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(54) Title: REDIRECTION OF TRANSFERRED INFORMATION

(57) Abstract: A method of redirecting the flow of information that previously just passed through a service provider, to be directly sent to information consumers without passing through the service provider, and a system carrying out the method. The flow of information is redirected by a virtual service provider interface placed at a content provider in question. The content providers with the virtual service provider interface will believe that they are communicating with the service provider and sending the information there.

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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.
Redirect of transferred information

FIELD OF THE INVENTION
The present invention relates generally to a method and a system for reliably and efficiently transferring information from one or more content providers to one or more information consumers.

BACKGROUND TO THE INVENTION
A system with information, i.e. a content provider, will usually have some incentive, monetary or otherwise, to distribute this information to one or more individuals and/or other systems, i.e. information consumers, that have or could have an interest in the information. A content provider will usually want to be able to distribute the information in a simple and efficient manner. Distributing information from one or more content providers to one or more information consumers traditionally involves a service provider. A service provider provides a uniform interface for the content providers when they distribute information and also a uniform interface for all the information consumers for receiving purposes. All information is transferred via a service provider to ensure, for example, that the information has the right format for the information consumers. It is also of a great convenience for the information consumer to receive information from a multitude of different content providers via, for example, a single service provider. As a comparison most people find it more convenient to shop in a store than to buy directly from all the different individual manufacturers. By using a service provider information consumers have an easier time finding the information they require from different content providers and a content provider has an easier time to reach interested information consumers. Information can, for example, be audio, video or data, and take many different forms, for example in the form of music, advertisements, movies, electronic encyclopedias, books or magazines, or internet access. A system utilizing such a distribution
structure for projecting advertisements in subway stations is disclosed in WO 97/41546. As mentioned above, there are many advantages of utilizing such a distribution structure, however, it could be considered a disadvantage that all the information will pass through the service provider putting a heavy demand on the availability and security of the service provider and a heavy demand on the required bandwidth into and out of the service provider. There is thus a need to optimize the information transfer to end-users in a cost efficient manner.

SUMMARY OF THE INVENTION

An object of the invention is to define a method for reducing the bandwidth requirements of a service provider.

Another object of the invention is to define a cost efficient information transfer system for presentation of information to one or more end users.

The aforementioned objects are achieved according to the invention by a method of redirecting the flow of information that previously just passed through a service provider, to be directly sent to information consumers without passing through the service provider, and a system carrying out the method. The flow of information is redirected by a virtual service provider interface placed at a content provider in question. The content providers with the virtual service provider interface will believe that they are communicating with the service provider and are sending the information there. A content provider with a virtual service provider interface will not notice any difference. A virtual service provider interface will preferably sort the traffic of information such that information intended for the information consumers will be transferred directly to the information consumers, i.e. directly without passing through the service provider, and communication with the service provider is directed to the service provider. This can in some embodiments provide an optimum solution as to information flow. A virtual service provider interface can be implemented as pure software in a content provider, as a hardware add-on, or as a mixture, in dependence on the specific embodiment.
The aforementioned objects are also achieved according to the invention by a method of distributing information via a wireless transfer system, to be displayed at one or more information consumers, from one or more content providers by means of a service provider. According to the invention the method comprises a number of steps. In a first step the one or more content providers transfer communication to a service provider interface, the service provider interface being a virtual interface residing at a content provider in question. In a second step the virtual interface transfers information to the transfer system. In a third step the transfer system transfers information provided by the virtual interface to the one or more information consumers.

The method can advantageously in some versions further comprise the step of the virtual interface sorting the received communication into communication to the service provider and information to the one or more information consumers, and the step of transferring the communication to the service provider from the virtual interface to the service provider.

The transfer system can advantageously be either a broadcasting system transferring information by means of at least one transmitter, a multicast transfer system, or a point to point transfer system. The broadcasting system is advantageously a digital audio broadcasting (DAB), a digital video broadcasting (DVB), or another type of digital broadcasting for use as an information transfer medium to the one or more information consumers. The multicast transfer system is advantageously unified mobile transmission service (UMTS), GSM packet radio service (GPRS), or the like.

The information consumer can be a stationary or mobile receiver, or a stationary or mobile advertisement and information point.
Preferably the virtual interface transfers statistics to the service provider of information transfers between the virtual interface and the transfer system. The statistics can for example be used for billing purposes.

One or more of the features of the above-described different methods according to the invention can be combined in any desired manner, as long as the features are not contradictory.

The aforementioned objects are further achieved in accordance with the invention by a system of distributing information via a wireless transfer system, to be displayed at one or more information consumers, from one or more content providers by means of a service provider. The system comprises a service provider interface, a first transfer means, a second transfer means, and a third transfer means to thus carry out the invention. The service provider interface is arranged in at least one of the one or more content providers, the service provider interface being a virtual service provider interface. The first transfer means being arranged at a content provider in question and arranged to transfer communication to the virtual service provider interface residing at the content provider in question. The second transfer means being arranged in the virtual service provider interface and arranged to transfer information to the transfer system. The third transfer means of the transfer system being arranged to transfer information provided by the virtual service provider interface to the one or more information consumers.

The system further advantageously comprises a sorting means and a fourth transfer means. The sorting means being arranged in the virtual service provider interface and arranged to sort the received communication into communication to the service provider and information to the one or more information consumers. The fourth transfer means being arranged to transfer the communication to the service provider from the virtual service provider interface to the service provider.
The transfer system can advantageously be either a broadcasting system transferring information by means of at least one transmitter, or a point to point transfer system. The broadcasting system is advantageously a digital audio broadcasting (DAB), a digital video broadcasting (DVB), or another type of digital broadcasting for use as an information transfer medium to the one or more information consumers.

Different embodiments of the system according to the invention can also be reached according to additional features mentioned above in connection with the description of the method according to the invention. The features of the above-described different embodiments of a system according to the invention can be combined in any desired manner, as long as no conflict occurs.

By providing a method for redirecting the transfer of information to one or more information consumers and by providing a system that implements the method, a number of advantages over prior art systems are attained. The required transfer bandwidth at a service provider can be minimized by not transferring information to a service provider, which is not intended for it, by means of a virtual service provider interface. Content providers will be able to distribute information to the intended one or more information consumers faster, i.e. without delay, as the information is not delayed by having to pass through, or be processed by, a service provider. Further, reliability is increased as the system does not come to a halt if the service provider of the system malfunctions.

DESCRIPTION OF THE FIGURES

The invention will now be described in more detail for explanatory, and in no sense limiting, purposes, with reference to the following figures, in which

Fig. 1 shows a block diagram of a system to which the invention advantageously can be applied,

Fig. 2 shows a block diagram of a system according to the invention,
Fig. 3 shows a flow chart of a basic method of transferring information to one or more information consumers according to the invention.

5 DESCRIPTION OF PREFERRED EMBODIMENTS

The invention concerns the transfer of information to one or more information consumers. The invention concerns information consumers that are either stationary or mobile. Mobile information consumers can either be passing through an area of interest, be completely within the area of interest for the complete route, or with just one end point within the area of interest and the route passing out of the area of interest. The information can, according to one embodiment of the invention, be transferred to an information consumer by means of a broadcasting system using, for example, one or more transmitters. In such embodiments, a suitable area of interest is the approximate or the coverage area of the broadcasting system or one or more of the transmitters of the broadcasting system. A preferable broadcasting system is either a digital audio broadcasting system (DAB), a digital video broadcasting system (DVB), or other type of digital broadcasting system.

According to the invention use is made of a service provider. The service provider will provide and control flow of information from one or more content providers to one or more information consumers.

An information consumer is normally a machine which will terminate and present the information in one way or another to a user, or further transfer, at least selected information that is received by it. An information consumer can also be seen as a user desiring information. An information consumer receives information from a service provider. A service provider can provide a part of the information but will commonly not generate any information itself. A service provider is the central management point, which will properly logically direct information from an external source, a content provider, to an external destination, an information consumer. Information is transferred to a service provider from one or more information or so
called content providers. A content provider is a source of information. The information can preferably be broadcasted to the information consumers.

In order to clarify the system according to the invention, some examples of its use will now be described in connection with Figures 1 to 3.

Figure 1 shows a block diagram of a system to which the invention advantageously can be applied. One or more content providers 120, 122 are communicatively connected 150, 152 to a service provider 110 to supply the information for one or more information consumers 140, 142. The service provider suitably comprises security functions 112 towards the content providers 120, 122, routing functions 116 for determining transport path of the information, and billing functions 114 for determining degree of utilization of each content provider 120, 122 and/or each information consumer 140, 142 for billing purposes. Each information consumer 140, 142, preferably has a respective presentation display 141, 143 for presentation of information. The information transfer system 170, 172 from the service provider to the information consumers 140, 142 can preferably be a broadcasting system such as DAB, DVB, or of another digital communication type. An optional back channel transfer system 171, 173 to the service provider 110 from each information consumer 140, 142 is also indicated, although some implementations will not need and/or implement such a back channel. Such a system can be considered vulnerable because all the information flow has to pass through the service provider and is thus dependent on the functionality of the service provider.

Figure 2 shows a block diagram of a system according to the invention. Figure 2 is similar to Figure 1 in that it also comprises a service provider 210 with security 212, billing 214 and routing functions 216, a first content provider 220, a second content provider 222, a first information consumer 240, a presentation display of the first information consumer 241, a second information consumer 242, and a presentation display of the second information consumer 243. Further, all of the transfer systems 250, 252 between the content providers 220, 222 and the service provider 210, the
transfer systems 270, 272 from the service provider 210 to the information consumers 240, 242 are shown. Optional back channel transfer system(s) from the information consumers 240, 242 to the service provider 210 are not shown. According to the invention, to restrict the dependence of the service provider 210 and also to restrict the bandwidth requirements into and out of the service provider 210, at least one content provider 220, 222 is provided with a virtual service provider interface 221, 223. The virtual service provider interface 221, 223 will redirect at least a part of the flow of information from a content provider 220, 222 in question directly to the one or more information consumers 240, 242 without passing through the service provider 210. The content provider 220, 222 in question will be unaware of the redirection of the information flow. The corresponding virtual service provider interface 221, 223 looks and acts as if the content provider 220, 222 in question was directly connected to the service provider 210 as in Figure 1. A virtual service provider interface 221, 223 according to the invention will comprise necessary safety, security and encryption functions 232, applications with complete communication stacks, typically a Java application, and other necessary functions such as at least part of billing functions 234 and routing functions 236 for communication with the service provider 210, direct communication with the one or more information consumers 240, 242 and a proper interface to the content provider 220, 222.

The virtual service provider interface 221, 222, possibly under one or more rules, redirects information that is intended for the one or more information consumers 240, 242 to an information transfer system 251, 253. The transfer system 251, 253 transfers data between the virtual service provider interface 221, 223 of the content provider 220, 222 and a combiner 275, 277. The combiner 275, 277 adds the information from the virtual service provider interface to the transfer system(s) 270, 272 between the service provider 210 and the information consumers 240, 242. A combiner 240, 242 can, for example, be a router or a part of a DVB or DAB infrastructure, such as a multiplexer which creates the data streams that are broadcasted. A combiner 240, 242 suitably combines the data streams from the
virtual interfaces and those from the service provider. A combiner will also suitably perform any necessary protocol conversions and comprise any necessary security functions 238. The one or more combiners 275, 277 and/or the one or more information transfer systems 270, 272 are in some applications suitably a single combiner and a single broadcasting system respectively. The service provider 210 has given the one or more combiners 275, 277 instructions on how and from where information is allowed to originate and be joined into the flow of information in the one or more transfer systems 270, 272 to the one or more information consumers 240, 242. Suitably the service provider 210 sets and removes any validities, privileges and authorizations. One possibility according to the invention is that the authorizations in a respective combiner 275, 277 is time stamped, i.e. only valid up to a certain time and date. In some applications the authorizations are only valid at certain times during a day and/or week.

The possible one or more rules under which information is redirected by the virtual service provider interface 221, 223 can suitably be sorting/determination if there is any communication to the service provider and then transfer this directly to the service provider 210. Another possibility according to the invention is to direct non-realtime and especially large information quantities over the service provider 210 and redirect realtime and possibly smaller information quantities directly to the one or more information consumers 240, 242 without passing through the service provider 210. These and other constraints of, for example, what is allowed and what is not allowed to be transferred directly to the information consumers 240, 242 is suitably remotely controlled by the service provider 210. In some applications the features are preprogrammed into the virtual service provider interface 210, in other applications they can be dynamically updated by, for example, the service provider 210. The virtual service provider interface 221, 223 suitable transfers statistics of, for example, the amount of data the content provider 220, 222 transfers directly the combiner 275, 277, to the service provider 210 for the purpose of billing.
Figure 3 shows a flow chart of a basic method of transferring information to one or more information consumers according to the invention. It is to be understood that the flow chart is presented in a sequential manner, but as is noted below many of the steps can be performed in parallel or in a different order. In a first step 310, information to be transferred is generated/determined. After the first step 310, a second step 320 transfers all communication that the content provider has with a service provider, including the generated/determined information, to a service provider interface, which according to the invention is a virtual service provider interface situated at the content provider in question. In a first optional step 322, after the second step 320, the information transferred to the virtual service provider interface is sorted into information that is solely intended for the information consumer(s) and into communication that should be transferred to the service provider first. A second optional step 324, after the first optional step 322, transfers to the service provider, communication that is sorted/determined to the service provider. A third step 330, after either the second step 320 or possibly, if implemented, one of the optional steps 322, 324 transfers information from the virtual service provider interface directly to a transfer system such as a broadcasting system. Finally a fourth step 340, after the third step 330, transfers the information via the transfer system to the one or more information consumers.

The transfer system to the one or more information consumers can advantageously be a broadcasting system such as digital audio broadcasting (DAB), digital video broadcasting (DVB), or another digital broadcasting system. Information that is transferred over a broadcasting system, especially if there is no feedback channel (uplink) to ask for specific desired information, is usually transferred with error correction coding continuously or at certain intervals and when there is a change. The repetition rate can be in dependence on the environment, e.g. geographical, and/or the type of information to be transferred. One type of information transfer is based on the assumption that the information to be transferred is divided into many parts that are often and independently updated and therefore needs to be continuously transferred over and over again. This type of information transfer is also suitable
when the content provider does not know when a single receiver is turned on and therefore to ensure that all receivers are able to receive all the information of interest. This type of information transfer is often referred to as using data carousels. A service provider could, for example, have a total of 50 pieces of information to broadcast. These 50 pieces of information are then continuously transferred, starting with the first one, then the second one and so on until the fiftieth has been transferred, then the procedure starts all over again with transferring the first piece of information again, and then the second one again and so on. If one piece of information becomes obsolete then it is removed and perhaps replaced by new updated information. Stock market information is suitable for this type of information transfer. Another type of information transfer is based on the assumption that the information is in larger parts that do not change very frequently, e.g. commercials. This type of transfer is also suitable when all interested receivers are more or less continuously tuned in and waiting for new updated information. This type of transfer is often referred to as a file transfer system.

A system according to the invention preferably implements in a virtual service provider interface a suitable combination or either one of the carousel transfer and the file transfer systems in dependence on the specific type of information to be transferred.

The present invention can be put into apparatus-form either as pure hardware, as pure software or as a combination of hardware and software. If the method according to the invention is realized in the form of software, it can be completely independent or it can be one part of a larger program. The software can suitably be located in a general-purpose computer or in a dedicated computer.

As a summary, the invention can basically be described as a method and a system which provide means to enable information such as advertisements, to be transferred directly to one or more information consumers, without having to pass through a
service provider first, by means of a virtual service provider interface at a content provider in question.

The invention is not limited to the embodiments described above but may be varied within the scope of the appended patent claims.
FIG 1 a block diagram of a system to which the invention advantageously
5 can be applied,
110 a service provider,
112 security/safety interface of service provider such as a firewall,
114 billing functions of service provider,
116 routing functions of service provider,
120 a first content provider,
122 a second content provider,
140 a first information consumer,
141 a presentation display of the first information consumer,
142 a second information consumer,
143 a presentation display of the second information consumer,
150 an information transfer system between the first content provider and
152 the service provider,
152 an information transfer system between the second content provider
and the service provider,
170 an information transfer system from the service provider to the first
information consumer,
171 an optional back channel transfer system from the first information
consumer to the service provider,
172 an information transfer system from the service provider to the second
information consumer,
173 an optional back channel transfer system from the second information
consumer to the service provider.

FIG 2 a block diagram of a system according to the invention,
30 210 a service provider,
212 security/safety interface of service provider such as a firewall,
billing functions of service provider,

routing functions of service provider,

a first content provider,

a virtual service provider interface at the first content provider,

a second content provider,

a virtual service provider interface at the second content provider,

security/safety interface of a virtual interface of a content provider,

billing functions of a virtual interface of a content provider,

routing functions of a virtual interface of a content provider,

security/safety interface/function of a combiner,

a first information consumer,

a presentation display of the first information consumer,

a second information consumer,

a presentation display of the second information consumer,

an information transfer system between the first content provider and the service provider,

an information transfer system between the virtual service provider interface of the first content provider and a combiner,

an information transfer system between the second content provider and the service provider,

an information transfer system between the virtual service provider interface of the second content provider and a combiner,

an information transfer system from the service provider to the first information consumer,

an information transfer system from the service provider to the second information consumer,

a combiner, for adding information flow arriving directly from the virtual interfaces of the first and second content providers to the information transfer system to the first information consumer,
a combiner, for adding information flow arriving directly from the
virtual interfaces of the first and second content providers to the
information transfer system to the second information consumer.

a flow chart of a basic method of transferring information to one or
more information consumers according to the invention,

a first step of generating/determining information to be transferred to a
service provider,

from the first step: a second step, which transfers the information to a
virtual service provider interface,

from the second step: a first optional step sorts the information
transferred to the virtual service provider interface into information
that is solely intended for the information consumer(s) and into
communication that should be transferred to the service provider first,

from the first optional step: a second optional step which transfers to
the service provider communication which is sorted/determined to the
service provider,

from the second step or one of the optional steps: a third step which
transfers information from the virtual service provider interface
directly to a transfer system such as a broadcasting system,

from the third step: a fourth step which transfers the information via
the transfer system to the one or more information consumers.
CLAIMS

5
1. A method of distributing information, to be displayed at one or more information consumers, from one or more content providers by means of a service provider via a wireless transfer system, characterized in that the method comprises the following steps:

10 - the one or more content providers transferring communication to a service provider interface, the service provider interface being a virtual interface residing at a content provider in question;
- the virtual interface transferring information to the transfer system;
- the transfer system transferring information provided by the virtual interface to the one or more information consumers.

2. The method according to claim 1, characterized in that the method further comprises the following steps:

20 - the virtual interface sorting the received communication into communication to the service provider and information to the one or more information consumers;
- transferring the communication to the service provider from the virtual interface to the service provider.

25 3. The method according to claim 1 or 2, characterized in that the transfer system is a broadcasting system such as digital audio broadcasting (DAB) or digital video broadcasting (DVB), transferring information by means of at least one transmitter.

30 4. The method according to claim 1 or 2, characterized in that the transfer system is a point to point transfer system.
5. The method according to claim 1 or 2, characterized in that the transfer system is a multicast transfer system such as unified mobile transmission service (UMTS) or GSM packet radio service (GPRS).

6. The method according to any one of claims 1 to 5, characterized in that the information consumer is a stationary or mobile receiver.

7. The method according to any one of claims 1 to 5, characterized in that the information consumer is a stationary or mobile advertisement and information point.

8. The method according to any one of claims 1 to 7, characterized in that the virtual interface transfers statistics to the service provider of information transfer between the virtual interface and the transfer system.

9. A system of distributing information, to be displayed at one or more information consumers, from one or more content providers by means of a service provider via a wireless transfer system, characterized in that the system comprises:
   - a service provider interface, in at least one of the one or more content providers, the service provider interface being a virtual service provider interface;
   - means at a content provider in question arranged to transfer communication to the virtual service provider interface residing at the content provider in question;
   - means in the virtual service provider interface arranged to transfer information to the transfer system;
   - means of the transfer system arranged to transfer information provided by the virtual service provider interface to the one or more information consumers.

10. The system according to claim 9, characterized in that the system further comprises:
means in the virtual service provider interface arranged to sort the received communication into communication to the service provider and information to the one or more information consumers;

- means arranged to transfer the communication to the service provider from the virtual service provider interface to the service provider.

11. The system according to claim 9 or 10, characterized in that the transfer system is a broadcasting system such as digital audio broadcasting (DAB) or digital video broadcasting (DVB), transferring information by means of at least one transmitter.

12. The system according to claim 9 or 10, characterized in that the transfer system is a point to point transfer system.

13. The system according to claim 9 or 10, characterized in that the transfer system is a multicast transfer system such as unified mobile transmission service (UMTS) or GSM packet radio service (GPRS).

14. The system according to any one of claims 9 to 13, characterized in that the information consumer is a stationary or mobile receiver.

15. The system according to any one of claims 9 to 13, characterized in that the information consumer is a stationary or mobile advertisement and information point.

16. The system according to any one of claims 9 to 15, characterized in that the virtual interface transfers statistics to the service provider of information transfer between the virtual interface and the transfer system.
Fig. 3
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPCL: H04N 7/16, H04N 7/173
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)

IPCL: H04N

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

SE,DK,FI,NO classes as above

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C.

See patent family annex.

Date of the actual completion of the international search

9 July 2001

Name and mailing address of the ISA/Swedish Patent Office

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Date of mailing of the international search report

10 -07- 2001

Authorized officer

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

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