents are listed in the continuation of Box C. | X | See patent family annex. |

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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Date of the actual completion of the international search	Date of mailing of the international search report
28 March 2006	03/04/2006

| Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016 | Authorized officer Ramenzoni, S |

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2004/205172 A1 (KIM DOHEON) 14 October 2004 (2004-10-14) paragraphs [0003] - [0020], [0035], [0038] figure 4a	1-20
A	RITCHIE J ET AL: "UPnP AV Architecture: 0.83" DESIGN DOCUMENT MICROSOFT, 12 June 2002 (2002-06-12), pages 1-22, XP002271673 cited in the application chapter 5	1-20

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
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			US	2005022210 A1	27-01-2005
US 2004100492	A1	27-05-2004	NONE		
US 2002083143	A1	27-06-2002	CN	1428034 A	02-07-2003
			EP	1346531 A2	24-09-2003
			WO	0249276 A2	20-06-2002
			JP	2004516711 T	03-06-2004
US 2004205172	A1	14-10-2004	CN	1523828 A	25-08-2004
			JP	2004252974 A	09-09-2004