

Claims

What is claimed is:

1. A method of managing transactions made by end users, the method comprising:
 - generating, by a processor, an information payload for each of a plurality of units of a first product, including a first unit information payload for a first unit of the first product, the first unit information payload for the first unit of the first product being different from a second unit information payload for a second unit of the first product, the first unit information payload for the first unit of the first product including:
 - a first unique identifier for the first unit information payload;
 - a first redemption reward for the first unit of the first product, the first redemption reward being a digital asset representing a reward redeemable by a user who has purchased the first unit of the first product, the first redemption reward configured to be transferrable, by the processor, to one of a plurality of users who has purchased the first unit of the first product based on a redemption verification process;
 - a first redemption status for the first unit information payload, the first redemption status being:
 - an unredeemed status when the first redemption reward has not yet been transferred to any of the plurality of users; or
 - a redeemed status when the first redemption reward has been transferred to one of the plurality of users;
 - a first geolocation requirement for the first unit information payload;
 - a first temporal requirement for the first unit information payload; and a first user requirement for the first unit information payload;
 - generating, by the processor, a unique detectable identifier for each information payload, including a first detectable identifier for the first unit information payload, the first detectable identifier associated with the first unique identifier for the first unit information payload, the first detectable identifier configured to cause a user device to perform a first action when the first detectable identifier is detected by the user device, the first action including:
 - sending, to the processor, a first redemption request, the first redemption request including the first unique identifier for the first unit information payload; and

responsive to receiving, by the processor, the first redemption request from a first user device of a first user, performing the redemption verification process for the first redemption request, the redemption verification process including:

- obtaining a first user information set for the first user;
- determining a geolocation of the first user device;
- determining a timestamp associated with the first redemption request;
- obtaining, based on the first unique identifier for the first unit information payload in the first redemption request, the first unit information payload;
- identifying the first redemption status for the first unit information payload;
- identifying the first geolocation requirement for the first unit information payload;
- identifying the first temporal requirement for the first unit information payload;
- identifying the first user requirement for the first unit information payload;
- responsive to a determination that the first redemption status for the first unit information payload is the unredeemed status, the geolocation of the first user device meets the first geolocation requirement, the timestamp of the first redemption request meets the first temporal requirement, and the first user meets the first user requirement based on the first user information set:

- transferring, by the processor to the first user based on the first user information set, the first redemption reward for the first unit information payload; and

- setting the first redemption status for the first unit information payload to be the redeemed status; and

- responsive to a determination that the first redemption status for the first unit information payload is the redeemed status and/or the geolocation of the first user device does not meet the first geolocation requirement and/or the timestamp of the first redemption request does not meet the first temporal requirement and/or the first user does not meet the first user requirement:

- sending, by the processor to the first user, a notification that the first redemption reward is not redeemable.

2. The method of claim 1, wherein at least one of the following apply:

- the first temporal requirement includes at least one of the following:

- a first expiry date for the first unit information payload, the first expiry date for the first unit information payload being a last date on which the first redemption reward can be transferred to one of the plurality of users; and

a first relevant date for the first unit information payload, the first relevant date for the first unit information payload being a date on which a value of the first redemption reward changes from a first value to a second value;

the timestamp of the first redemption request is at least one of the following:

- a timestamp when the first user device detected the first detectable identifier; and
- a timestamp when the first user device sent the first redemption request; and
- a timestamp when the process received the first redemption request;

the first geolocation restriction includes at least one of the following:

- one or more allowed geolocation regions; and
- one or more restricted geolocation regions;

the first detectable identifier is a unique QR code, and the first detectable identifier is detected by the first user device via image capturing of the unique QR code;

the first detectable identifier includes at least one of the following:

- a unique QR code;
- a unique bar code; and
- a unique sequence of characters;

the first redemption request further includes the geolocation of the first user device, and the redemption verification process determines the geolocation of the first user device from the first redemption request; and

the transferring of the first redemption reward includes recording, in a distributed ledger, a record of the transfer of the first redemption reward to the first user.

3. The method of claim 1, wherein:

the first user information set includes:

- an address of a digital wallet of the first user; and

the transferring of the first redemption reward includes transferring the first redemption reward to the address of the digital wallet of the first user.

4. A method of managing transactions made by end users, the method comprising:

generating, by a processor, an information payload for each of a plurality of units of a first product, including a first unit information payload for a first unit of the first product, the first unit information payload for the first unit of the first product being different from a second unit information payload for a second unit of the first product, the first unit information payload for the first unit of the first product including:

- a first unique identifier for the first unit information payload;

a first redemption reward metric for the first unit of the first product, the first redemption reward metric identifying a plurality of available digital rewards transferrable, by the processor, to a user based on a redemption process;

generating, by the processor, a unique detectable identifier for each information payload, including a first detectable identifier for the first unit information payload, the first detectable identifier associated with the first unique identifier for the first unit information payload, the first detectable identifier configured to cause a user device to perform a first action when the first detectable identifier is detected by the user device, the first action including:

sending, to the processor, a first redemption request, the first redemption request including the first unique identifier for the first unit information payload; and

responsive to receiving, by the processor, the first redemption request from a first user device of a first user, performing the redemption process for the first redemption request, the redemption process including:

obtaining a first user information set for the first user;

obtaining, based on the first unique identifier for the first unit information payload in the first redemption request, the first unit information payload;

selecting, based on the first user information set for the first user, a first digital reward from among the plurality of digital rewards in the first redemption reward metric, the selecting of the first digital reward from among the plurality of digital rewards in the first redemption reward metric based on one or more of the following:

a geolocation of the first user; and/or

a timestamp associated with the first redemption request; and/or

one or more information in the first user information set; and

transferring, by the processor to the first user, the selected first digital reward.

5. The method of claim 4, wherein:

the first unit information payload further includes:

a first redemption status for the first unit information payload, the first redemption status for the first unit information payload being:

an unredeemed status when the first digital reward has not yet been transferred to a user based on the redemption process; or

a redeemed status when the first digital reward has been transferred to a user based on the redemption process;

the redemption process further includes:

identifying the first redemption status for the first unit information payload; and
the first digital reward is transferred to the first user when the first redemption status is the unredeemed status.

6. The method of claim 4, wherein at least one of the following apply:

the first redemption request further includes the geolocation of the first user device, and the redemption process determines the geolocation of the first user device from the first redemption request;

the first detectable identifier is a unique QR code, and the first detectable identifier is detected by the first user device via image capturing of the unique QR code;

the first detectable identifier includes at least one of the following:

a unique QR code;

a unique bar code; and

a unique sequence of characters;

the first user information set includes a geolocation of the first user, and the first digital reward is selected based on the geolocation of the first user;

the first user information set includes a history of previous redemption requests from the first user, and the first digital reward is selected based on the history of previous redemption requests from the first user;

the first user information set includes an address of a digital wallet of the first user, and the transferring of the first digital reward includes transferring the first digital reward to the address of the digital wallet of the first user; and

the transferring of the first digital reward includes recording, in a distributed ledger, a record of the transfer of the first digital reward to the first user.

7. A method of managing transactions made by end users, the method comprising:

providing a first detectable identifier for a first unit of a first product, the first detectable identifier for the first unit of the first product being different from a second detectable identifier for a second unit of the first product, the first detectable identifier including instructions which, when detected by a user device, causes the user device to send, to a processor, a first redemption request; and

responsive to receiving, by the processor, the first redemption request from a first user device of a first user, performing a redemption verification process for the first redemption request, the redemption verification process including:

obtaining, based on the first redemption request, a first unit information payload for the first unit of the first product, the first unit information payload including:

a first redemption reward for the first unit of the first product; and

a first redemption status, the first redemption status being an unredeemed status or a redeemed status;

identifying the first redemption status for the first unit information payload; and

responsive to a determination that the first redemption status is the unredeemed status:

transferring, by the processor to the first user, the first redemption reward.

8. The method of claim 7, wherein:

the first unit information payload further includes:

a first expiry date for the first unit information payload, the first expiry date being a last date on which the first redemption reward can be transferred to a user based on the redemption verification process;

the redemption verification process further includes:

determining a current date; and

identifying the first expiry date for the first unit information payload; and

the first redemption reward is transferred to the first user when the current date has not exceeded the first expiry date.

9. The method of claim 7, wherein:

the first unit information payload further includes:

a first geolocation restriction for the first unit information payload, the first geolocation restriction including:

one or more allowed geolocation regions; and/or

one or more restricted geolocation regions;

the redemption verification process further includes:

determining a geolocation of the first user device; and

identifying the one or more allowed geolocation regions and/or one or more restricted geolocation regions; and

the first redemption reward is transferred to the first user when:

the geolocation of the first user device is within one or more of the allowed geolocation regions; and/or

the geolocation of the first user device is not within one or more of the restricted geolocation regions.

10. The method of claim 7, wherein at least one of the following apply:

the first redemption request further includes the geolocation of the first user device, and the redemption verification process determines the geolocation of the first user device from the first redemption request;

the first detectable identifier is a unique QR code, and the first detectable identifier is detected by the first user device via image capturing of the unique QR code;

the first detectable identifier includes at least one of the following:

a unique QR code;

a unique bar code; and

a unique sequence of characters;

the transferring of the first redemption reward includes recording, in a distributed ledger, a record of the transfer of the first redemption reward to the first user;

the first redemption reward includes at least one of the following:

a digital stamp;

a digital badge;

a feature on the digital badge;

a quantity of digital tokens; and

a digital coupon.

11. A method of managing transactions made by end users, the method comprising:

providing a first unique QR code for a first unit of a first product, the first unique QR code for the first unit of the first product being different from a second unique QR code for a second unit of the first product, the first unique QR code including instructions which, when scanned by a user device, causes the user device to send, to a processor, a first redemption request; and

responsive to receiving, by the processor at a first time, the first redemption request from a first user device of a first user, performing a redemption verification process for the first redemption request, the redemption verification process including:

obtaining, based on the first redemption request, a first unit information payload for the first unit of the first product, the first unit information payload including:

a first redemption reward for the first unit of the first product; and

a first redemption status, the first redemption status being:

an unredeemed status when the processor has not received the first redemption request prior to the first time;

a redeemed status when the processor has received the first redemption request before the first time;

identifying the first redemption status for the first unit information payload; and responsive to a determination that the first redemption status is the unredeemed status:

transferring, by the processor to the first user, the first redemption reward.

12. The method of claim 11, wherein:

the first unit information payload further includes:

a first expiry date for the first unit information payload, the first expiry date being a last date on which the first redemption reward can be transferred to a user based on the redemption verification process;

the redemption verification process further includes:

determining a current date; and

identifying the first expiry date for the first unit information payload; and

the first redemption reward is transferred to the first user when the current date has not exceeded the first expiry date.

13. The method of claim 11, wherein:

the first unit information payload further includes:

a first geolocation restriction for the first unit information payload, the first geolocation restriction including:

one or more allowed geolocation regions; and/or

one or more restricted geolocation regions;

the redemption verification process further includes:

determining a geolocation of the first user device; and

identifying the one or more allowed geolocation regions and/or one or more restricted geolocation regions; and

the first redemption reward is transferred to the first user when:

the geolocation of the first user device is within one or more of the allowed geolocation regions; and/or

the geolocation of the first user device is not within one or more of the restricted geolocation regions.

14. The method of claim 11, wherein at least one of the following apply:
- the first redemption request further includes the geolocation of the first user device, and the redemption verification process determines the geolocation of the first user device from the first redemption request;
 - the transferring of the first redemption reward includes recording, in a distributed ledger, a record of the transfer of the first redemption reward to the first user;
 - the first redemption reward includes at least one of the following:
 - a digital stamp;
 - a digital badge;
 - a feature on the digital badge;
 - a quantity of digital tokens; and
 - a digital coupon.
15. A method of managing transactions made by end users, the method comprising:
- providing a first detectable identifier for a first unit of a first product, the first detectable identifier associated with a first unique identifier for the first unit of the first product, the first detectable identifier configured to cause a user device to perform a first action when the first detectable identifier is detected by the user device, the first action including:
 - sending, to a processor, a first redemption request, the first redemption request including the first unique identifier for the first unit of the first product;
 - providing a second detectable identifier for a second unit of the first product, the second detectable identifier associated with a second unique identifier for the second unit of the first product, the second detectable identifier configured to cause the user device to perform a second action when the second detectable identifier is detected by the user device, the second action including:
 - sending, to the processor, a second redemption request, the second redemption request including the second unique identifier for the second unit of the first product;
 - responsive to receiving, by the processor at a first time, the first redemption request from a first user device of a first user, performing a first redemption process for the first redemption request, the first redemption process including:
 - obtaining a first user information set for the first user;
 - obtaining, based on the first unique identifier in the first redemption request, a first unit information payload, the first unit information payload including:
 - the first unique identifier for the first unit of the first product;

a first redemption reward for the first unit of the first product; and
a first redemption status, the first redemption status being an unredeemed status;

responsive to a determination that the first redemption status is the unredeemed status:

transferring, by the processor to the first user based on the first user information set, the first redemption reward; and

changing the first redemption status for the first unit information payload from the unredeemed status to the redeemed status;

responsive to receiving, by the processor at a second time after the first time, the first redemption request from the first user device of the first user, performing the first redemption process for the first redemption request, the first redemption process including:

obtaining the first user information set for the first user;

obtaining, based on the first unique identifier in the first redemption request, the first unit information payload, the first unit information payload including:

the first unique identifier for the first unit of the first product;

the first redemption reward for the first unit of the first product; and

the first redemption status, the first redemption status being the redeemed status; and

responsive to a determination that the first redemption status is the redeemed status:

sending, by the processor to the first user, a notification that the first redemption reward for the second unit of the first product has already been redeemed;

responsive to receiving, by the processor at a third time, the second redemption request from the first user device of the first user, performing a second redemption process for the second redemption request, the second redemption process including:

obtaining the first user information set for the first user;

obtaining, based on the second unique identifier in the second redemption request, a second unit information payload, the second unit information payload including:

the second unique identifier for the second unit of the first product;

a second redemption reward for the second unit of the first product; and

a second redemption status, the second redemption status being the unredeemed status;

responsive to a determination that the second redemption status is the unredeemed status:

transferring, by the processor to the first user based on the first user information set, the second redemption reward; and

changing the second redemption status for the second unit information payload from the unredeemed status to the redeemed status;

responsive to receiving, by the processor at a fourth time after the first time, the first redemption request from a second user device of a second user, performing the first redemption process for the first redemption request, the first redemption process including:

obtaining a second user information set for the second user;

obtaining, based on the first unique identifier in the first redemption request, the first unit information payload, the first unit information payload including:

the first redemption reward for the first unit of the first product; and

the first redemption status, the first redemption status being the redeemed status; and

responsive to a determination that the first redemption status is the redeemed status:

sending, by the processor to the second user, a notification that the first redemption reward for the first unit of the first product has already been redeemed; and

responsive to receiving, by the processor at a fifth time after the third time, the second redemption request from the second user device of the second user, performing the second redemption process for the second redemption request, the second redemption process including:

obtaining the second user information set for the second user;

obtaining, based on the second unique identifier in the second redemption request, the second unit information payload, the second unit information payload including:

the second redemption reward for the second unit of the first product; and

the second redemption status, the second redemption status being the redeemed status; and

responsive to a determination that the second redemption status is the redeemed status:

sending, by the processor to the second user, a notification that the second redemption reward for the second unit of the first product has already been redeemed.

16. The method of claim 15, wherein:

the first unit information payload further includes:

a first expiry date for the first unit information payload, the first expiry date being a last date on which the first redemption reward can be transferred to a user based on the first redemption process;

the first redemption process further includes:

determining a current date; and

identifying the first expiry date for the first unit information payload; and

the first redemption reward is transferred to the first user when the current date has not exceeded the first expiry date.

17. The method of claim 15, wherein:

the first unit information payload further includes:

a first geolocation restriction for the first unit information payload, the first geolocation restriction including:

one or more allowed geolocation regions; and/or

one or more restricted geolocation regions;

the first redemption process further includes:

determining a geolocation of the first user device; and

identifying the one or more allowed geolocation regions and/or one or more restricted geolocation regions; and

the first redemption reward is transferred to the first user when:

the geolocation of the first user device is within one or more of the allowed geolocation regions; and/or

the geolocation of the first user device is not within one or more of the restricted geolocation regions.

18. The method of claim 15, wherein at least one of the following apply:

the first redemption request further includes the geolocation of the first user device, and the first redemption process determines the geolocation of the first user device from the first redemption request;

the first detectable identifier is a unique QR code, and the first detectable identifier is detected by the first user device via image capturing of the unique QR code;

the first detectable identifier includes at least one of the following:

a unique QR code;

a unique bar code; and

a unique sequence of characters;

the first user information set includes a geolocation of the first user, and the first redemption reward is selectable based on the geolocation of the first user;

the first user information set includes a history of previous redemption requests from the first user, and the first redemption reward is selected based on the history of previous redemption requests from the first user;

the first user information set includes an address of a digital wallet of the first user, and the transferring of the first redemption reward includes transferring the first redemption reward to the address of the digital wallet of the first user;

the transferring of the first redemption reward includes recording, in a distributed ledger, a record of the transfer of the first redemption reward to the first user;

the first redemption reward includes at least one of the following:

- a digital stamp;
- a digital badge;
- a feature on the digital badge;
- a quantity of digital tokens; and
- a digital coupon.

19. A method of managing transactions made by end users, the method comprising:

providing a first detectable identifier for a first unit of a first product, the first detectable identifier associated with a first unique identifier for the first unit of the first product, the first detectable identifier configured to cause a user device to perform a first action when the first detectable identifier is detected by the user device, the first action including:

sending, to a processor, a first redemption request, the first redemption request including the first unique identifier for the first unit of the first product;

providing a second detectable identifier for a second unit of the first product, the second detectable identifier associated with a second unique identifier for the second unit of the first product, the second detectable identifier configured to cause the user device to perform a second action when the second detectable identifier is detected by the user device, the second action including:

sending, to the processor, a second redemption request, the second redemption request including the second unique identifier for the second unit of the first product;

responsive to receiving, by the processor at a first time, the first redemption request from a first user device of a first user, performing a first redemption process for the first redemption request, the first redemption process including:

- obtaining a first user information set for the first user;
- obtaining a first geolocation for the first user;
- obtaining, based on the first unique identifier in the first redemption request, a first unit information payload, the first unit information payload including:
 - the first unique identifier for the first unit of the first product;
 - a first redemption reward for the first unit of the first product;
 - a first redemption status, the first redemption status being an unredeemed status;
 - a first geolocation requirement for the first unit of the first product;
 - a first temporal requirement for the first unit of the first product;
- responsive to a determination that the first redemption status is the unredeemed status, the first geolocation meets the first geolocation requirement, and the first time meets the first temporal requirement:
 - transferring, by the processor to the first user based on the first user information set, the first redemption reward; and
 - changing the first redemption status for the first unit information payload from the unredeemed status to the redeemed status;
- responsive to receiving, by the processor at a second time after the first time, the first redemption request from the first user device of the first user, performing the first redemption process for the first redemption request, the first redemption process including:
 - obtaining the first user information set for the first user;
 - obtaining, based on the first unique identifier in the first redemption request, the first unit information payload, the first unit information payload including:
 - the first unique identifier for the first unit of the first product;
 - the first redemption reward for the first unit of the first product; and
 - the first redemption status, the first redemption status being the redeemed status;
 - and
 - responsive to a determination that the first redemption status is the redeemed status:
 - sending, by the processor to the first user, a notification that the first redemption reward for the second unit of the first product is not redeemable;
 - responsive to receiving, by the processor at a third time, the second redemption request from the first user device of the first user, performing a second redemption process for the second redemption request, the second redemption process including:

- obtaining the first user information set for the first user;
- obtaining a second geolocation for the first user;
- obtaining, based on the second unique identifier in the second redemption request, a second unit information payload, the second unit information payload including:
 - the second unique identifier for the second unit of the first product;
 - a second redemption reward for the second unit of the first product;
 - a second redemption status, the second redemption status being the unredeemed status;
 - a second geolocation requirement for the second unit of the first product;
 - a second temporal requirement for the second unit of the first product;
- responsive to a determination that the second redemption status is the unredeemed status and responsive to a determination that the second geolocation does not meet the second geolocation requirement and/or the third time does not meet the second temporal requirement:
 - sending, by the processor to the second user, a notification that the second redemption reward for the second unit of the first product is not redeemable;
- responsive to receiving, by the processor at a fourth time after the first time, the first redemption request from a second user device of a second user, performing the first redemption process for the first redemption request, the first redemption process including:
 - obtaining a second user information set for the second user;
 - obtaining, based on the first unique identifier in the first redemption request, the first unit information payload, the first unit information payload including:
 - the first redemption reward for the first unit of the first product; and
 - the first redemption status, the first redemption status being the redeemed status; and
 - responsive to a determination that the first redemption status is the redeemed status:
 - sending, by the processor to the second user, a notification that the first redemption reward for the first unit of the first product has already been redeemed; and
 - responsive to receiving, by the processor at a fifth time after the third time, the second redemption request from the second user device of the second user, performing the second redemption process for the second redemption request, the second redemption process including:
 - obtaining the second user information set for the second user;
 - obtaining a third geolocation for the second user;

obtaining, based on the second unique identifier in the second redemption request, the second unit information payload, the second unit information payload including:

- the second unique identifier for the second unit of the first product;
- the second redemption reward for the second unit of the first product;
- the second redemption status, the second redemption status being the unredeemed status;
- the second geolocation requirement for the second unit of the first product;

and

- the second temporal requirement for the second unit of the first product; and

responsive to a determination that the second redemption status is the unredeemed status, the third geolocation meets the second geolocation requirement, and the fifth time meets the second temporal requirement:

- transferring, by the processor to the first user based on the second user information set, the second redemption reward; and

- changing the second redemption status for the second unit information payload from the unredeemed status to the redeemed status.

20. A method of managing transactions made by end users, the method comprising:

- providing a first detectable identifier for a first unit of a first product, the first detectable identifier associated with a first unique identifier for the first unit of the first product, the first detectable identifier configured to cause a user device to perform a first action when the first detectable identifier is detected by the user device, the first action including:

- sending, to a processor, a first redemption request, the first redemption request including the first unique identifier for the first unit of the first product;

- responsive to receiving, by the processor at a first time, the first redemption request from a first user device of a first user, performing a first redemption process for the first redemption request, the first redemption process including:

- obtaining a first user information set for the first user;
- obtaining a first geolocation for the first user, the first geolocation being a geolocation based on the first redemption request;

- obtaining, based on the first unique identifier in the first redemption request, a first unit information payload, the first unit information payload including:

- the first unique identifier for the first unit of the first product;
- a first redemption reward for the first unit of the first product;

a first redemption status, the first redemption status being a status of whether the first redemption reward has been redeemed or unredeemed;

a first geolocation requirement for the first unit of the first product, the first geolocation requirement being a geolocation requirement for redeeming the first redemption reward;

a first temporal requirement for the first unit of the first product, the first temporal requirement being a temporal requirement for redeeming the first redemption reward; and

responsive to a determination that the first redemption status is an unredeemed status, the first geolocation meets the first geolocation requirement, and the first time meets the first temporal requirement:

transferring, by the processor to the first user based on the first user information set, the first redemption reward; and

changing the first redemption status for the first unit information payload from the unredeemed status to a redeemed status;

responsive to receiving, by the processor at a second time, a first consumption request for using the first redemption reward at a first merchant, performing a first consumption process for the first consumption request, the first consumption process including:

obtaining the first user information set for the first user;

obtaining a first merchant information set for the first merchant;

obtaining a second geolocation, the second geolocation being a geolocation based on the first consumption request;

obtaining, based on the first consumption request, the first unit information payload, the first unit information payload including:

the first unique identifier for the first unit of the first product;

the first redemption reward for the first unit of the first product;

the first redemption status;

a first consumption status, the first consumption status being a status of whether the first redemption reward has been consumed or unconsumed;

a second geolocation requirement for the first unit of the first product, the second geolocation requirement being a geolocation requirement for consuming the first redemption reward;

a second temporal requirement for the first unit of the first product, the second temporal requirement being a temporal requirement for consuming the first redemption reward; and

a first participating merchant requirement for the first redemption reward, the first participating merchant requirement indicating one or more merchants that will accept the first redemption reward; and

responsive to a determination that the first redemption status is the redeemed status, the first consumption status is an unconsumed status, the second geolocation meets the second geolocation requirement, the second time meets the second temporal requirement, and the first merchant meets the first participating merchant requirement:

removing the first redemption reward from the first user;

sending a notification to the first user and/or the first merchant, the notification indicating that the first redemption reward has been used by the first user at the first merchant; and

changing the first consumption status for the first unit information payload from the unconsumed status to a consumed status.