

Title**Promotional Coupon Distribution****Technical Field**

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The invention concerns a method for distributing a promotional coupon of a merchant to consumers via broadcast infrastructure.

Background of the Invention

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Merchants regularly rely on coupons as an advertising medium for marketing and promoting their products and services to consumers. Traditional paper coupons require consumers to cut out coupons from printed paper-based media like newspapers or magazines, or detach perforated leaflet coupons. The consumer then redeems these coupons at merchant outlets.

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Paper coupons are troublesome to use because consumers have to cut them out and keep the paper coupons. Also, consumers may forget about these coupons and never redeem them. Paper coupons are costly because advertisers have to pay for production, printing, distribution and reconciliation of the paper coupons.

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Tracking the redemption rate of paper coupons is costly, time consuming and error prone. Paper coupons are also susceptible to fraud and abuse from duplication or alteration. Redemption of paper coupons at the merchant's checkout counters is very time consuming. Merchant cashiers must verify the correctness and validity of these presented coupons and subsequently manually reconcile the purchase to the value of the paper coupon.

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Summary of the Invention

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In a first preferred aspect, there is provided a method for distributing a promotional coupon of a merchant to consumers via broadcast infrastructure, the method comprising:

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- receiving an encrypted version of the coupon via the broadcast infrastructure;
- decrypting the encrypted coupon; and
- displaying the decrypted coupon to the consumer;

wherein the decrypted coupon is downloadable to a mobile device of a consumer, the downloaded coupon being redeemable by the consumer when presented to the merchant.

- 5 The broadcast infrastructure may be satellite television infrastructure. The broadcast infrastructure may include infrastructure capable of carrying a digital or analogue signal via terrestrial signals or cables.

- 10 The method may further comprise receiving a coupon application via the broadcast infrastructure for managing the coupon. The coupon application and coupon may be received at substantially the same time.

- 15 The method may further comprise an initial step of encrypting the coupon and the coupon application. The coupon and coupon application may be encrypted by the broadcast infrastructure.

- 20 A digital receiving device may receive the encrypted coupon and encrypted coupon application. The digital receiving device may be a set-top box or personal video recorder (PVR).

- 25 The mobile device of the consumer may be connectable to the digital receiving device. Alternatively, the mobile device may wirelessly communicate with the digital receiving device. The mobile device may be a chip-based card such as a smart card. The mobile device may be a mobile computing device such as a Personal Device Assistant (PDA), a palm machine, a notebook, a removable hard disk, a thumb drive, or a mobile phone.

- 30 The merchant may be a retailer, a company, franchise, financial institution, or government agency.

- 35 The coupon may be presented to the consumer via a presentation device. The presentation device may be a television, a computer monitor or other display device. Display devices may include LCD/OLED screens, projectors, mobile phone displays.

The coupon may be presented through a channel solely for presenting coupons. The coupon may be presented within a coupon listing. The coupon may be

presented as part of an interactive application broadcast through the broadcast infrastructure for advertising the promotion of the merchant.

5 A consumer interface device may interact with the coupon application residing on the digital receiving device. The consumer interface device may be a remote control device or other device such as a keyboard, mouse, mobile phone or wireless controller.

10 More than one coupon may be encrypted and transmitted to the digital receiving device at substantially the same time via the broadcast infrastructure.

The encrypted coupon and coupon application may be broadcast either on demand or in an automated manner.

15 The encrypted coupon and coupon application may be decrypted by interaction with Conditional Access (CA) of the digital receiving device. Other methods such as a software and/or hardware based encryption/decryption system may be used.

20 The method may further comprise downloading the coupon onto the mobile device of the consumer. The mobile device may be connected to or inserted into the digital receiving device to enable download of the coupon. Alternatively, the mobile device may wirelessly download the coupon from the digital receiving device.

25 The mobile device may be pre-initialised with a storage application to manage the storage of coupons on the mobile device. The storage application may contain information about the mobile device's mapping, size, writing to Secure-Read-Write or Free-Read-Write data storage space, smart card type, and file structure.

30 The method may further comprise presenting the mobile device of the consumer with at least one downloaded coupon to the merchant for redemption of the at least one downloaded coupon. The mobile device may be read by a terminal of the merchant for detecting the at least one downloaded coupon on the mobile device. The detection may be automatic or by manual operation.

35 The terminal may include a Point-of-Sale (POS) terminal, cash register, computer or kiosk. The terminal may be enabled to accept cash or process cash-less payments from the consumer.

The terminal may have pre-loaded coupon information to enable reading or matching of the coupons downloaded on the mobile device. Reading and matching may be performed during a coupon information synchronisation process.

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In a second aspect, there is provided a system for distributing a promotional coupon of a merchant to consumers via broadcast infrastructure, the system comprising:

10 a digital receiving device to receive an encrypted version of the coupon and coupon application via the broadcast infrastructure;

a decryption module of the digital receiving device to decrypt the encrypted coupon; and

a presentation device in communication with the digital receiving device to display the decrypted coupon to the consumer;

15 wherein the decrypted coupon is downloadable to a mobile device of a consumer, the downloaded coupon being redeemable by the consumer when presented to the merchant.

20 The system may further comprise a consumer interface device to enable the consumer to interact with the digital receiving device and selectively download coupons to their mobile device.

25 The decryption module may be a Conditional Access (CA) of the digital receiving device. The decryption module may include a software and/or hardware based encryption/decryption system.

30 The system may further comprise a back-channel link from the digital receiving device to the broadcast infrastructure for coupon distribution control and tracking. The back-channel link may be over the Internet or third party communications infrastructure such as a mobile telephone network, plain old telephone service (POTS) or optical fibre network.

35 In a third aspect, there is provided a method for generating a promotional coupon of a merchant for distribution to consumers via broadcast infrastructure, the method comprising:

generating coupon information for the coupon in accordance with predetermined coupon information rules;

processing the generated coupon information, the processing including synchronising the generated coupon information with at least one terminal of the merchant in accordance with the predetermined coupon information rules; and

storing the processed coupon information in the at least one terminal and
 5 at least one coupon server for a duration defined by coupon information rules;

wherein the at least one coupon server updates and synchronises the at least one terminal of the merchant with the processed coupon information to enable redemption of the coupon by the consumers.

10 The synchronisation of the generated coupon information may only update the most recent coupon information to the at least one terminal.

The coupon information rules may include coupon campaign requirements of a coupon campaign. Expired coupon information may be deleted from the at least
 15 one terminal when the coupon campaign has expired.

The coupon information may include information relating to expiry date of the coupon, coupon ID, acquirer ID, issuer ID, merchant ID, terminal ID, dedicated file ID, card type ID, host ID or others.

20 The method may further comprise generating a secure key module for the coupon application to manage the presentation of the coupon and download of the coupon to the mobile device.

25 The method may further comprise broadcasting coupon information via the broadcast infrastructure using the secure key module.

A coupon campaign designer may generate the coupon information.

30 In a fourth aspect, there is provided a method for downloading at least one new coupon into a mobile device of a consumer, comprising:

selecting the at least one new coupon for download into the mobile device;
 determining whether the mobile device is compatible;
 deleting expired coupons from the mobile device; and
 35 checking for available space to download the at least one new coupon to the mobile device;

where if the mobile device is compatible and there is available space, the at least one new coupon is stored on the mobile device.

5 The mobile device may be pre-initialised with a storage application for managing the storage of the at least one coupon.

The at least one coupon is selected from a list of coupons presented on a presentation device.

10 The mobile device may provide Secure-Read-Write and unsecured or Free-Read-Write data storage space for storing the at least one new coupon. If Free-Read-Write data storage space is provided, the coupon may be downloaded into the mobile device without using a private key to unlock the mobile device via the secure key module.

15 Expired coupons may be automatically deleted or deleted after confirmation from the consumer.

20 Coupon information may be communicated and synchronised on the terminal through the coupon server and broadcaster's coupon server during the coupon information synchronisation process.

25 Coupons on the mobile device may be matched with the coupon information stored on the terminal. The terminal may reject any unrecognised or unmatched coupon information.

30 If the mobile device is a smart card, the terminal may check the smart card type and architecture through a reset command of the smart card. When the terminal recognises the specified smart card type, the terminal application may read the smart card to check the number of coupons stored in the smart card.

The terminal may select the coupon that corresponds to its merchant identification and host identification based on coupon information stored on the terminal.

In a fifth aspect, there is provided a method for reconciling redeemed coupons at a terminal of a merchant, the method comprising:

reporting the coupons redeemed at the terminal to a first coupon server via at least one second coupon server; and

5 reconciling the redeemed coupons from the terminal to the first coupon server based on a specific coupon campaign.

The first coupon server may be a coupon server of a broadcaster in a broadcast infrastructure.

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The at least one second coupon server may be a coupon server of the merchant, an acquirer bank or loyalty programme operators.

The reporting and reconciliation of the redeemed coupons may be performed at

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In a sixth aspect, there is provided a mobile device carrying a promotional coupon of a merchant, the device comprising:

a storage area to store coupon information of the coupon;

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a Free-Read-Write data storage space of the storage area to store a first portion of the coupon information; and

a Secure-Read-Write data storage space of the storage area to store a second encrypted portion of the coupon information using a secure key module and a private key;

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wherein an encrypted form of the coupon information is transmitted via broadcast infrastructure to a digital receiving device, the digital receiving device decrypting the encrypted coupon information and writing the coupon information to the mobile device.

30 In a seventh aspect, there is provided a terminal application for reading coupon information of at least one promotional coupon of a merchant from a mobile device of a consumer, the terminal application being stored in a terminal of the merchant, the terminal application comprising:

a coupon reader module to read the coupon information stored on the

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mobile device;

a redemption module to redeem the at least one coupon, and to update a coupon server with the coupon information for reconciling the redemption ; and

a synchronisation module to receive current coupon information from the coupon server during a coupon information synchronisation process;

wherein an encrypted form of the coupon information is transmitted via broadcast infrastructure to a digital receiving device, the digital receiving device
 5 decrypting the encrypted coupon information and writing the coupon information to the mobile device.

If the coupon reader module detects any expired coupons on the mobile device, the expired coupons may be automatically deleted from the mobile device. The
 10 terminal may be instructed to alert the consumer of the coupon deletion.

In an eighth aspect, there is provided a storage application for managing the storage of coupon information of at least one promotional coupon of a merchant, the storage application being stored in a mobile device of a consumer, the
 15 application comprising:

storage application information relating to information about the mobile device; and

a coupon application data container to store the coupon information in distinct device purses;

20 wherein an encrypted form of the coupon information is transmitted via broadcast infrastructure to the digital receiving device, the digital receiving device decrypting the encrypted coupon information and writing the coupon information to the mobile device.

25 The storage application information may be read by the digital receiving device or by a terminal to determine whether the mobile device is compatible to communicate with the digital receiving device or terminal.

In a ninth aspect, there is provided a method for downloading at least one promotional coupon to a mobile device of a consumer, the at least one coupon
 30 being distributed to the consumer via broadcast infrastructure, the method comprising:

storing the at least one coupon in a memory of a digital receiving device, the digital receiving device receiving the at least one coupon via the broadcast
 35 infrastructure;

retrieving the stored at least one coupon from the memory after a first predetermined amount of time has elapsed; and

downloading the retrieved at least one coupon onto the mobile device when the mobile device is connected to the digital receiving device;

wherein the consumer receives at least one reminder of the at least one stored coupon if the at least one coupon has not been retrieved, the at least one
 5 reminder reminding the consumer to retrieve and download the at least one stored coupon to their mobile device.

The at least reminder may be a visual indication displayed to the consumer. The at least reminder may also include an audible indication played to the consumer. The
 10 reminder may be coupon overlay information presented on a presentation device to the consumer.

When the mobile device is connected to the digital receiving device, the at least one coupon stored in the memory of a digital receiving device may be automatically
 15 downloaded to the mobile device.

The consumer may instruct the digital receiving device to selectively store the at least one coupon. The reminder may be coupon overlay information presented on a presentation device to the consumer. When the coupon overlay information is
 20 presented, the consumer may cause the storage of the at least one coupon onto the digital receiving device by interacting with a consumer interface device.

In a tenth aspect, there is provided a storage application for storing consumer information relating to a consumer, the storage application being stored in a mobile
 25 device of the consumer, the application comprising:

storage application information relating to information about the mobile device; and

a consumer application data container to store the consumer information;

wherein an interactive application of a service provider is broadcast to the
 30 consumer via broadcast infrastructure and presented to the consumer for interaction via a presentation device, the stored consumer information being transmitted via communications infrastructure to the service provider to authenticate the identity of the consumer.

35 The consumer information may include consumer preferences, membership information, payment and account details, recorded usage of services provided by the service provider, or delivery address of the consumer.

The service provider may include a bank, utilities provider, merchant, or top-up service provider. The interactive application may include an interactive banking application or interactive account management application.

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Brief Description of the Drawings

An example of the invention will now be described with reference to the accompanying drawings, in which:

- 10 Figure 1 is a graphical process flow diagram of preparing, downloading and redeeming coupons;
- Figure 2 is a system diagram of the distribution system;
- Figure 3 is a block diagram of the distribution system;
- Figure 4 is a graphical process flow diagram of downloading coupons;
- 15 Figure 5 is a screenshot of a main menu of a merchant terminal;
- Figure 6 is a set of photos of a pair of digital receiving devices with two smart card readers;
- Figure 7 is a schematic diagram of a coupon application in the broadcast infrastructure;
- 20 Figure 8 is a schematic diagram of broadcasting application data chunks;
- Figure 9 is a pictorial diagram of a store and retrieve coupon; and
- Figure 10 is a pictorial diagram of a list of coupons on the presentation device.

Detailed Description of the Drawings

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- The drawings and the following discussion are intended to provide a brief, general description of a suitable computing environment in which the present invention may be implemented. Although not required, the invention will be described in the general context of computer-executable instructions, such as program modules,
- 30 being executed by a personal computer. Generally, program modules include routines, programs, characters, components, and data structures that perform particular tasks or implement particular abstract data types. As those skilled in the art will appreciate, the invention may be practiced with other computer system configurations, including multiprocessor systems, microprocessor-based or
- 35 programmable consumer electronics, network Personal Computers, minicomputers, mainframe computers, and the like. The invention may also be practiced in distributed computing environments where tasks are performed by

remote processing devices that are linked through communications infrastructure. In a distributed computing environment, program modules may be located in both local and remote memory storage devices.

5 Referring to Figures 1 to 3, a distribution system 10 for distributing a promotional coupon 80 of a merchant 15 to consumers 29 via digital broadcast infrastructure 20 is provided. The promotion coupon 80 is transmitted to a set-top box 30 of the consumer 29, and then is downloaded to their smart card 40. The system 10 generally comprises digital broadcast infrastructure 20, a set-top box 30 with a
10 decryption module (not shown), smart card readers to read the smart card 40, a television 32 and a remote control 31 to remotely operate the set-top box 30. Although a television 32 is described, other presentation devices 32 may be used such as computer monitors, LCD/OLED screens, projectors, mobile phone displays.

15 The set-top box 30 receives an encrypted version of the coupon 80 and a coupon application 66 via the digital broadcast infrastructure 20. Figure 7 depicts a coupon application 66. The coupon's presentation is managed by the coupon application 66 and coupon information 11, and is navigated using the remote control 31. The
20 decryption module of the set-top box 30 decrypts the received encrypted coupon 80. The television 32 is connected to the set-top box 30 and displays the decrypted coupon 80 to the consumer 29.

Alternatively, the consumer 29 is presented with a list of coupons 80 for download
25 to the smart card 40. Figure 10 depicts a list of coupons 80. From the consumer's 29 perspective, the remote control 31 and the television 32 are the interactive means by which they view, select and download coupons 80 to their smart card 40. Figure 6 shows a set-top box 30 with two smart card readers 180, 181. The first
30 smart card reader 180 is typically used to decode the digital satellite signal to present the television program using a specific Conditional Access (CA) system for broadcasters. The second smart card reader 181 provides at-home capabilities and revenues for the deployment of Interactive TV services like coupon 80 downloads, TV-Commerce for purchases of goods or services, TV-Banking (bill payment, funds transfer, inquiries via television 32) and TV-Token pre-payments/top-ups (for
35 utilities, telephone, council services).

The decrypted coupon 80 contains coupon information 11 that is downloadable to a smart card 40 of a consumer 29 via a download mechanism in-built or attached to the set-top box 30. When the coupons 80 are selected, the consumer 29 presses the relevant buttons on the remote control 31 to download the coupon 80 into the smart card 40 that is pre-initialised with a storage application 41 to read coupons 80. The storage application 41 is described in detail later.

In one embodiment, the coupon information 11 is downloaded to the smart card 40 via a second smart card reader 181 that is attached or in-built into the set-top box 30. The coupon information 11 includes information relating to: expiry date of the coupon 80, coupon ID, acquirer ID, issuer ID, merchant ID, terminal ID, dedicated file ID, card type ID, host ID or others.

The downloaded coupon 80 is redeemable by the consumer 29 from the merchant 15 when the smart card 40 is presented for redemption upon making the purchase via a terminal 50 of the merchant 15. When shopping at a merchant 15 is completed, the consumer 29 redeems the coupon 80 specific to that merchant 15 based on the coupon offer and coupon information 11 at the checkout counter. This is performed by reading the smart card 40 by the Point-of-Sale (POS) terminal of the merchant 15. The terminal 50 is pre-initialised with a terminal application 51.

The redeemed coupon information 11, also referred to as redemption information, is stored at the terminal 50 until settlement occurs with the coupon server 60. Communication equipment facilitates communication between the terminals 50 and coupon server 60. The terminal application 51 co-exists with other terminal applications such as credit card payment and existing loyalty points systems. The settlement process is performed immediately if the terminal 50 is permanently connected with the coupon server 60. Alternatively, a batch process carries out the settlement process. The batch process involves the terminal 50 connecting with the coupon server 60 periodically on an off-line basis, at the end of the business day during or end-of-day settlement. When the merchant's cashier performs the end-of-day settlement, the redemption information that is stored temporary in the terminal 50 is electronically transmitted to the coupon server 60 via communications infrastructure. Communications infrastructure generally includes mobile telephone networks, plain old telephone service (POTS), optical fibre networks, the Internet. The coupon server 60 consolidates the redemption information and it is

subsequently communicated back to the broadcaster's coupon server 12 for reconciliation, settlement and reporting.

Five main phases that occur along the coupon value chain are:
5 advertising/preparation, broadcasting, downloading, redemption and reconciliation.

Advertising/preparation

In the advertising/preparation phase, the coupon information 11 is defined and prepared based on the pre-defined coupon information rules and coupon campaign requirements of the merchant 15. A coupon campaign designer 14 is a tool used for generating the coupon information. A coupon information synchronisation process also occurs in this phase between three components in the distribution system 10: the broadcaster's coupon server 12, the coupon servers 60 of third parties such as acquirer banks and loyalty providers, and merchant's terminals 50.
15 This ensures that all participating terminals 50 have been pre-initialised with a terminal application 51 with specific pre-loaded coupon information 11 based on the merchant's coupon information rules and coupon campaign requirements before any coupon broadcasting or advertising commences.

20 The advertising/preparation phase involves preparing coupon information 11 for broadcasting via the digital broadcast infrastructure 20 by designing the coupon information 11 based on merchant's coupon campaign requirements. This involves discussing with the merchant 15 on what exactly the coupon 80 should look like on the television 32, and duration and type of coupon offers.

25 There are many types of coupons 80. Coupon types include: fixed or variable, targeted or non-targeted, generic or specific, and limited or non-limited coupons 80. Merchants/retailers, manufacturers, or sponsored by third parties such as financial institutions and credit card associations like Visa or MasterCard International may
30 offer any type of coupon 80 depending on their marketing strategy and campaign.

When the new coupon information 11 is prepared and generated, the broadcaster's coupon server 12 is updated with the new coupon information 11. The broadcaster's coupon server 12 then notifies the coupon server 60 of the new coupon information 11 and that it is ready for uploading to the respective terminals 50. This notification is done via communications infrastructure. Next, the coupon server 60 updates and stores the new pre-loaded coupon information 11 in the
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terminal 50 either manually or via a centralised terminal management system during the pre-defined coupon campaign period. This ensures that all participating terminals 50 are enabled with the terminal application 51 and specific coupon information 11 based on specific coupon campaign requirements before any
 5 broadcast of coupons 80 commences. This whole process is referred to as a coupon information synchronisation process.

An error handling process is considered during the coupon information synchronisation process to ensure that the latest coupon information has been
 10 successfully updated at the respective terminal 50. If successfully updated, the coupon broadcast process is permitted to commence. Otherwise, the consumers 29 who have downloaded the coupons 80 into their smart card 40 cannot redeem their downloaded coupons 80 at the respective merchant's terminals 50 because the terminals 50 are not able to recognise the downloaded coupon information 11.

15 The coupon information 11 is written to the smart card 40. Based on its security access of the data storage space, it is written by either a Free-Read-Write or Secure-Read-Write method. Free-Read-Write method does not require a unique private key 219 to unlock the storage application 41 (in order to access the coupon information 11). In contrast, the Secure-Read-Write requires a private key 219. The
 20 private key 219 is typically provided by the smart card issuer. To prevent unauthorised access to the secure storage space, the smart card issuer protects this space using the private key 219.

25 Referring to Figure 7, for Secure-Read-Write security access, the private key 219 is inserted into a secure key module 220. The private key 219 is a sequence of unique binary data required to unlock the smart card 40 via a decryption technique. The secure key module 220 is a binary program module that is called by the coupon application 66 to securely handle the private key 219. In one embodiment,
 30 the secure key module 220 is part of the coupon application 66 and is transmitted together using the digital broadcast infrastructure 20.

Broadcasting

35 In the broadcasting phase, the coupon information 11, other related information and the coupon application 66 are encrypted and broadcast from the digital broadcast infrastructure 20 to the set-top box 30 and presented on the television 32 after confirmation of a successful coupon information synchronisation process.

The consumer 29 uses the remote control 31 to navigate the menus presented on the television 32.

5 The broadcasting phase begins by inserting the coupon information 11, coupon application 66 and secure key module 220 into the broadcast transmitter 13. These items are broadcast to the set-top box 30 via the digital broadcast infrastructure 20.

10 Referring to Figure 4, there are at least two ways that the coupon application 66 appears on the set-top box 30: a dedicated channel or as part of an interactive advertisement that the consumer 29 is able to interact with. Both ways require the consumer 29 to use the remote control 31.

15 Referring to Figure 10, for the dedicated channel showing the coupon lists, the consumer 29 tunes to the dedicated channel using the remote control 31.

For the interactive advertisement, the consumer 29 is automatically shown a notification banner, superimposed on a television program on the television 32 that is currently shown to the consumer 29. This banner indicates to the consumer 29 that there is a coupon offering for immediate download or future download, using
20 their remote control 31 to navigate.

To secure the transmission of the coupon application 66 and coupon information 11, the broadcast transmission is encrypted throughout the digital broadcast infrastructure 20. Upon reception of the transmission to the set-top box 30, the set-top box 30 uses the Conditional Access (CA) system to decrypt the received
25 transmission.

After decryption, the set-top box 30 executes the coupon application 66 and coupon information 11. In one embodiment, the set-top box 30 uses a private key
30 219 stored within the smart card 40 to decrypt the coupon application 66 and coupon information 11.

35 Referring to Figure 10, the coupon application 66 presents the coupon 80 to the consumer 29 either as a coupon listing or as overlay information on the existing television programme. The programme is shown via the set-top box 30 on television 32 such as current affairs, news, movies, advertisement or others. The overlay information may appear on a corresponding advertisement.

Where there is a coupon listing, the consumer 29 triggers the coupon application 66 to be received, decrypted and executed on the set-top box 30 by selecting a pre-defined function on the remote control 31.

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Referring to Figure 7, a secure mechanism for transportation and broadcast of the private key 219 is described. The following security measures are used to secure private key transmission in the digital broadcast infrastructure 20:

- 10 • Encrypted broadcast Application. The coupon application 66 is encrypted via the broadcaster's Conditional Access (CA) system prior to broadcast. Only a set-top box 30, equipped with the same Conditional Access (CA) algorithm decrypts the encrypted coupon application 66 and coupon information 11. This ensures the first level of security in the transmission of the private key 219 over the digital broadcast infrastructure 20.
- 15 • Secure key module 220. The coupon application 66 requires the private key 219 to "unlock" the data storage space and access smart card 40, if the storage space is protected by the private key 219. To further facilitate and ensuring the security of the private key 219, as such that they are not exposed to the coupon application developer directly, all coupon applications 66 are
- 20 required to work only with the secure key module 220, instead of accessing the private key 219 directly. The secure key module 220 is provided to the application developer in binary format and contains the entry interface definition, in the form of an Application Protocol Interface (API) declaration only. The secure key module 220 shields the private key retrieval; encryption of
- 25 message with the private key 219; and message authentication code calculation.
- The encrypted private key 219 within the secure key module 220. Although the secure key module 220 hides the private key 219 from the coupon application 66, the secure key module 220 is further encrypted via the broadcaster's
- 30 Conditional Access (CA), providing another layer of security by further scrambling the private key string within the secure key module 220 code. This ensures that the private key 219 is not presented in the clear/plain text even within the secure key module 220 code itself.

35 In order to ensure secure transmission of the private key 219, the three levels of security described are implemented to ensure adequate security in private key transmission.

Downloading

The downloading phase refers to the action when a consumer 29 activates the on-demand coupon application 66 and selects coupons 80 of interest from the coupon listing shown on the television 32 using their remote control 31. Subsequently, the selected coupon 80 is downloaded into their smart card 40. Upon completing the coupon 80 download, the consumer 29 detaches and removes their smart card 40 from the second smart card reader 181 of the set-top box 30. Later, when shopping, the smart card 40 containing the downloaded coupons 80 is presented at a merchant outlet for redemption.

Referring to Figure 9, where the coupon 80 appears as an overlay information on the currently shown television programme or advertisement, the coupon application 66 is scheduled by the broadcaster for broadcast and automatically transmitted via the digital broadcast infrastructure 20. The consumer 29 notices this overlay information when it automatically appears on the television 32. When the overlay information appears, the consumer 29 has at least two choices. That is, to either download the coupon 80 immediately, or to Store-and-Retrieve the coupon 80 later.

There are two ways to download a coupon 80 during an interactive advertisement: by following downloading instructions or using a store-and-retrieve method. The store-and-retrieve method involves the consumer 29 storing the coupon 80 into a temporary memory of the set-top box 30 and retrieving it later for download onto their smart card 40. The consumer 29 is reminded of the setting aside of the coupon 80 by way of a visual indication such as a small flashing “bug” appearing on the television 32. Once the smart card 40 is connected with the set-top box 30, the coupon 80 is automatically downloaded and the visual indication disappears. In other embodiments, rather than the “bug”, a star, a circle or any other appropriate indicative symbol may be used and displayed in the corner of the television 32 for reminding the consumer 29 that the coupon 80 is still stored inside the set-top box 30 for retrieval.

The consumer 29 may also switch to the dedicated channel of coupon listings and manually select the desired coupons 80 using the remote control 31 of the set-top box 30.

- Store-and-Retrieve operates when the consumer 29 instructs the coupon application 66 to store the coupon 80 within the set-top box 30. The coupon application 66 reminds the consumer 29 by showing a flashing “bug” on the television 32. When reminded, the consumer 29 has several choices. The
- 5 consumer 29 may:
- (1) download the coupon immediately by connecting their smart card 40 to the set-top box 30;
 - (2) suppress the notification for future re-notification;
 - (3) ignore it or cancel it; or
 - 10 (4) change the present channel to the dedicated coupon channel.

In one embodiment, the Store-and-Retrieve method is activated when the consumer 29 presses a button on the remote control 31 when the coupon overlay information appears.

15 Once the smart card 40 is inserted into the set-top box 30, the coupon application 66 immediately checks whether it is a compatible smart card 40 or one that is compatible and pre-initialised with the storage application 41. If it is a compatible smart card 40, the coupon application 66 in the set-top box 30 checks for any

20 expired coupons 80 on the smart card 40. If any are found, expired coupons 80 are deleted automatically from the smart card 40 and the consumer 29 is notified on the television 32. This makes it easier for consumer 29 to manage their coupons 80 on their smart card 40.

25 The secure key module 220 is used to “unlock” the data storage space on the smart card 40, especially if it is a Secure-Read-Write data storage security access. The coupon application 66 checks whether there is available space in the smart card 40 for downloading of newly selected coupons 80. If there is available space on the smart card 40, then it automatically stores the coupon 80. Otherwise, an

30 error message prompts the consumer 29 to manually housekeep their smart card 40 using the remote control 31 by deleting their existing coupons 80 in the smart card 40.

Storage application 41

35 All smart cards 40 have a limited amount of space that is allocated to store the coupons 80, as defined by the storage application 41 in the smart card 40. In some instances, this space is not exhausted either because the consumer 29 does not

download too many coupons 80 or the space allocated is large. Notwithstanding this possibility, the system 10 provides a coupon management function that enables the consumer 29 to view and delete existing coupons 80 on the smart card 40.

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The storage application 41 comprises two components: storage application information and a coupon application data container. The storage application information contains information about the smart card 40 in supporting the storage application 41, whereas the coupon application data container stores the coupon information 11 as device purses.

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Based on the storage application information, the storage application 41 is able to discover the number of device purses that have been allocated for storing the coupon information 11. The storage application 41 looks into the allocated device purses for coupon information 11.

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Smart card issuers set the maximum number of device purses that can be created on the unused portion of the smart card 40. This depends on existing spare capacity in the smart card 40, or other usage of the existing spare capacity in the smart card 40.

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For the smart card 40, in particular those having both dedicated file and elementary file structure, the storage application 41 is encapsulated in the dedicated file, whereas the Elementary File contains both the storage application information and the coupon application data container in two separate elementary files.

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Once the coupon application 66 displays the coupon 80, the consumer 29 selects the coupon 80 that appeals to them and subsequently instructs the coupon application 66 to download the coupon information 11 into their smart card 40. For example in Figure 10, the consumer 29 presses the cursor up and down to scroll between the coupons listing and then presses the OK button to select the coupon 80 for download.

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Consumers 29 are able to use a wide variety of smart cards 40 that have the storage application 41 pre-initialised to read and store coupons 80. Interoperability management between different smart cards 40 is managed by the storage application 41. For example, a particular coupon 80 may be expected to be

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downloaded into a Europay-MasterCard-VISA (EMV) compliant smart card 40, debit cards issued by American Express or Diners, BankCards (for ATM or eDebit transactions) or Loyalty Cards (Co-Brand, Private Label, Community).

5 For interoperability, the coupon application 66 self-detects the relevant smart card 40 type, and uses its prior/pre-stored knowledge of the smart card 40 based on predefined specific mapping and architecture to manage the download of the coupon 80 onto the various smart cards 40. For example, if it detects a smart card 40 from Citibank, it stores the coupon 80 in a location A. If it detects a smart card 10 40 from HSBC bank, it stores the coupon 80 in a location B. The indication of location A and location B is to illustrate different location within the smart card 40, which corresponds to the location of the smart card memory space.

15 In some cases, access to the smart card 40 for downloading the coupon 80 is protected by a private key 219 and security mechanism. Consequently, the coupon application 66 requires the private key 219 and knowledge of the encryption/decryption mechanism to unlock the smart card 40 for writing into its secure data storage space. This private key 219 is broadcast through the digital broadcast infrastructure 20 and it is encrypted and obfuscated. Consequently, 20 there is a secure electronic private key broadcast to unlock the smart card's Secure-Read-Write data storage space using the smart card issuer's private key 219.

25 During coupon 80 downloading, the coupon application 66 searches a list of device purses within the coupon application data container for an empty device purse to download the coupon information 11. In the preferred embodiment, there are at least five device purses. If there is an empty device purse, the coupon application 66 continues to write or deposit the coupon information 11 into the device purse. If there is no empty device purse, the coupon application 66 displays an error 30 message and the downloading process is terminated until the consumer 29 deletes any expired coupons 80 or deletes any unused coupon 80 from the smart card 40.

Redemption

35 The redemption phase refers to the action when the consumer 29 redeems their downloaded coupon 80 at the merchant's terminals 50, which are pre-initialised with the terminal application 51. The terminal application 51 reads the coupon information 11 contained in the smart card 40. The terminals 50 are configured to

reduce the cashier's data entry on the keypad, thus reducing waiting time for the consumer 29 at the check-out counter.

5 The redemption phase involves the consumer 29 taking their smart card 40 containing the downloaded coupon 80 and redeeming it with the merchant 15. The terminal application 51 redeems coupons 80, and is updated or synchronised with the latest or current coupon information 11 during the coupon information synchronisation process.

10 When the smart card 40 is connected to the terminals 50 at the merchant's outlet, the terminal application 51 immediately checks whether it is a smart card 40 or one that is compatible and pre-initialised with the storage application 41. If it is a compatible smart card 40, the terminal application 51 then checks for any expired coupons 80 on the smart card 40. If expired coupons 80 are found by the terminal
15 application 51, they are deleted automatically from the smart card 40 and the consumer 29 is informed via a display of the terminal 50 of the coupon deletion.

The terminal 50 matches the validity of the coupon 80 in the consumer's 29 smart card 40 with the updated/pre-loaded coupon information 11. If it matches, the
20 consumer 29 is able to claim the coupon through the terminal 50. Any error in the process is communicated to the consumer 29.

The terminal 50 automatically scans through the valid smart card 40 for coupons relevant to the merchant 15 based on the synchronised coupon information, which resides in either a single location or at multiple locations or device purses within the
25 smart card 40. If no matched coupons 80 are found, the terminal 50 proceeds with conventional payment. If more than one relevant coupon 80 is detected, the terminal 50 prompts and requests the consumer 29 to select the desired coupon 80 for redemption. If only one relevant coupon 80 is detected, the terminal 50 proceeds to automatically redeems the coupon 80.

30 For example, a consumer 29 downloads two coupons 80 offered by Carrefour. The first coupon 80 is 10% off for a purchase above \$50 and the second coupon 80 is a free six pack of soft drink for a purchase above \$25. When the consumer's 29 purchases are detected to be \$60, the terminal 50 automatically detects the two
35 suitable coupons 80 offered by the same merchant 15 and requests the consumer 29 to select one.

The distribution system 10 stores all the information for each of the redeemed coupons (redemption information). This redemption information is initially stored temporary at the terminal 50. If the terminal 50 is connected to a host, this redemption information is also simultaneously sent to a coupon server 60. If the terminal 50 does not have a permanent connection, or in off-line mode, the terminal 50 is scheduled to connect to the coupon server 60 periodically. For example, at the end of business day with the cashier performing an end-of-day settlement. The redemption information of the redeemed coupons are used to charge the merchant 15 a small transaction/service fee based on how many coupons 80 are successfully redeemed or which coupons 80 are redeemed. This transaction/service fee is charged in substitute for the merchant previously having to print, distribute, and reconcile paper-based coupons.

The terminal application 51 checks for expired coupons 80 in the device purse and deletes them automatically. Information about any deletion of expired coupons 80 is captured and forms part of the terminal collection batch and coupon server collection batch, which is sent back from the terminal 50 to the coupon server 60.

Every device purse has a purse header, which provides preliminary information about the device purse. Unlike the terminal 50 that is in a controlled environment and handled by a trained cashier, the set-top box 30 is situated at a consumer's 29 home and the consumer 29 is untrained. Therefore, it is more likely that the consumer 29 will remove the smart card 40 from the set-top box 30 when the coupon application 66 is still downloading the coupon information 11 onto the smart card 40.

When a coupon transaction update starts, the terminal application 51 updates the transaction integrity bit. The message authentication code field is provided for integrity check and it is based on a symmetrical private key. If the terminal application 51 encounters a wrong message authentication code, the device purse is considered empty and the purse header is set to indicate it as empty.

When the coupon item is purchased (either by electronic cash method, deduction through customer's bank account or through a credit card), the terminal 50 may automatically deducts the downloaded coupon value from the consumer 29 receipt and electronically sends the redemption information to the coupon server 60 for reconciliation, settlement and reporting.

Coupons 80 are downloaded and redeemed from any one of the following devices:

- set-top box 30.
- terminals 50.
- 5 • smart card reader (not shown) connected to a Personal Computer.
- In-Store Kiosk.

The coupon server 60 also functions as a terminal management server. The terminal management server manages the following aspects of the terminal 50 remotely:

- Download and update coupon information 11 to the broadcaster's coupon server 12. This forms part of the coupon information synchronisation process.
- Download and update/pre-load coupon information 11 to the merchant's terminals 50 with the terminal application 51 based on the coupon campaign.
- 15 This forms part of the coupon information synchronisation process.
- Removal of expired coupon information 11 on terminals 50.
- Update enhanced terminal application 51.
- Update merchant information and terminal configuration and setting information.

20

Referring to Figure 5, the terminal application 51 on the terminal 50 is a standalone executable application that is enabled from the main menu of the terminal 50. The coupon 80 is shown as an option on the screen of the terminal 50.

25 All terminals 50 are identified by a terminal ID. The terminal ID is unique within the coupon server 60. Firstly, a "redeem" option allows the cashier to display the coupon information 11 downloaded into the consumer 29 smart card 40 as well as perform redemption through the terminal 50. Secondly, a "settlement" option allows the cashier to perform end-of-day settlement, where the coupon redemption

30 information is sent to the coupon server 60. Thirdly, a "terminal setup" option allows the cashier to configure the terminal 50.

Configurable terminal information includes: terminal ID, phone number or IP address (used for dial up to/connection with a coupon server 60 via

35 communications infrastructure), and other information required to connect the terminal 50 to the designated coupon server 60. Configurable merchant information

includes: merchant ID, merchant name, and any other information that is essential in the terminal operation.

Referring to Figure 5, if the cashier selects the “redeem” option from the main menu of the terminal 50, the coupon redemption process is started. The terminal 50 prompts the cashier to insert the smart card 40 after the “redeem” option is selected. The terminal 50 waits for the cashier to insert the smart card 40.

The terminal 50 attempts to read the coupon information 11 from the inserted smart card 40. The reading process is triggered automatically as soon as the cashier inserts the smart card 40. If the inserted smart card 40 is supported by the terminal 50 and has the downloaded coupon 80, the terminal 50 reads the coupon 80 and displays the details on the main menu of the terminal 50.

The terminal 50 displays a list of coupons 80 found in the smart card 40. The cashier is able to scroll through the list of valid unexpired coupons 80 and selects the relevant coupon 80 for redemption. Only coupons 80 specific to the merchant 15 and which match the synchronised coupon information 11 are displayed in the main menu of the terminal 50. The terminal 50 does not display coupons 80 of other merchants 15.

The terminal 50 performs redemption after the cashier selects relevant coupon for redemption. The terminal 50 screen displays the current coupon 80 available and prompts the cashier to enter the number of coupons to redeem (default is set to one). After the cashier selects the number corresponding to the coupons 80 to redeem (by pressing the OK button or any button to indicate confirmation on the terminal 50, which vary between different terminals 50), the terminal application 51 starts to perform the coupon redemption process.

Upon successfully performing the coupon redemption, the terminal application 51 causes terminal 50 to print an internal coupon redemption receipt and subsequently allows the cashier to print another receipt for the consumer 29, if required.

35 Reconciliation

The reconciliation phase refers to the process of: consolidating and reporting redemption information; reconciling and error checking of redemption information;

computing the commission payable to stakeholders, based on a pre-agreed rate table; and billing of merchants 15 for redemption information, based on a pre-agreed rate table.

- 5 The reconciliation phase involves the cashier responsible for the terminal 50 to perform an end-of-day settlement process to report and send back all coupon redemption information to the coupon server 60, in addition to the financial payment transactions. Next, the coupon server 60 reports or sends back all the redemption information to the broadcaster's coupon server 12 for consolidation,
10 checking, reconciliation and billing.

The reconciliation phase involves coupon redemption information being reported, consolidated, checked and computed. This phase is transparent to consumers 29, unless it involves redemption roll-back/charge-backs when the consumer 29
15 cancels a coupon purchase, and hence the coupon transaction is reversed or cancelled.

To ensure integrity of coupon redemption information being transmitted back from the coupon server 60 to broadcaster's coupon server 12, the following processes
20 applies:

- The coupon server 60 must maintain all coupon redemption information within the coupon server collection batches from the terminals 60.
- The coupon server collection batch must be secured within the coupon server 60 until such time that they are sent back to the broadcaster's coupon server
25 12. The coupon server collection batch may also be encrypted.
- New coupon transactions must not be added to a closed coupon server collection batch.
- When a coupon transaction is added to an active coupon server collection batch, the associated coupon server collection batch summary totals must also
30 be updated to reflect the new addition.
- Closed coupon server collection batch must not be re-opened, and new coupon transactions must not be added to a closed coupon server collection batch.

- 35 The coupon server 60 does not delete closed coupon server collection batches until an acknowledgement has been received from the broadcaster's coupon server 12.

To maintain coupon reconciliation integrity:

- The coupon server 60 must maintain coupon redemption information of all coupons and information about all coupon campaigns.
- 5 • Coupon redemption information is stored within the coupon server collection batches and terminal collection batches.
- Coupon server collection batch is secured.
- When a coupon transaction is added to the active coupon server collection batch, the associated coupon server collection batch summary totals must also
- 10 be updated to reflect the new addition.
- Coupon server collection batch summary totals must also be updated.
- Closed coupon server collection batch must not be re-opened, and new transactions must not be added to a closed coupon server collection batch.
- The coupon server 60 does not delete closed coupon server collection batches
- 15 until an acknowledgement has been received from broadcaster's coupon server 12.
- Closed coupon server collection batches to be kept for one year.

20 The terminal 50 prompts the cashier to print coupon redemption receipt for consumer 29. An end-of-day settlement is done by the cashier at the end of every business day. This is done through the REDEEM option on the terminal 50. The REDEEM option is protected by a supervisory password.

25 During the end-of-day settlement process, the terminal 50 communicates with the coupon server 60 via communications infrastructure. Simultaneously, the terminals 50 transmit the coupon redemption information as records to the coupon server 60 and retrieves any new coupon information 11 from the coupon server 60 for uploading to the participating terminals 50, based on new coupon campaign information.

30 The terminal 50 displays the coupon settlement report. Systems and devices used in the coupon value chain are auditable to assure accuracy, reliability and validity. They are set up to minimise catastrophic failures. Back-up systems and procedures are put in place so that outages at any point in the process do not jeopardise the

35 operations of the entire coupon value chain. The system 10 is also protected against external or internal infiltration, hackers, and computer viruses. An electronic

data retention policy is also enforced such that all electronic transactions and records are kept for at least six months in a secure and safe location.

Coupon Servers 12, 60

5 Major components of the broadcaster's coupon server 12 includes:

- Loyalty Management Module.
- Campaign Management Module.
- Communication Management Module.
- Advertising Banner Module.
- 10 • Reconciliation and Reporting Module.
- Community Service Board Module.
- Administration Module.

To complete the coupon business logic in a merchant campaign, merchants 15 decide the following:

- Coupon value.
- Start and end date of coupon campaign.
- Expiry date of the coupon.
- Coupon redemption instruction.
- 20 • Business logic/redemption rule, especially for the terminals 50.

The coupon server 60 manages the connected terminals 50 in the following manner.

- Add terminal profile - Enter the terminal profile of the terminals such as
25 terminal ID and terminal's configuration.
- Delete terminal profile - Allow the terminal 50 to be deleted from the system 10.
- Edit terminal profile - Allow the terminal profile to be modified and updated.
- Coupon information 11 is updated by a terminal management system that
30 is connected to the coupon server 60 before the start of the coupon campaign during the coupon information synchronisation process.
- Terminal management system automatically deletes expired coupon information 11 on the terminals 50, the day after the coupon expiry date (usually at mid-night).
- 35 • Failure to update or refresh the coupon information 11 on the terminals 50 triggers an acknowledgement to the broadcaster's coupon server 12 via

the coupon server 60. This is to ensure that only enabled terminals 50 pre-loaded with specific coupon information are able to read the downloaded coupons 80.

- 5 • During the end-of-day settlement, the terminal 50 communicates with the coupon server 60 via communications infrastructure and simultaneously sends the coupon redemption information as records to the coupon server 60 and retrieves any new coupon information 11 for uploading to the participating terminals 50, based on a new coupon campaign.
- 10 The coupon server 60 is able to manage the profiles of merchants 15 participating in the issuance of coupon 80 as part of a coupon campaign, in the following manner:

 - Add merchant profile - Enter the profile of the merchant 15.
 - Delete merchant profile - Allow the merchant record to be deleted.
 - 15 • Edit merchant profile - Allow the merchant profile to be modified and updated.
 - Creation/Update/Deletion of merchant's outlet/chain records,
 - Creation of different merchant's outlet/chain grouping.

20 The coupon server 60 is able to manage coupon information 11 in the following manner:

- Accept and update coupon information 11 from broadcaster's coupon server 12.
- Prepare coupon information 11 to be downloaded or synchronised to participating terminals 50.
- 25 • Update and pre-load all terminals 50 with the latest coupon information 11, based on coupon campaign specifications during the coupon information synchronisation process.
- Accept confirmations back from the participating terminals 50, confirming that coupon information 11 has been successfully updated and pre-loaded by the
- 30 terminals 50 (part of the coupon information synchronisation process).
- Upon consolidating these successful confirmations back from the participating terminals 50, send coupon information acknowledgement (either ready or error status) to broadcaster's coupon server 12 to trigger the broadcast of the coupon information 11 via the digital broadcast infrastructure 20.
- 35 • Collect and consolidate coupon redemption information from terminals 50.

- Send coupon redemption information to the broadcaster's coupon server 12 via the coupon server 60 for consolidation, reconciliation and billing of transaction revenue.
- All coupon redemption information is archived for at least six months including information about expired coupons 80.

A coupon server 60 is able to manage terminal profiles in the following manner:

- Add terminal profile - Enter the profile of the terminal 50 (that has been pre-initialised with the terminal application 51) such as terminal ID and terminal's configuration.
- Delete terminal profile - Allow the terminal profile to be deleted from the system.
- Edit terminal profile - Allow the terminal profile to be modified and updated.
- Assignment of terminal profile to merchant's outlet/chain.
- Update participating terminal profile with active and the latest coupon information 11 and terminal application 51 such that the coupon is recognised by the participating terminals 50.
- Removal and archival of expired coupon information 11 from terminal 50.

The terminals 50 are capable of determining that the smart card 40 has been removed before the completion of the transaction and before terminating the processing. This reduces the likelihood that the smart card 40 is being accidentally removed during the transaction.

To ensure integrity of coupon redemption information being returned from the terminals 50 to the coupon server 60, the terminal collection batch (a consolidated list of coupon redemption transaction records per day) is transmitted back to the broadcaster's coupon server 12. The terminals 50 prepares the terminal collection batch daily, as part of the end-of-day settlement processes. Terminal collection batches have a summary of the totals of transaction record within the batch.

It was earlier described that the second smart card reader 181 also provides at-home capabilities and revenues for the deployment of interactive TV services like coupon 80 downloads, TV-Commerce for purchases of goods or services, TV-Banking (bill payment, funds transfer, inquiries via television 32) and TV-Token pre-payments/top-ups (for utilities, telephone, council services).

Consumers 29 are only able to perform TV-Commerce and/or TV-Banking transactions via the set-top box 30 when the set-top box 30 recognises the specific interactive television information contained in the storage application 41 on the smart card 40. Such information includes consumer preferences, membership
 5 information, payment and account details, and also the delivery address of the consumer 29. This information also authenticates the consumer performing these transactions via the set-top box 30 and/or reduces the need to key in information using the remote control on television, which can be cumbersome and repetitive. That is, the storage application 41 on the smart card 40 performs consumer identity
 10 authentication and hence allows TV-Commerce and/or TV-Banking, top-up services to occur in a trusted environment. Service providers (banks or merchants) are able to validate the consumer's identity, based on information stored on the smart card 40 in the storage application 41.

15 The storage application 41 is also used to download and upload utilisation and payment details for TV-Token pre-payments/top-ups. For example, for utility payments, information such as last unit reading, number of units consumed, number of units purchased/top-up and new/current unit reading are stored in the storage application 41. The smart card 40 with the storage application 41 is used
 20 as a physical conduit between the set-top box 30 and pre-paid metering/payment systems by updating the consumed units, downloading the last unit reading and uploading purchased/top-up information between these systems and the consumer 29. These utilisation and payment details from the storage application 41 are then downloaded and uploaded via the set-top box's back-channel/return-path
 25 connectivity to a designated back-end host system of the utility provider or service provider.

The digital broadcast infrastructure 20 may be satellite television infrastructure or other broadcast infrastructure that may carry digital or analogue signals via
 30 terrestrial signals, optical cables, broadband, wireless means, the Internet, telephone lines or mobile phones.

Although, a remote control 31 has been described, other consumer 29 interface devices 31 are envisaged such as a keyboards, mice, mobile phones or wireless
 35 controllers.

Although a set-top box 30 has been described, it is envisaged that any digital receiving device 30 to receive coupons via the digital broadcast infrastructure may be used. For example, Personal Video Recorders (PVRs) or Digital Video Recorders (DVRs).

5

Although a smart card 40 has been described, it is envisaged that any smart card 40 may be used. For example, a mobile computing device 40 such as a Personal Device Assistant (PDA), palm devices, portable computers, removable hard disks, thumb drives, or mobile phone 40.

10

Although a POS terminal 50 has been described, it is envisaged that other devices including a cash register, computer or kiosk are also suitable. For example, a terminal 50 that is also able to accept cash or process cash-less payments from the consumer 29.

15

It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the scope or spirit of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects

20

illustrative and not restrictive.

WE CLAIM:

1. A method for distributing a promotional coupon of a merchant to consumers via broadcast infrastructure, the method comprising:
 - 5 receiving an encrypted version of the coupon via the broadcast infrastructure;
 - decrypting the encrypted coupon information; and
 - displaying the decrypted coupon information to the consumer;wherein the decrypted coupon is downloadable to a mobile device of a consumer, the downloaded coupon being redeemable by the consumer when presented to the merchant.
- 10 2. The method according to claim 1, wherein the broadcast infrastructure is satellite television infrastructure.
- 15 3. The method according to claim 1, wherein the broadcast infrastructure includes infrastructure capable of carrying digital or analogue signals via terrestrial signals or cables.
- 20 4. The method according to claim 1, further comprising receiving a coupon application via the broadcast infrastructure for managing the coupon.
5. The method according to claim 4, wherein the coupon application and coupon are received at substantially the same time.
- 25 6. The method according to claim 1, further comprising an initial step of encrypting the coupon and the coupon application.
7. The method according to claim 6, wherein the coupon and coupon application are encrypted by the broadcast infrastructure.
- 30 8. The method according to claim 1, wherein a digital receiving device receives the encrypted coupon and encrypted coupon application.
- 35 9. The method according to claim 8, wherein the digital receiving device is a set-top box or personal video recorder (PVR).

10. The method according to claim 8, wherein the mobile device of the consumer is connectable to the digital receiving device.
11. The method according to claim 8, wherein the mobile device wirelessly communicates with the digital receiving device.
12. The method according to claim 1, wherein the mobile device is a chip-based card such as a smart card.
13. The method according to claim 1, wherein the mobile device is a mobile computing device such as a Personal Device Assistant (PDA), a palm machine, a notebook, a removable hard disk, a thumb drive, or a mobile phone.
14. The method according to claim 1, wherein the merchant is a retailer, a company, franchise, financial institution, or government agency.
15. The method according to claim 1, wherein the coupon is presented to the consumer via a presentation device.
16. The method according to claim 15, wherein the presentation device is a television or computer monitor or other display device.
17. The method according to claim 16, wherein the other display device include LCD/OLED screens, projectors, mobile phone displays.
18. The method according to claim 1, wherein the coupon is presented through a channel solely for presenting coupons.
19. The method according to claim 1, wherein the coupon is presented within a coupon listing.
20. The method according to claim 1, wherein the coupon is presented as part of an interactive application broadcast through the broadcast infrastructure for advertising the promotion of the merchant.

21. The method according to claim 8, wherein a consumer interface device is provided to interact with the coupon application received by the digital receiving device.
- 5 22. The method according to claim 21, wherein the consumer interface device is a remote control device or other device such as a keyboard, mouse, mobile phone or wireless controller.
- 10 23. The method according to claim 8, wherein more than one coupon is encrypted and transmitted to the digital receiving device at substantially the same time via the broadcast infrastructure.
- 15 24. The method according to claim 6, wherein the encrypted coupon and coupon application are broadcast on demand or in an automated manner.
- 20 25. The method according to claim 8, wherein the encrypted coupon and coupon application are decrypted by interaction with Conditional Access (CA) of the digital receiving device.
- 25 26. The method according to claim 8, wherein the encrypted coupon and coupon application are decrypted by a software and/or hardware based encryption/decryption system.
27. The method according to claim 1, further comprising downloading the coupon onto the mobile device of the consumer.
28. The method according to claim 8, wherein the mobile device is connected to or inserted into the digital receiving device to enable download of the coupon.
- 30 29. The method according to claim 8, wherein the mobile device wirelessly downloads the coupon from the digital receiving device.
- 35 30. The method according to claim 27, wherein the mobile device is pre-initialised with a storage application to manage the storage of coupons on the mobile device.

31. The method according to claim 30, wherein the storage application contains information about the mobile device's mapping, size, writing to Secure-Read-Write or Free-Read-Write data storage space, smart card type, and file structure.
- 5 32. The method according to claim 1, further comprising presenting the mobile device of the consumer with at least one downloaded coupon to the merchant for redemption of the at least one downloaded coupon.
- 10 33. The method according to claim 32, wherein the mobile device is read by a terminal of the merchant for detecting the at least one downloaded coupon on the mobile device.
- 15 34. The method according to claim 33, wherein the detection is automatic or by manual operation.
35. The method according to claim 33, wherein the terminal includes a Point-of-Sale (POS) terminal, cash register, computer or kiosk.
- 20 36. The method according to claim 35, wherein the terminal is enabled to accept cash or process cash-less payments from the consumer.
- 25 37. The method according to claim 33, wherein the terminal has preloaded coupon information to enable reading or matching of the coupons downloaded on the mobile device.
38. The method according to claim 37, wherein reading or matching are performed during a coupon information synchronisation process.
- 30 39. A system for distributing a promotional coupon of a merchant to consumers via broadcast infrastructure, the system comprising:
 a digital receiving device to receive an encrypted version of the coupon via the broadcast infrastructure;
 a decryption module of the digital receiving device to decrypt the encrypted
 35 coupon; and
 a presentation device in communication with the digital receiving device to display the decrypted coupon to the consumer;

wherein the decrypted coupon is downloadable to a mobile device of a consumer, the downloaded coupon being redeemable by the consumer when presented to the merchant.

5 40. The system according to claim 39, further comprising a consumer interface device to enable the consumer to interact with the digital receiving device and selectively download coupons to their mobile device.

41. The system according to claim 39, wherein the decryption module is a
10 Conditional Access (CA) of the digital receiving device.

42. The system according to claim 39, wherein the decryption module includes a software and/or hardware based encryption/decryption system.

15 43. The system according to claim 39, further comprising a back-channel link from the digital receiving device to the broadcast infrastructure for coupon distribution control and tracking.

44. The system according to claim 43, wherein the back-channel link is over
20 the Internet or third party communications infrastructure such as a mobile telephone network, plain old telephone service (POTS) or optical fibre network.

45. The system according to claim 39, wherein the broadcast infrastructure is satellite television infrastructure.
25

46. The system according to claim 39, wherein a coupon application is received via the broadcast infrastructure for managing the coupon.

47. A method for generating a promotional coupon of a merchant for
30 distribution to consumers via broadcast infrastructure, the method comprising:

generating coupon information for the coupon in accordance with predetermined coupon information rules;

processing the generated coupon information, the processing including synchronising the generated coupon information with at least one terminal of the
35 merchant in accordance with the predetermined coupon information rules; and

storing the processed coupon information in the at least one terminal and at least one coupon server for a duration defined by coupon information rules;

wherein the at least one coupon server updates and synchronises the at least one terminal of the merchant with the processed coupon information to enable redemption of the coupon by the consumers.

- 5 48. The method according to claim 47, wherein the synchronisation of the generated coupon information only updates the most recent coupon information to the at least one terminal.
49. The method according to claim 47, wherein the coupon information rules
10 include coupon campaign requirements of a coupon campaign.
50. The method according to claim 49, wherein expired coupon information is deleted from the at least one terminal when the coupon campaign has expired.
- 15 51. The method according to claim 47, wherein the coupon information includes information relating to expiry date of the coupon, coupon ID, acquirer ID, issuer ID, merchant ID, terminal ID, dedicated file ID, card type ID, or host ID.
52. The method according to claim 47, further comprising generating a secure
20 key module for the coupon application to manage the presentation of the coupon and download of the coupon to the mobile device.
53. The method according to claim 47, further comprising broadcasting coupon information via the broadcast infrastructure using the secure key module.
- 25 54. The method according to claim 47, wherein a coupon campaign designer generates the coupon information.
55. A method for downloading at least one new coupon of a merchant into a
30 mobile device of a consumer, comprising:
 - selecting the at least one new coupon for download into the mobile device;
 - determining whether the mobile device is compatible;
 - deleting expired coupons from the mobile device; and
 - checking for available space to download the at least one new coupon to
35 the mobile device;where if the mobile device is compatible and there is available space, the at least one new coupon is stored on the mobile device.

56. The method according to claim 55, wherein the mobile device is pre-initialised with a storage application for managing the storage of the at least one coupon.
- 5 57. The method according to claim 55, wherein the mobile device is a chip-based card such as a smart card.
58. The method according to claim 55, wherein the mobile device is a mobile
10 computing device such as a Personal Device Assistant (PDA), a palm machine, a notebook, a removable hard disk, a thumb drive, or a mobile phone.
59. The method according to claim 55, wherein the at least one coupon is selected from a list of coupons presented on a presentation device.
- 15 60. The method according to claim 55, wherein the mobile device provides Secure-Read-Write and unsecured or Free-Read-Write data storage space for storing the at least one new coupon.
- 20 61. The method according to claim 60, wherein the coupon is downloaded into the mobile device without using a private key to unlock the mobile device via the secure key module.
62. The method according to claim 55, wherein expired coupons are
25 automatically deleted or deleted after confirmation from the consumer.
63. The method according to claim 55, wherein the coupon information is communicated and synchronised on a terminal of the merchant through the coupon server and broadcaster's coupon server during a coupon information
30 synchronisation process.
64. The method according to claim 63, wherein the coupons on the mobile device are matched with the coupon information stored on the terminal.
- 35 65. The method according to claim 63, wherein the terminal rejects any unrecognised or unmatched coupon information.

66. The method according to claim 57, further comprising checking the smart card type and architecture through a reset command of the smart card.

67. The method according to claim 66, wherein if the specified smart card type
5 is recognised, the smart card is read to check the number of coupons stored in the smart card.

68. The method according to claim 63, wherein the terminal selects the coupon
that corresponds to its merchant identification and host identification based on
10 coupon information stored on the terminal.

69. A method for reconciling redeemed coupons at a terminal of a merchant,
the method comprising:
reporting the coupons redeemed at the terminal to a first coupon server via
15 at least one second coupon server; and
reconciling the redeemed coupons from the terminal to the first coupon
server based on a specific coupon campaign.

70. The method according to claim 69, wherein the first coupon server is a
20 coupon server of a broadcaster in a broadcast infrastructure.

71. The method according to claim 69, wherein the at least one second
coupon server is a coupon server of the merchant, an acquirer bank or loyalty
programme operators.
25

72. The method according to claim 69, wherein the reporting and reconciliation
of the redeemed coupons is performed at periodic time intervals or on request.

73. A mobile device carrying a promotional coupon of a merchant, the device
30 comprising:
a storage area to store coupon information of the coupon;
a Free-Read-Write data storage space of the storage area to store a first
portion of the coupon information; and
a Secure-Read-Write data storage space of the storage area to store a
35 second encrypted portion of the coupon information using a secure key module;
wherein an encrypted form of the coupon information is transmitted via
broadcast infrastructure to a digital receiving device, the digital receiving device

decrypting the encrypted coupon information and writing the coupon information to the mobile device.

74. The device according to claim 73, wherein the mobile device is a chip-based card such as a smart card.

75. The device according to claim 73, wherein the mobile device is a mobile computing device such as a Personal Device Assistant (PDA), a palm machine, a notebook, a removable hard disk, a thumb drive, or a mobile phone.

76. The device according to claim 73, wherein the digital receiving device is a set-top box or personal video recorder (PVR).

77. A terminal application for reading coupon information of at least one promotional coupon of a merchant from a mobile device of a consumer, the terminal application being stored in a terminal of the merchant, the application comprising:

a coupon reader module to read the coupon information stored on the mobile device;

a redemption module to redeem the at least one coupon, and to update a coupon server with the coupon information for reconciling the redemption; and

a synchronisation module to receive current coupon information from the coupon server during a coupon information synchronisation process;

wherein an encrypted form of the coupon information is transmitted via broadcast infrastructure to a digital receiving device, the digital receiving device decrypting the encrypted coupon information and writing the coupon information to the mobile device.

78. The application according to claim 77, wherein if the coupon reader module detects any expired coupons on the mobile device, the expired coupons are automatically deleted from the mobile device.

79. The application according to claim 78, wherein the terminal is instructed to alert the consumer of the coupon deletion.

80. A storage application for managing the storage of coupon information of at least one promotional coupon of a merchant, the storage application being stored in a mobile device of a consumer, the application comprising:

5 storage application information relating to information about the mobile device; and

a coupon application data container to store the coupon information in distinct device purses;

10 wherein an encrypted form of the coupon information is transmitted via broadcast infrastructure to the digital receiving device, the digital receiving device decrypting the encrypted coupon information and writing the coupon information to the mobile device.

81. The application according to claim 80, wherein the storage application information is read by the digital receiving device or by a terminal to determine
15 whether the mobile device is compatible to communicate with the digital receiving device or terminal.

82. A method for downloading at least one promotional coupon to a mobile device of a consumer, the at least one coupon being distributed to the consumer
20 via broadcast infrastructure, the method comprising:

storing the at least one coupon in a memory of a digital receiving device, the digital receiving device receiving the at least one coupon via the broadcast infrastructure;

25 retrieving the stored at least one coupon from the memory after a first predetermined amount of time has elapsed; and

downloading the retrieved at least one coupon onto the mobile device when the mobile device is connected to the digital receiving device;

30 wherein the consumer receives at least one reminder of the at least one stored coupon if the at least one coupon has not been retrieved, the at least one reminder reminding the consumer to retrieve and download the at least one stored coupon to their mobile device.

83. The method according to claim 82, wherein the at least reminder is a visual indication displayed to the consumer.

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84. The method according to claim 83, wherein the at least reminder also include an audible indication played to the consumer.

84. The method according to claim 82, wherein when the mobile device is connected to the digital receiving device, the at least one coupon stored in the memory of a digital receiving device is automatically downloaded to the mobile device.

85. The method according to claim 82, wherein the consumer instructs the digital receiving device to selectively store the at least one coupon.

86. The method according to claim 85, wherein the reminder is coupon overlay information presented on a presentation device to the consumer.

87. The method according to claim 86, wherein when the coupon overlay information is presented, the consumer causes the storage of the at least one coupon onto the digital receiving device by interacting with a consumer interface device.

88. A storage application for storing consumer information relating to a consumer, the storage application being stored in a mobile device of the consumer, the application comprising:

storage application information relating to information about the mobile device; and

a consumer application data container to store the consumer information;

wherein an interactive application of a service provider is broadcast to the consumer via broadcast infrastructure and presented to the consumer for interaction via a presentation device, the stored consumer information being transmitted via communications infrastructure to the service provider to authenticate the identity of the consumer.

88. The application according to claim 87, wherein the consumer information includes consumer preferences, membership information, payment and account details, recorded usage of services provided by the service provider, or delivery address of the consumer.

89. The application according to claim 87, wherein the service provider includes a bank, utilities provider, merchant, or top-up service provider.

90. The application according to claim 87, wherein the interactive application includes an interactive banking application or interactive account management application.

5 91. The application according to claim 87, wherein the presentation device is a television or computer monitor or other display device.

92. The application according to claim 91, wherein the other display device include LCD/OLED screens, projectors, mobile phone displays.

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