

**[0005]** According to a first aspect, there is provided a method of allowing a user to control a time for playback of an advertisement, the method includes receiving, from a content provider or a content delivery network, a bitstream comprising a static content and a shiftable content, wherein the shiftable content is content whose relative temporal position within a program is changeable the bitstream includes playback time information for the shiftable content; generating an index table comprising indices for independently accessing the shiftable content, wherein each index provides data facilitating access and then shifting/arrangement of the playback of the shiftable content on any segmentation of the program; receiving a user input to time-shift the shiftable content from a first playback time at which the shiftable content is to be played during playback of the program to a second playback time that is later than the first playback time; switching out the shiftable content to an updated version of the shiftable content; and selectively playing back, based on the user input and an advertisement credit policy, the updated version of the shiftable content to the user.

**[0006]** According to a second aspect, there is provided a content playback apparatus including a content receiver module configured to receive, from a content provider, a bitstream comprising a static content and a shiftable content, wherein the shiftable content is content whose relative temporal position within a program is changeable, the bitstream includes a playback time information for the shiftable content, a storage module configured to store the static content and the shiftable content, a bitstream analysis module configured to generate an index table comprising indices for independently accessing the shiftable content, wherein each index provides the apparatus with the ability to access and then shift/arrange the playback of the shiftable content on any segmentation of the program; a credit determination module configured to determine an amount of credit points available to the user to control playback of the shiftable content, and a playback control module configured to control playback of the shiftable content based on a user selection of the shiftable content and the amount of credit points available to the user, the playback control module being configured to remove a user control for providing the user selection of the shiftable content when a debt ceiling for the user is reached.

**[0007]** In an embodiment, at least a portion of the shiftable content in the above method comprises advertisements, the method further including assigning values to programming segments, assigning values to advertisements, maintaining a user's advertisement account, wherein the advertisement account comprises advertisement points for the user, and adjusting, in response to the user playing back a programming segment or an advertisement, the advertisement points for the user.

**[0008]** Disclosed herein is a server apparatus operable in a content network includes a playback value storage module that stores a list of digital programs and advertisements available for viewing in the content network and corresponding playback values, an account storage

module that stores information about advertisement accounts for a plurality of users of the content network, a playback report reception module that receives playback reports from a plurality of user devices, wherein a playback report includes information indicative of a digital program viewing or an advertisement viewing by a user, and an account balance management module that manages advertisement account points for the users based on the received playback reports.

**[0008a]** Disclosed herein is a content streaming server apparatus, including a bitstream receiver that receives, from a content provider, a bitstream comprising audiovisual content; a content store that stores the received bitstream; a content segmenter that segments the received content into static segments that are not time-shifted and time-shiftable segments; an index generator that generates an index table comprising indices for independently accessing the time-shiftable segments; a credit determiner that determines an amount of credit points available to the user to control playback of the shiftable content; and a streamer that streams the content by controlling playback of the shiftable content based on a user input and the amount of credit points available to the user.

**[0009]** These, and other, aspects are described below in the drawings, the description and the claims.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

**[0010]** FIG. 1 depicts high level architecture of a digital program delivery system.

**[0011]** FIG. 2 depicts an example of time-shifting advertisements using an index table.

**[0012]** FIG. 3 is a flowchart representation of a method of generating and playing back program content having time-shifted advertisements.

**[0013]** FIG. 4 depicts an example of a digital program delivery system including an ad exchange server.

**[0014]** FIG. 5 depicts an example process of assigning values to program segments.

**[0015]** FIG. 6 depicts an example process of accumulating credit during playback.

**[0016]** FIG. 7 depicts an example process of accumulating debt during playback.

**[0017]** FIG. 8 depicts an example process of conditionally skipping advertisements during playback.

**[0018]** FIG. 9 is a flowchart representation of a method of allowing a user to time-shift advertisement when watching content.

**[0019]** FIG. 10 is a block diagram representation of an apparatus for time-shifting advertisements.

**[0020]** FIG. 11 is a flowchart representation of a method of operating an ad exchange.

**[0021]** FIG. 12 is a block diagram representation of an ad exchange apparatus.

**[0022]** Like reference symbols in the various drawings indicate like elements.

## CLAIMS

1. A method of allowing a user to control a time for playback of an advertisement, comprising:

receiving, from a content provider or a content delivery network, a bitstream comprising a static content and a shiftable content, wherein the shiftable content is content whose relative temporal position within a program is changeable the bitstream includes playback time information for the shiftable content;

generating an index table comprising indices for independently accessing the shiftable content, wherein each index provides data facilitating access and then shifting/arrangement of the playback of the shiftable content on any segmentation of the program;

receiving a user input to time-shift the shiftable content from a first playback time at which the shiftable content is to be played during playback of the program to a second playback time that is later than the first playback time;

switching out the shiftable content to an updated version of the shiftable content; and selectively playing back, based on the user input and an advertisement credit policy, the updated version of the shiftable content to the user.

2. The method of claim 1, further comprising:  
generating, upon playing back the updated version of the shiftable content, an advertisement playback report.

3. The method of claim 1, further including:  
displaying, to the user, visual controls for time shifting the shiftable content, wherein the displaying is responsive to the advertisement credit policy.

4. The method of claim 1, further comprising:  
allowing the user to skip playing the shiftable content during playback of the video program when the advertisement credit policy indicates that the user has sufficient credit for skipping the shiftable content; and  
reducing an amount of the credit for the user caused by skipping the shiftable content.

5. A content playback apparatus, comprising:
  - a content receiver module configured to receive, from a content provider or a content delivery network, a bitstream comprising a static content and a shiftable content, wherein the shiftable content is content whose relative temporal position within a program is changeable, the bitstream includes playback time information for the shiftable content;
  - a storage module configured to store the static content and the shiftable content;
  - a bitstream analysis module configured to generate an index table comprising indices for independently accessing the shiftable content, wherein each index provides the apparatus with the ability to access and then shift/arrange the playback of the shiftable content on any segmentation of the program;
  - a credit determination module that configured to determine an amount of credit points available to the user to control playback of the shiftable content; and
  - a playback control module configured to control playback of the shiftable content based on a user selection of the shiftable content and the amount of credit points available to the user, the playback control module being configured to remove a user control for providing the user selection of the shiftable content when a debt ceiling for the user is reached.
6. The apparatus of claim 5, wherein the credit determination module is configured to increase the credit points available to the user for playing back a portion of the shiftable content and reduces the credit points for skipping a portion of the shiftable content.
7. The apparatus of claim 5, wherein the static content includes a digital video program for a linear playback and the shiftable content includes one or more advertisements.
8. The apparatus of claim 5, further comprising:
  - a credit exchange module configured to allow the user to perform accounting operations with the amount of credit points available to the user.
9. The apparatus of claim 8, wherein the accounting operations include checking, buying and selling the amount of credit points available to the user.
10. The method of claim 1, wherein at least a portion of the shiftable content comprises advertisements, the method further comprising:
  - assigning values to programming segments;

assigning values to advertisements;  
maintaining a user's advertisement account, wherein the advertisement account comprises advertisement points for the user; and  
adjusting, in response to the user's playing back of a programming segment or an advertisement, the advertisement points for the user.

11. The method of claim 10, wherein the adjusting operation includes, crediting advertisement points corresponding to a value assigned to a programming segment, when the user plays back the programming segment.

12. The method of claim 10, wherein the adjusting operation includes crediting advertisement points corresponding to a value assigned to an advertisement when the user watches the advertisement.

13. The method of claim 10, wherein the adjusting operation includes debiting points corresponding to a value assigned to an advertisement when the user skips playback of the advertisement or when the user fast forwards the advertisement.

14. The method of claim 10, further comprising:  
allowing the user to perform transactions with the user's advertisement account including a status check transaction by which the user can check a balance of the advertisement account.

15. The method of claim 10, wherein the transactions further comprise a purchase transaction by which the user can increase advertisement points in the user's advertisement account by making a payment.

16. The method of claim 14, wherein the transactions further comprise a trading transaction by which the user can trade a portion of advertisement points in the user's advertisement account with another user's advertisement points in the another user's advertisement account.

17. The method of claim 1, further comprising removing from a user interface displayed to a user a control usable by the user to provide the user input to time-shift the shiftable content when a debt ceiling is reached.

18. The content playback apparatus of claim 5, wherein the playback apparatus is configured to receive an updated version of the shiftable content and switch out the shiftable content to the updated version of the shiftable content.