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(54) Title: A SYSTEM FOR SUPPLYING TARGETED ADVERTISEMENTS TO CONSUMERS OF VIDEO AND/OR AUDIO SERVICES

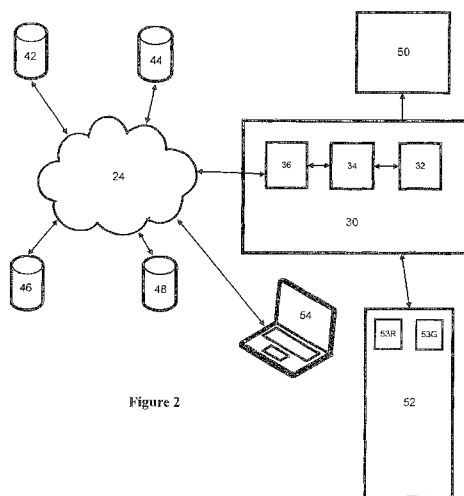


Figure 2

(57) Abstract: A system under the control of a commercial operator (42) for supplying targeted advertisements from an advertisement database (48) for insertion into programmes from a content-provider (44) to a consumer's TV (50) for time-shifted viewing. The adverts can have limitations as to time and/or date of showing and can be restricted by eg postcode. The adverts can be targeted at specified consumer characteristics to a predetermined level of eg 80% accuracy to protect privacy; this is achieved by use of a privacy-enhanced database (46) which stores personal characteristics of each participating consumer and generates for each consumer a pseudo identity which is stored in a pseudo-identity domain (46B). An advertiser has access only to the pseudo-identities. The real identities are decoded by the commercial operator and the targeted advertisements are supplied to the selected consumers.



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**A system for supplying targeted advertisements to consumers of video and/or audio services**

#### **CROSS REFERENCE TO RELATED APPLICATIONS**

- 5 This application claims priority from United Kingdom Patent Application No. 1000338.2 filed 11 January 2010 and from United Kingdom Patent Application No. 1010262.2 filed 18 June 2010, the whole contents of both applications being incorporated herein by reference.

#### **10 BACKGROUND OF THE INVENTION**

##### **Technical Field**

This invention relates to a system for supplying targeted advertisements to viewers of digital television programmes whether conventionally broadcast or provided via the Internet or other means, and similarly to listeners to digital radio programmes, whether  
15 broadcast or provided via the Internet or other means.

##### **Description of the Related Art**

In the specification of US 7,584,223, Hewlett-Packard, targeted advertisements are supplied to consumers while protecting their privacy, and pseudo-identities are generated to permit information in a database to be verified.

20

The present invention may be implemented by use of a Set Top Box (STB) which can be a hardware item separate from and connectable to a television set (to provide upgraded services) or can be incorporated into the set while providing the same functions. Both will be referred to as a STB.

25

As shown in Figure 1, a known STB 10 contains a computer-type hard disc 12 and twin signal decoders/tuners 14. The STB 10 is controlled by a remote control 16, such as an Infra Red control, and supplies signals to the consumer's viewing station such as a TV set or visual display unit 18. The STB receives broadcast digital television and  
30 audio signals from an aerial 20 or a satellite dish 22 or from the Internet 24.

The remote control 16 allows the consumer to navigate through the received digital and audio broadcast channels, to call up an on-screen guide to current and forthcoming

programmes, either for live viewing or for recording on the hard disc 12 for later viewing, and to set parental controls. The consumer can pause live TV, schedule the recording of programmes into the hard disc 12, and watch one channel while viewing another by use of the twin decoders 14. The STB may contain facilities to decrypt  
5 encrypted broadcasts, sometimes by use of a smart card authorisation device (not shown).

When supply through the Internet 24 is selected by the consumer, the consumer is able to use the remote 16 to retrieve video and audio content from the Internet for live  
10 viewing or for storage on the hard disc 12 of the STB 10. The commercial operator can additionally send commands to the STB 10 so that it records broadcast programmes and advertisements, selected by the commercial provider, for storage in the hard disc for later viewing. Additionally, programmes and advertisements can be "pushed" into the STB 10 instead of being broadcast. Save for a blanket refusal to accept this  
15 service, the consumer cannot control this process

Whatever the source of a programme with associated advertisements, if it is stored for later viewing it is a current practice for consumers to "fast forward" through the adverts, and while it is technically possible to disable fast forward controls during  
20 advertisements, this is disliked by consumers. A result is that advertising in association with programmes provided over Internet services is unpopular, given the loss of potential revenue to service providers.

Further, an STB with Internet connection is technically capable of being used to monitor  
25 and control what a consumer views, which is a growing concern for democratic institutions. While such monitoring would allow the provision of targeted advertising with 100% accuracy, the loss of privacy is unlikely to be tolerable.

These two issues are believed to inhibit the take-up of STBs by consumers.  
30

## **BRIEF SUMMARY OF THE INVENTION**

According to the invention a method of providing targeted advertisements in video

and/or audio programmes comprising the steps of :-

- a multiplicity of consumers supplying personal data;
- generating at least one pseudo identity for each consumer and storing the pseudo identities;
- 5 an advertiser specifying at least one personal datum of a specified number of target consumers and supplying a targeted advertisement;
- identifying the specified number of pseudo identities which match the at least one specified personal datum to a predetermined level less than 100%;
- retrieving the real identities corresponding to the pseudo identities; and
- 10 sending the targeted advertisement to those consumers.

The predetermined level may be between 75% and 85%.

Also according to the invention, a system for supplying targeted advertisements to a  
15 multiplicity of consumers of video and/or audio programmes comprising connection means for connection to a viewing/listening unit of each consumer; and a privacy enhanced database arranged:

- a) to store personal data relating to each consumer in a first, identity domain;
- b) to generate and store, in a second, pseudo identity domain, at least one  
20 pseudo identity for each consumer;
- c) to receive and store at least one specified personal datum; and
- d) to select a specified number of pseudo identities which match the at least one specified personal datum to a predetermined level less than 100%.

25 In the system the privacy enhanced database may be further arranged:

- e) to receive a targeted advertisement,
- f) to identify the consumer viewing/listening units corresponding to the selected pseudo identities; and
- g) to send the targeted advertisement to those units.

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Yet further according to the invention, a Set Top Box for use in the system comprising data storage means; input connection means for connection to a source of digital video and/or audio signals; output means for connection to the STB owner's viewing/listening

unit; control means to control operation of the viewing unit; a digital feed assembler arranged to insert advertisements into the video and/or audio signals; means to store personal data relating to the consumer; and a privacy firewall.

## 5 BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described by way of example with reference to the accompanying drawings in which:

Figure 2 illustrates a system permitting the supply of privacy-enhanced services including a STB;

10 Figure 3 illustrates by means of a flowchart how the user downloads content from the Internet to the STB of Fig 2;

Figure 4 illustrates the format of first and second types of encrypted feed;

Figure 5 illustrates the process of setting up the STB with personal data;

15 Figure 6 illustrates the operation of privacy-enhanced services in the downloading of programmes;

Figure 7 illustrates the operation of getting paid for watching adverts;

Figure 8 illustrates the process of receiving vouchers for interacting with adverts; and

Figure 9 illustrates the process of a consumer updating his profile.

## 20 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

In the system shown in **Figure 2**, an enhanced STB 30 contains a computer-style hard disc 32, a digital feed assembler 34 and a privacy firewall 36. The STB 30 supplies television and audio signals to a TV set 50 and is controlled by a remote control 52  
25 such as an IR control. The remote is provided with viewer response means, in this example the conventional red and green buttons 53R, 53G. The STB 30 is connected to the Internet 24, and the consumer's laptop 54 is also connectable to the Internet. The STB 30 may be separate from or merged into the TV set 50.

30 The Figure also shows a commercial operator 42 (shown as a processor) connected to the Internet 24 and a content-provider 44 (shown as a processor) also connected to the Internet, as are a privacy-enhanced database 46 and an advertisement database 48.

A brief general overview of the operation of the system in fig 2 will be given, followed by detailed descriptions of parts of the system with reference to subsequent Figures.

The commercial operator 42 controls the operation of the privacy-enhanced television service via the Internet 24. The content-provider 44 supplies commercial television programmes funded by advertising and the programmes are encrypted. The advertisement database 48 stores advertisements ready for insertion by the commercial operator 42 in accordance with its commercial relations with advertisers. The privacy-enhanced database 46 is also controlled by the commercial operator 42 via the Internet 24 and it includes personal data relating to every owner of an STB such as STB 30 who wishes to benefit from the service provided by the commercial operator 42. The owners' personal information is kept private by use of pseudo-identities to which access by an advertiser is permitted. When an advertiser sets criteria for recipients of an advert, the system is arranged to give a less than 100% match, such as a 80% match. Thus perfectly targeted adverts are not possible and consumer privacy is enhanced.

In the STB 30, the privacy firewall 36 blocks access to the STB 30 except by the commercial operator 42, and then only in accordance with privacy rules set by the owner of the STB 30.

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The Digital Feed Assembler (DFA) 34 receives encrypted television signals from the Internet 24 through the firewall 36 and decrypts them for provision to the TV 50; the signals are stored in the hard disc 32 of STB 30 for immediate or later viewing. The DFA 34 also, when privacy rules set by the owner of STB 30 permits, interleaves advertisements from the advertising database 48 with the television signals.

On initial purchase of the STB 30, the consumer plugs it in and it automatically registers itself via the Internet 24 by logging its Internet Protocol (IP) address and its unique serial number in the privacy enhanced database 46. The database 46 returns a confirmatory signal to the STB 30, providing a unique code which is stored by the STB and can be called up at any time. If the consumer does not wish to benefit from privacy-enhanced services, no personal data is entered by the consumer and the STB operates in the same way as a prior art STB as shown in figure 1. The owner of the STB can at

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any time decide to benefit from the enhanced services by registering, as will now be described.

For a consumer who does wish to have privacy-enhanced services via the STB 30, instructions are provided when the STB is purchased. The consumer uses the laptop 54 to call-up the registered anonymous STB 30 on screen and to start a personal registration process in the privacy enhanced database 46 via the Internet 24. The unique code number of the STB is displayed on the TV screen 50 and the consumer enters this into database 46 via the laptop 54. Suppose the consumer wishes to accept advertising material in return for free programmes via the Internet; the consumer is asked for their name, address, postcode, number of people in the household, their sexes, and whether they are adult or children; the information is supplied to the privacy database 46, which will be described in detail below.

If the consumer decides to receive television service from the system operator 42 but does not wish to see any advertisements, a fee relating to the unique code number of the STB 30 is paid by any suitable means, such as a debit/credit/card payment over the Internet or the use of Paypal™ or similar service. The fee can be topped up at any time. The privacy-enhanced database 46 accepts, registers and keeps track of the fees but does not permit any withdrawals of money.

**Figure 3** illustrates the process to authorise downloading of encrypted signals to STB 30; there is a three-way handshake involving the STB 30, the privacy-enhanced database (PED) 48 and the content provider 44.

25

In step 102 the STB 30 requests the down load of a specific programme provided by the content provider 44. The programme can be requested by selection from a menu which can be called up on the TV screen 50 by use of the remote 52; this extra feature in the remote is provided by an electronic programme guide software within the STB 30. Following selection of the programme, additional software within the STB 30 takes the STB's unique code (which was generated upon registration of the STB), takes the unique identity code associated with the specific programme and creates an encrypted data packet which the STB 30 sends across the Internet to the privacy enhanced

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database (PED) 46.

In step 104 upon receipt of this encrypted data packet the privacy enhanced database 46 decrypts it, extracting the STB's unique code and the unique identity code  
5 associated with the specific programme. If these are found to be valid the privacy enhanced database will authorise the downloading of the specific programme to the STB 30. In this example the specific programme is hosted (in the conventional sense of running the servers on which the programmes are located) by the content provider 44.

10 In step 106, the privacy enhanced database 46 sends a request acknowledgement to the STB 30 and creates two codes; a Website Authorisation Code (WAC) is sent to the content provider 44 in step 108, and a STB Authorisation Code (SAC) is sent to the STB 30 in step 110.

15 In step 112, on receipt of the WAC the content provider 44 enables the download of the requested programme in encrypted form and sends it to STB 30;

In step 114, the STB 30 stores the encrypted material together with the SAC in the hard disc 32 which acts as a buffer store.

20

In step 116, the consumer requests viewing of the programme by calling up a menu on the TV 50 by use of the remote control 52 and selecting the programme for immediate viewing

25 The DFA (digital feed assembler) 34, which is an appropriately-programmed processor, now assumes control of the STB 30; the DFA has two main functions:-

1. to decrypt encrypted signals and supply them to the TV 50;
2. in certain circumstances controlled by the STB owner to insert advertisements into TV programmes shown on TV 50;

30 The second function is controlled by the consumer when setting up the STB 30 initially; if the consumer has authorised the viewing of advertisements and has provided personal data to the PED 46, then the STB 30 accesses the advertisement database 48 at intervals and downloads advertisements for storage in the hard disc 32; each



advertisement has associated with it various codes including a time code and a date code. Alternatively the STB 30 may receive the advertisements by selectively downloading broadcast advertisements which contain codes that approximately match the characteristics of the personal data recorded in the PED 46 and storing those with  
5 their date codes and time codes on the hard disk 32. For example, an approximate match could be consumers within a broad income band who also own a pet; the more specific match, made at a later stage, would be to select consumers in a narrow income band who own a dog; at the later stage the 80% match is applied. Thus an STB is pre-populated with advertisements which may, or may not, be shown to that consumer,  
10 depending on the precise targeting of an advertisement.

The signals supplied to the STB in step 112 of Figure 3 may be represented as in Figure 4A; as is conventional in TV programmes supported by advertisements, the programme or copyright content 70 is divided into parts separated by time slots 72.  
15 The encryption of the copyright material is indicated at 74.

The DFA 34 decrypts the copyright material 70 and sends it to the TV 50. For each time slot 72 the DFA 34 selects one or more advertisements from the advertisements stored in hard disc 32 and having appropriate time and date indicators, and provides them to  
20 TV 50. The viewer sees a programme with advertisements at intervals, as is known in conventionally-provided commercial TV.

Figure 4B shows the situation for a consumer who has decided not to see advertisements, but to pay for the programme as described above; the copyright  
25 material 70 is not separated by time slots and the consumer views the programme without interruption.

The operation of the privacy-enhanced database 46 will now be described with reference to Figure 5, which illustrates both the hardware and the directions of  
30 information flows. The database 46 includes an identity domain 46A which is accessed by each STB owner to record personal data, and a pseudo identity domain 46B which is not accessible by the STB owners.

When the owner of STB 30 wishes to benefit from enhanced television services according to the invention, the owner's laptop 54 is used to enter personal data 60 into the STB 30 by connecting to the identity domain 46A of the PED 46 via the Internet 24, which sends the data to the STB 30 over the Internet 24. These personal data 60 pass  
5 through the privacy firewall 36 in STB 30. A copy is retained in the identity domain 46A of the privacy enhanced database 46. From this copy of the personal data, the identity domain 46A generates one or more pseudo-identities for each provider of real data, for example by the conventional technique. One such technique is to generate a random number for each real identity. A variation is to generate a random number and to  
10 associate with it the precise time of generation, so that the very low chance of duplication is eliminated. Another way would be to use the known phenomenon of Clock Drift to generate a random number: the timer tick of the operating system of the database is compared with that of a microprocessor running the operating system; since the clock speeds are conventionally different by a factor of 10,000, and since the  
15 microprocessor is affected by interrupts and the like, one tick of the operating system could equal eg 9,995 or 9,998 ticks of the microprocessor, and a random number can be generated from a sequence of such slight differences from 10,000..

The identity domain 46A retains a copy of each pseudo identity and also sends a copy  
20 to the pseudo-identity domain 46B. It will be seen that the information flow arrow 62 is unidirectional; there is no information flow from domain 46B to 46A.

The pseudo identity associated with a consumer is not necessarily a permanent one; each consumer may be allocated a new pseudo identity at intervals, such as once a  
25 week.

**Figure 6** illustrates the position once the STB 30 has been registered and the user has supplied it with some personal data so that advertisements can be targeted. Suppose now that an advertiser 66 informs the commercial operator 42 of the criteria of a target  
30 group, such as males between 30 and 70 having a specific postcode. Advertisers will have pre-registered with the commercial operator and in accordance with the terms of their registration will be entitled to access the pseudo-identity domain 46B as shown by the arrow 68. Under these terms the advertisers 66 can access the pseudo-identity

domain 46B, enter the criteria and in return receive a required number of entries in the form of pseudo identities; the advertiser cannot access the real identities in domain 46A, and the required number of pseudo identities is supplied under the control of the commercial operator 42.

5

There is a further level of privacy for STB owners. It is a feature of the present invention that it is never possible to target specific consumer groups precisely and accurately, because the system is designed to match target consumer groups only to a certain level of accuracy, which is always less than 100%. The level may be set at eg 80% by  
10 the commercial operator 42, but may be set at a higher or lower level, provided that it is less than 100%. The selection can be regarded as diluted or defocused by the deliberate inclusion of non-matching consumers, eg 20% of non-matches.

In the example above, the pseudo identity domain 46B extracts a number of records of  
15 males having the required age and postcode which equals 80% of the total number of records requested by the advertiser, and then extracts a further 20% of the requested number but this time of non-matching records from the domain 46B, (for example records in which the post code is matched but the age range is not). The two sets of records are merged and supplied to the advertiser by domain 46B.

20

The advertiser 66 then sends the extracted records together with the advert to be displayed to the commercial operator 42 who sends this information to the domain 46A. Domain 46A decodes the pseudo identities into the real identities and sends the advert to the STBs corresponding to those real identities.

25

All communications are via the internet 24, not shown in this figure.

The description above is based on the assumption that the data provided by each consumer is completely accurate, but in a practical situation this is unlikely to be true. In  
30 the present invention, this risk of inaccuracy is accommodated.

The further generation of pseudo identities, this time using probability theory, will now be described. Suppose that the database 44 is loaded with a number of consumer

records from STB owners, eg name, address, postcode or zipcode, number of people in the household including their sex and whether they are adult or not. (It will be appreciated that this is similar to the information requested when registering a household appliance such as a washing machine for warranty). The correctness of the information supplied by each consumer can be checked on a mass basis from the publically available trusted sources of information such as Census Records, Council Tax Registration details, Voter Registration and the like. By use of such records, the probability of each record being correct can be assessed by known techniques taking into account factors such as the age of the database with which a comparison is made, the legal penalty for supplying false information to a public database, and the benefit to the consumer for supplying accurate information to a public database.

The assessment of the probability of the personal information supplied by STB owners being correct is by use of Bayes' Theorem. In a simple situation involving discrete distributions, Bayes' theorem relates the conditional and marginal probabilities of events A and B, where B has a non-vanishing probability, the relationship being given by:

$$P(A/B) = \frac{P(B/A)P(A)}{P(B)}$$

Each term in Bayes' theorem has a conventional name:

P(A) is the prior probability or marginal probability of A. It is "prior" in the sense that it does not take into account any information about B.

P(A/B) is the conditional probability of A, given B. It is also called the posterior probability because it is derived from or depends upon the specified value of B.

P(B/A) is the conditional probability of B given A.

P(B) is the prior or marginal probability of B, and acts as a normalising constant.

In the present invention, A may be the probability that the viewer watching a particular STB is male, and B may be the probability that the viewer watching a particular STB is between the ages of 30 and 70.

30

The assessed probability of correctness of each item of data supplied by each STB owner to identity domain 46A is used to calculate a pseudo identity for each actual identity as before, and the pseudo identities are stored in the identity domain 46A and

the pseudo identity domain 46B. The domain 46B is not accessible to the STB owners, or indeed to anyone other than the commercial operator 42. This use of probability has the advantage of substantially increasing the chance of consumer information from which pseudo identities are calculated being correct. This improves the accuracy of the  
5 targeting of advertisements.

The advertisements stored in the advertisement database 48 and downloaded to hard disc 32 include various codes including a time code and a date code. The time code may prevent showing before 9pm. Another code may allow the advert to be shown not  
10 more than once in three days. Yet another code may set date limits so that it must be shown before eg Christmas Day.

With the provision of advertisements according to the invention, it will be clear that the adverts will be different on repeated viewing of the programme. Further, if a consumer  
15 requests a programme download before Christmas but does not view it until after the New Year, the DFA 34 in the consumer's STB 30 will assemble only appropriate advertisements, eg those relating to a New Year Sale.

Additionally the adverts can be targeted; the privacy-enhanced database 44 includes  
20 personal data provided by all STB owners and an advert can be targeted using any type of data. The dilution to a less than 100% match to the personal data still protects privacy.

For example, an advert can include coding to indicate that it is to be shown only to  
25 consumers having a specified postcode; this can be used by local businesses to advertise their services only to local residents; the charge made by the content provider 44 for such an advert will be much less than the cost of traditional nation-wide TV advertising, which has previously been prohibitive for local businesses. In combination with a timing indicator, a local restaurant whose bookings are low on Tuesday evenings  
30 could place an advert to be shown early on Tuesdays up to a specified time, the advert reading "If you make a booking for this evening and give the following codeword (to show that the advert is the origin of the booking) then you will receive a 20% discount on your bill".

Since the advert codes can include time-of-showing, it is possible using the invention to hold dynamic auctions for prime time slots. Suppose an auction is held for a 30 second time slot in a prime time interval, eg between 8pm and 8.30pm. The auction runs until  
5 7.30pm, and the advert of the winner is inserted into the advertising database 48 in a prioritised manner so that it is downloaded immediately to STBs for showing in the prime time slot, provided the STB owner is in fact watching TV during that time interval.

An option in use of the invention is that, when a STB is registered, it can be provided  
10 with a customised Home Page. When the remote control 52 is used to navigate through a programme guide displayed on the TV 50, the display can be arranged to contain programmes and playlists based on personal choices, which can be registered by the STB user, or generated from the user's viewing statistics. For multi-users such as a family, each person can have an individual Home Page selectable on the TV  
15 screen.

A privacy-enhanced system according to the invention may also be used to provide direct financial benefits, such as cash, money-off vouchers and the like. For this the consumer must supply his mobile 'phone or cellphone number. This is shown in **Figure**  
20 **7**. The system to which the STB 30 is connected now includes a mobile phone 56, whose number is registered in the privacy-enhanced database 44. This is information which has not previously been provided or used in this description.

The mobile 56 is used to receive payments from the system provider 42, because in  
25 effect the consumer is being paid to watch TV with adverts; the arrangement is shown in Figure 7. The STB 30, TV 50 and remote 52 are as shown in figure 2; the STB is connected to the Internet 24 and the STB owner's mobile 56 is connected either to the Internet 24 as illustrated or alternatively to a mobile network which supports SMS messaging. The remote 52 is provided, as is conventional, with red and green buttons  
30 53R, 53G, forming consumer response means. The system now includes a viewer credit database which is located in the identity domain 46A of the privacy enhanced database 46. When the consumer watches an advert inserted into programmes by the STB 30 (rather than "fast forwarding" through the advert), this fact is recorded by the

STB and a signal is sent to the commercial operator 42; for watching the adverts, the consumer receives an electronic payment which is recorded in the identity domain 46A shown in Figure 7. Upon the instruction of the consumer the reward could be transferred to the mobile 56 as a barcode. The barcode can be used for purchases in a shop or restaurant etc (on condition that the shop or restaurant is a participator in the advertiser's programme and is prepared to accept the barcode as a mode of payment for goods or services). Alternatively the rewards for watching and responding to advertisements could be accumulated in the identity domain 46A and used as credits to permit the consumer to watch downloaded content without adverts, as described with reference to Figure 4B.

The arrangement may also be used for benefits such as money-off vouchers as also shown in **Figure 7**. Suppose an advert includes in the last ten seconds it is shown the message "Press the green button 53G on your remote for a 20% voucher off your next purchase" (of the product just advertised); if the consumer presses the green button, an electronic voucher is delivered to the mobile 56 as a barcode.

The arrangement can also be used to distinguish between a consumer who had watched an advert, such as a special offer as described above, and one who is not interested in the offer. The consumer is now requested to respond to every advert and is rewarded for doing so, as illustrated in Figure 8 In step 202 the consumer selects, at the beginning of a viewing session, to be "paid to view adverts". In step 204, during the advertisement break the consumer is shown an advert and is requested to indicate his interest or lack of interest; in step 206 the consumer does nothing and this is recorded in the STB 30 in step 212; in step 208 the consumer indicates lack of interest by pressing the red button 53R and in step 214 the STB 30 records this; in step 210 the consumer indicates interest in the special offer by pressing the green button 53G on the remote 52 and in step 216 the STB 30 records this. The sequence is repeated for subsequent adverts and at the end of the advertising break the STB 30 restarts the programme and credits or debits the viewer account in the consumer credit database; debits are made when the consumer has not responded at all and credits are made for responses, even when the consumer is not interested in the offer, because the advertiser can now refine the advert if necessary.

If a consumer has chosen to be paid for watching adverts by the provision of vouchers, the advertiser can offer the consumer the option of answering questions to improve targeting. This process is illustrated in Fig 9 . In step 402 the consumer selects payment by vouchers and in step 404 the STB lists available vouchers and asks a  
5 question to update the consumer's profile or to refine targeting, optionally by use of a pre-populated answer which permits a faster response and minimises delay in programme-watching. The consumer responds in step 406. In steps 408 and 410 the STB 30 updates the profile, and checks the account and in step 412 the consumer receives the voucher, provided sufficient credits have been generated.

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There is also the option for a consumer of reviewing responses previously made to adverts, of responding to adverts previously ignored, and therefore of increasing his credit total. In a further option the consumer is provided with a PIN code and is permitted access to his recorded profile so as to check or update it via secure access.

15

Even with the voluntary updating of recorded profiles by consumers, adverts are still provided to consumer STBs in diluted form with 80% match, or other selected percentage less than 100%.

20 While the example of 80% match in the diluted selection of consumers has been used above, a different percentage can be set by the commercial operator. For example a lower match such as 75% may be set, although this may result in less efficient use of advertising expenditure as fewer adverts will reach a matched consumer. Alternatively a higher match such as 85% may be set, although this may result in lower protection of  
25 consumer privacy.

In addition, the 80% or other selected percentage can be applied either to the data as supplied by the consumers, which may or may not be accurate, or to that data after processing by comparison with a publicly available database, when the data have a  
30 greater likelihood of being accurate.

While the preferred embodiment describes the generation of pseudo identities in the privacy-enhanced database, they may alternatively be generated within each STB. The



commercial operator 42 then instructs the STB to generate a new or replacement pseudo identity, which the STB records, and also sends a copy to the commercial operator.

- 5 Further, an advertiser can sell his adverts to consumers without the use of a distributor or other intermediary.

While the Figures show programmes provided through the Internet, use of aerials and satellite dishes can also be incorporated so that broadcast programmes can include  
10 targeted advertising with the permission of the broadcaster. While the invention has been described with reference to television services, the same service may be applied to radio.

## CLAIMS

1. A method of providing targeted advertisements in video and/or audio programmes comprising the steps of :-
- 5 a multiplicity of consumers supplying personal data;  
generating at least one pseudo identity for each consumer and storing the pseudo identities;  
an advertiser specifying at least one personal datum of a specified number of target consumers and supplying a targeted advertisement;
- 10 identifying the specified number of pseudo identities which match the at least one specified personal datum to a predetermined level less than 100%;  
retrieving the real identities corresponding to the pseudo identities; and  
sending the targeted advertisement to those consumers.
- 15 2. A method according to claim 1 further including the step of processing said personal data by probability matching against at least one publicly available database.
3. A method according to claim 1 or claim 2 in which the predetermined level is between 75% and 85%.
- 20 4. A system for supplying targeted advertisements to a multiplicity of consumers of video and/or audio programmes comprising connection means for connection to a viewing/listening unit of each consumer; and a privacy enhanced database arranged:
- a) to store personal data relating to each consumer in a first, identity domain;
- 25 b) to generate and store, in a second, pseudo identity domain, at least one pseudo identity for each consumer;
- c) to receive and store at least one specified personal datum; and
- d) to select a specified number of pseudo identities which match the at least one specified personal datum to a predetermined level less
- 30 5. A system for supplying targeted advertisements according to claim 4 in which the privacy enhanced database is further arranged:
- e) to receive a targeted advertisement,

f) to identify the consumer viewing/listening units corresponding to the selected pseudo identities; and

g) to send the targeted advertisement to those units.

- 5 6. A system for supplying targeted advertisements according to claim 4 or claim 5 in which the privacy enhanced database is arranged to pass personal data unidirectionally from the identity domain to the pseudo identity domain.
7. A system for supplying targeted advertisements according to any one of claims 4 to 10 6 further comprising an advertisement database, and in which the privacy enhanced database, the advertisement database and the consumer viewing/listening units communicate via the Internet.
8. A system according to any one of claims 4 to 7 further arranged to process said 15 personal data by probability matching against at least one publicly available database.
9. A system according to any one of claims 4 to 8 further comprising consumer input means by which a consumer can respond to an advertisement.
- 20 10. A system according to any one of claim 4 to 9 in which each consumer viewing/listening unit comprises a Set Top Box.
11. A Set Top Box according to claim 10 comprising data storage means; input connection means for connection to a source of digital video and/or audio signals; 25 output means for connection to the STB owner's viewing/listening unit; control means to control operation of the viewing unit; a digital feed assembler arranged to insert advertisements into the video and/or audio signals; means to store personal data relating to the consumer; and a privacy firewall.
- 30 12. A STB according to claim 11 arranged so that only the STB owner can enter personal data into the means to store personal data.

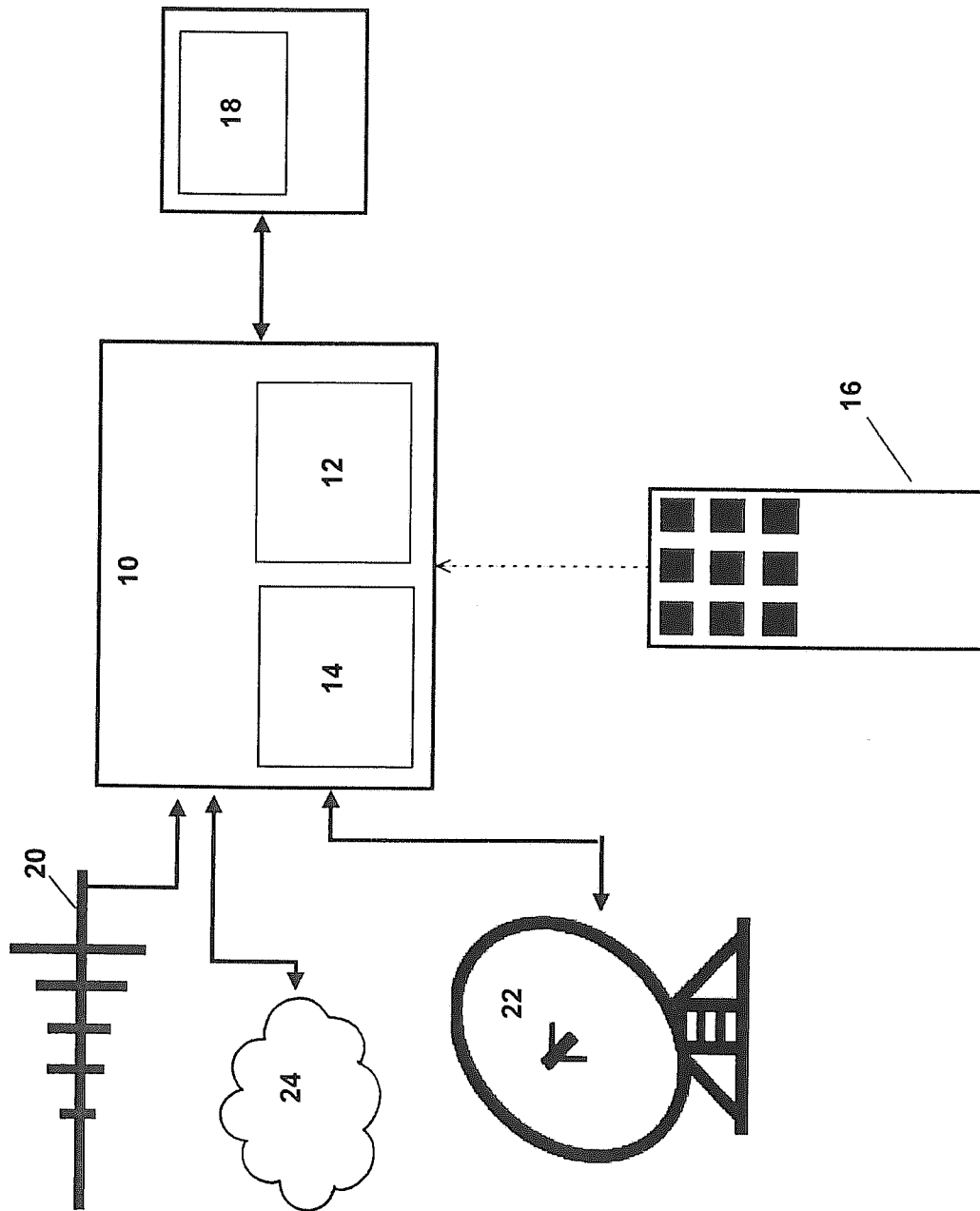


Figure 1

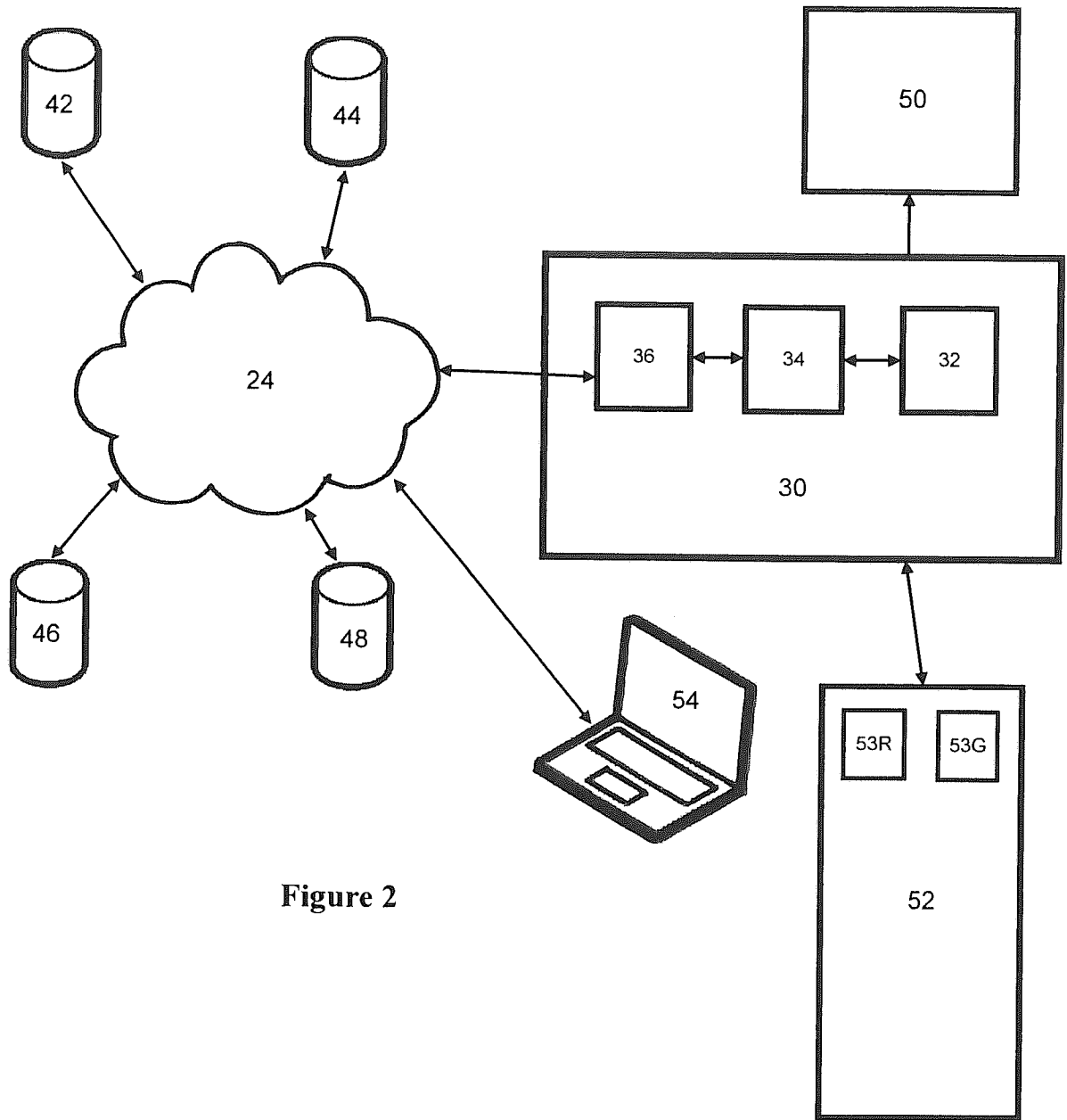


Figure 2

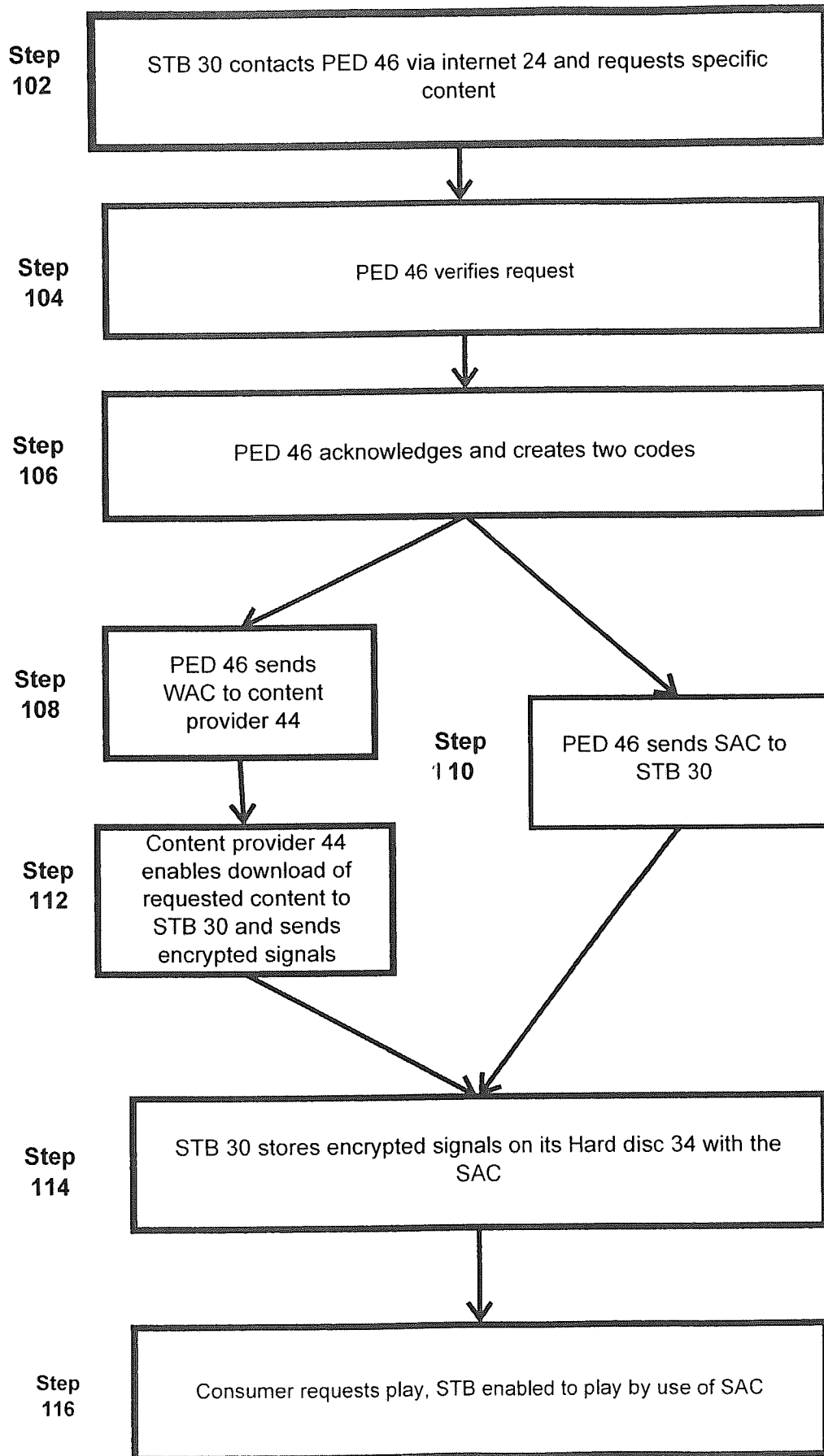


Figure 3

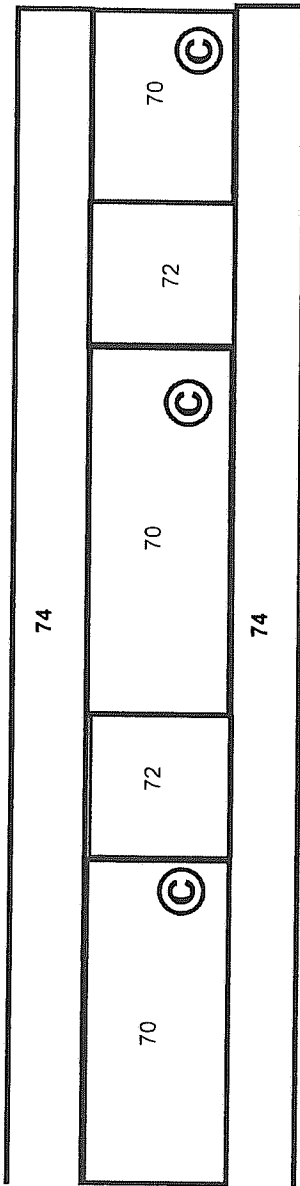


Figure 4A

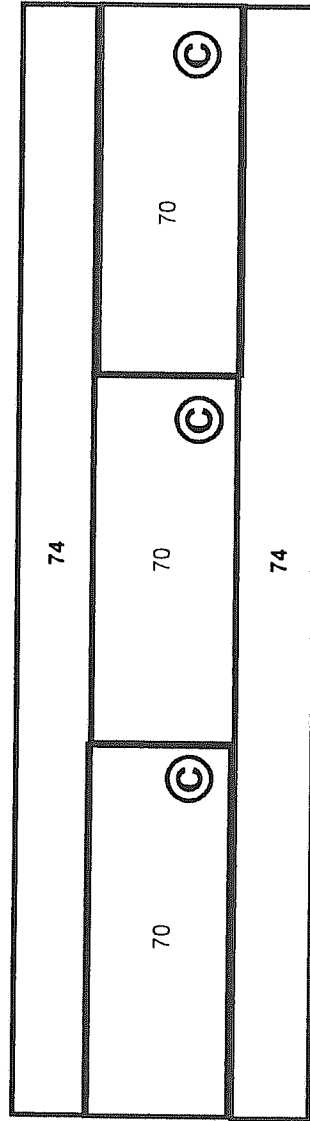


Figure 4B

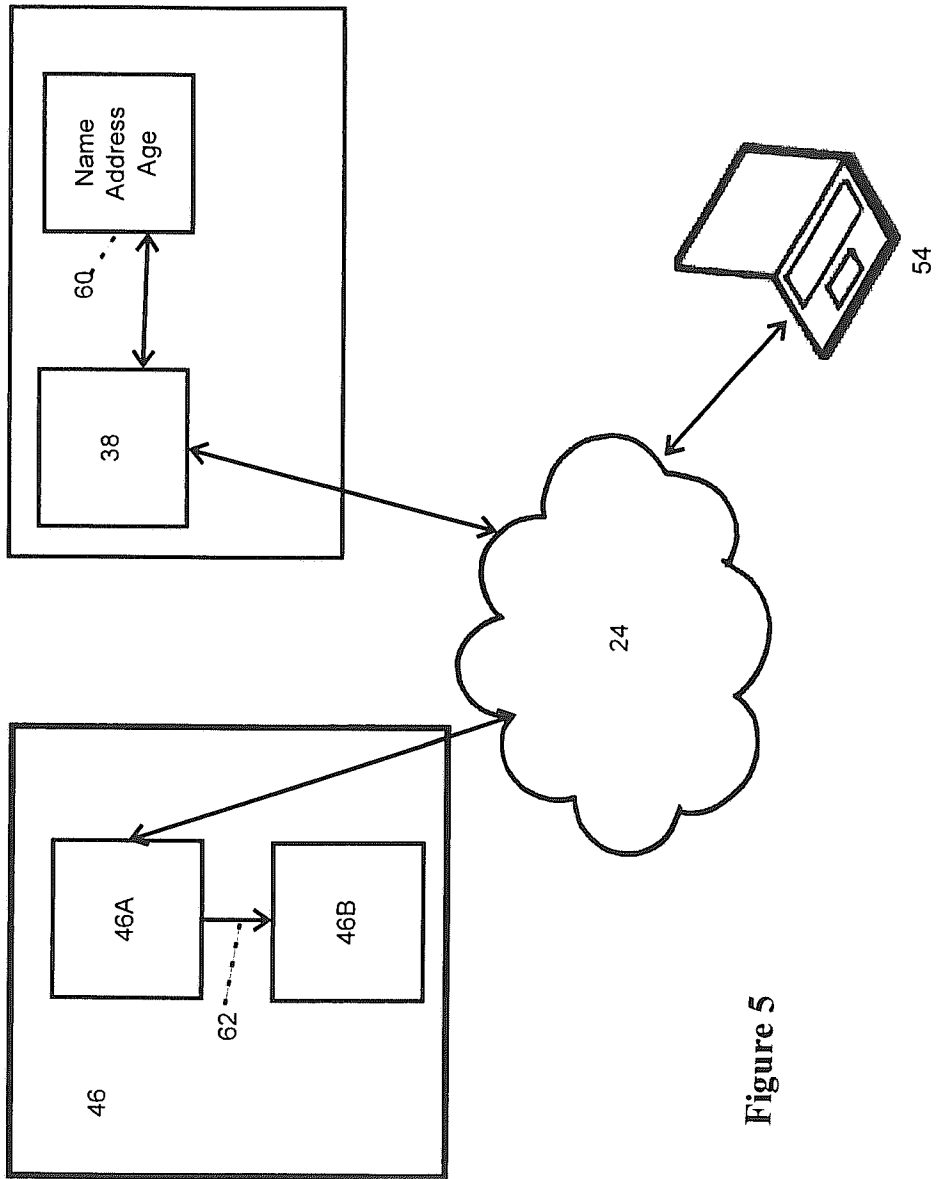


Figure 5



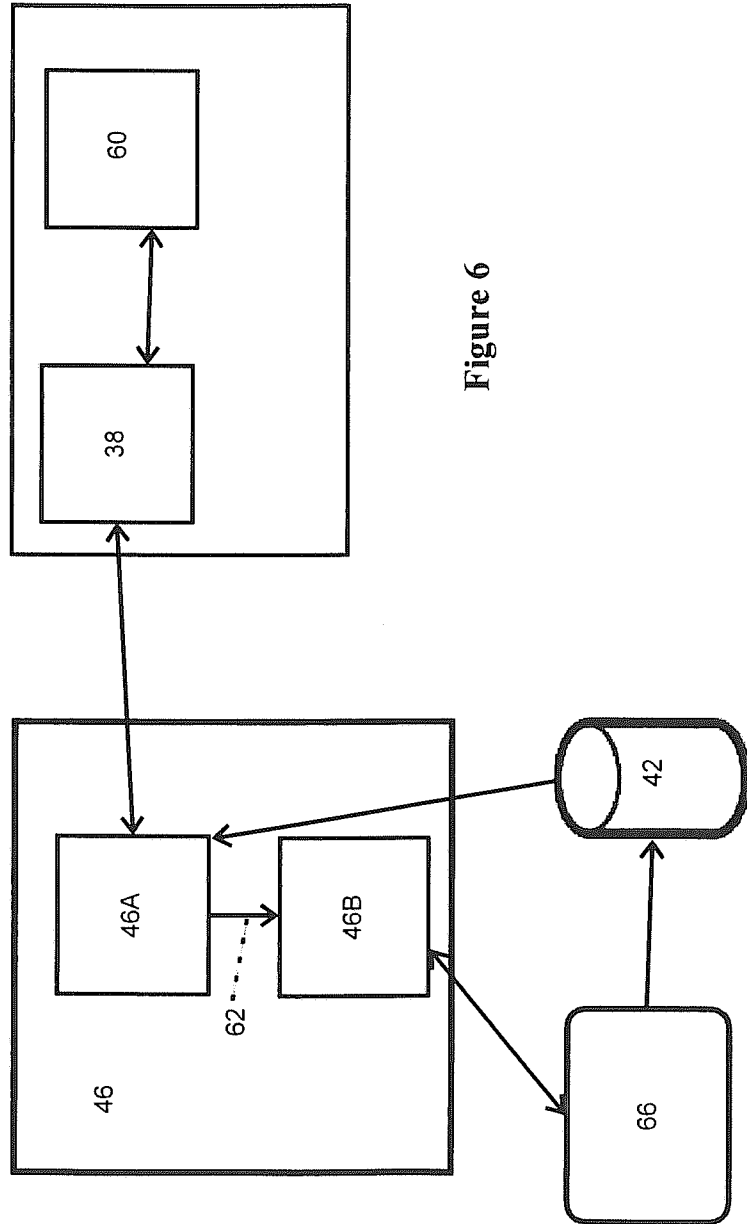


Figure 6

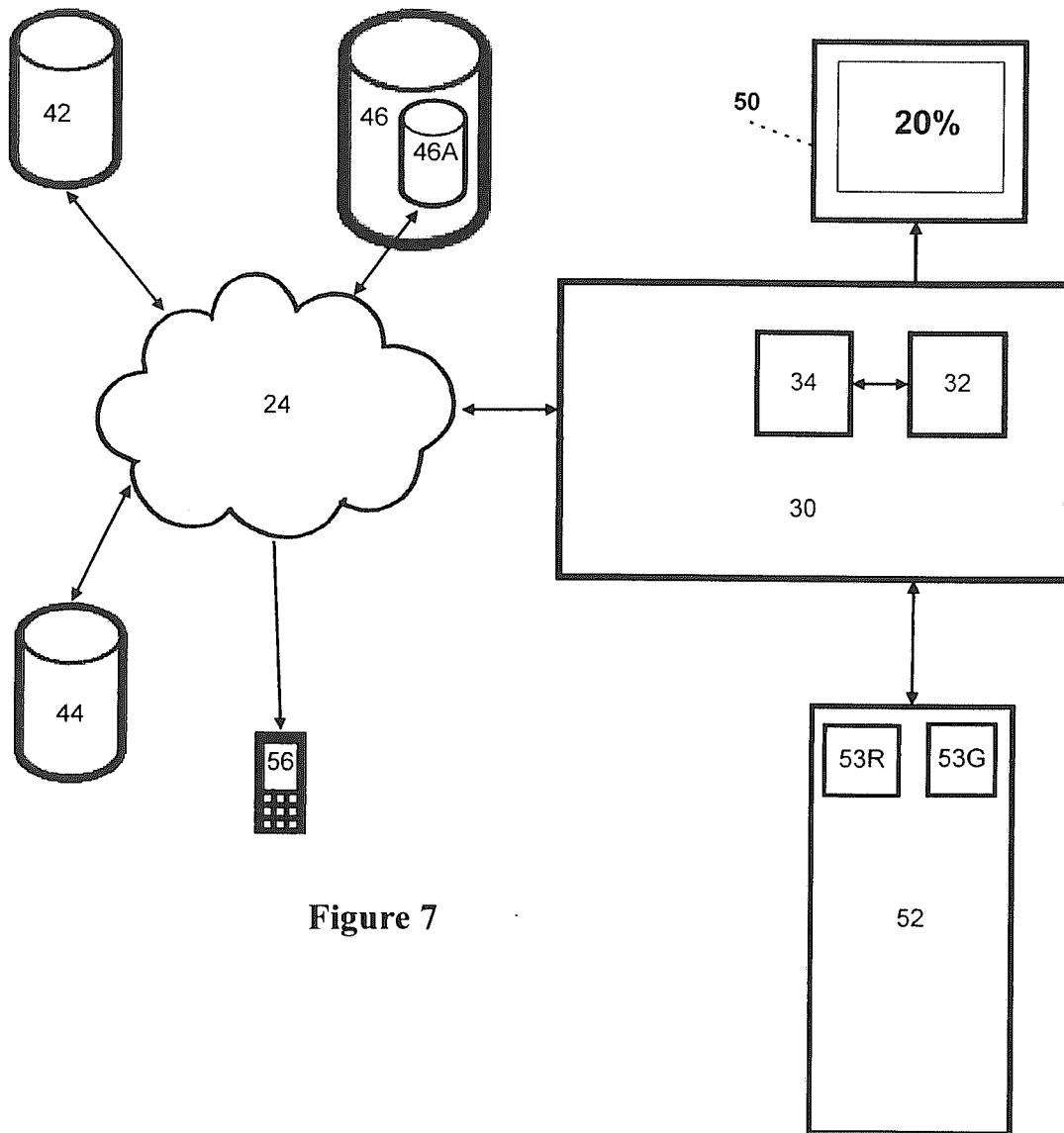


Figure 7

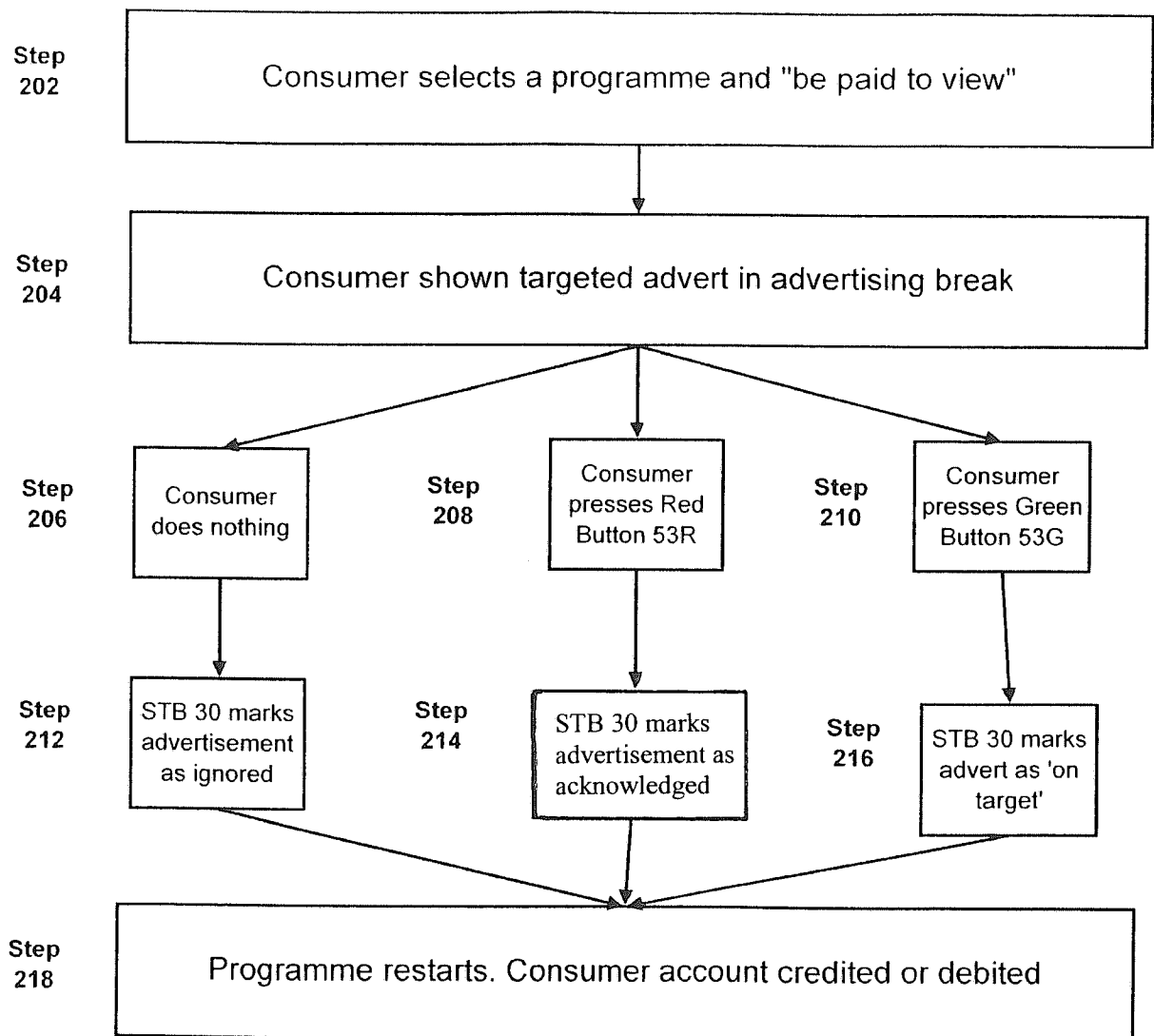


Figure 8

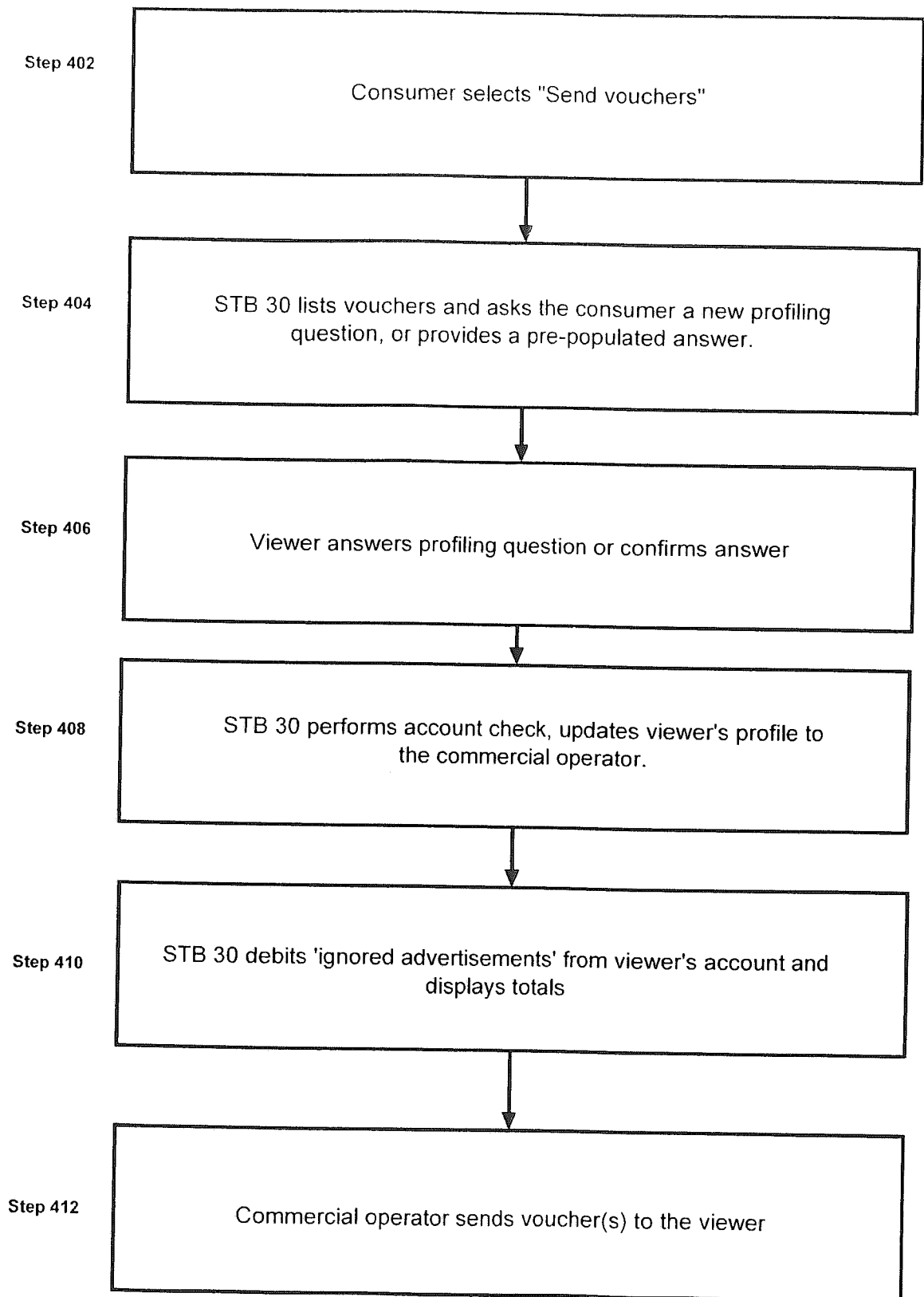


Figure 9

INTERNATIONAL SEARCH REPORT

International application No  
PCT/GB2011/050023

A. CLASSIFICATION OF SUBJECT MATTER  
INV. G06Q30/00 H04N5/00  
ADD.  
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)  
G06Q H04N  
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

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2009/036028 A2 (DISNEY ENTPR INC [US]; WANG YIQING [US]; FRITZ ADAM [US]; WHITE CHRIST) 19 March 2009 (2009-03-19) page 6, paragraph 25 - page 20, paragraph 62 figures 1-5	1-12
X	US 2008/288975 A1 (CHEN ALBERT CHUTSUNG [TW] ET AL) 20 November 2008 (2008-11-20) page 3, paragraph 59 - page 5, paragraph 72 figures 1-6	1-12
A	US 2004/237098 A1 (WATSON PAUL THOMAS [US] ET AL) 25 November 2004 (2004-11-25) page 2, paragraph 28 - page 3, paragraph 37 figures 2,4,5	1-12

Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
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- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "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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- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search  14 April 2011	Date of mailing of the international search report  21/04/2011
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer  Rachkov, Vassil

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2011/050023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US 2008288975 A1	20-11-2008	NONE	
US 2004237098 A1	25-11-2004	US 2009254936 A1	08-10-2009