# CROSS-BORDER PAYMENT SYSTEM AND METHOD, STORAGE MEDIUM, AND COMPUTER SYSTEM

## TECHNICAL FIELD

**[0001]** This specification relates to the field of computer technologies, and in particular, to a cross-border payment system and method, a storage medium, and a computer system.

## BACKGROUND

**[0002]** With the development of information technology, cross-border payments are increasingly widely applied.

**[0003]** Currently, when making a payment, a user can scan, by using a client of a payment institution, an aggregation code provided by a merchant, to perform code processing on the aggregation code through interaction between the payment institution and a transfer network, so as to obtain an aggregation page and display the aggregation page to the user through the payment institution. Then, the user enters a payment amount on the aggregation page, to pay an acquiring institution of the merchant through the payment institution. The aggregation code, referred to as "one code for a plurality of payments" or "one code pass", is a two-dimensional code that can support a plurality of payment institutions in making payments. The transfer network supports code processing on the aggregation code. The code processing includes code recognition and decoding.

**[0004]** However, the payment institution and the transfer network are located in different regions, and an interaction process for performing code processing on the aggregation code is limited by impact of a physical distance and quality of an international public network. Consequently, a long time may be consumed for obtaining the aggregation page, and the user waits for the aggregation page for a long time, resulting in poor user experience and a long payment time. Therefore, how to quickly make a cross-border payment is a very important problem.

**[0005]** Based on this, this specification provides a cross-border payment system.

## SUMMARY

**[0006]** This specification provides a cross-border payment system and method, a storage medium, and a computer system, to partially resolve the above-mentioned problem in the conventional technology.

**[0007]** This specification provides a cross-border payment system. The system includes a payment institution, a transfer network, and an acquiring institution. The transfer network and the payment institution are deployed in different regions. The payment institution is configured to: obtain an aggregation code; recognize the aggregation code to determine a recognition result; decode the aggregation code based on the recognition result; determine whether decoding of the aggregation code succeeds; and if yes, determine a decoding result, render an aggregation page based on the decoding result, display the aggregation page to a user, determine transaction information in response to an input operation of the user, and pay the acquiring institution based on the transaction information; or if no, send the aggregation code to the transfer network. The transfer network is configured to: decode the received aggregation code to determine the decoding result, and send the decoding result to the payment institution. The payment institution is configured to: render the aggregation page based on the received decoding result, display the aggregation page to the user, determine the transaction information in response to the input operation of the user, and pay the acquiring institution based on the transaction information.

**[0008]** This specification provides a cross-border payment method. The method is applied to a payment institution, and the payment institution is deployed in a cross-border payment system. The cross-border payment system includes the payment institution, a transfer network, and an acquiring institution. The transfer network and the payment institution are deployed in a same region. The method includes: obtaining an aggregation code; recognizing the aggregation code to determine a recognition result; decoding the aggregation code based on the recognition result; determining whether decoding of the aggregation code succeeds; and if yes, determining a decoding result, rendering an aggregation page based on the decoding result, displaying the aggregation page to a user, determining transaction information in response to an input operation of the user, and paying the acquiring institution based on the transaction information; or if no, sending the aggregation code to the transfer network, so that the transfer network decodes the received aggregation code to determine the decoding result, and sends the decoding result to the

payment institution; and rendering the aggregation page based on the received decoding result, displaying the aggregation page to the user, determining the transaction information in response to the input operation of the user, and paying the acquiring institution based on the transaction information.

**[0009]** This specification provides a computer system, including a storage, a processor, and a computer program that is stored in the storage and that is capable of running on the processor. When the processor executes the program, the following steps are implemented: obtaining an aggregation code; recognizing the aggregation code to determine a recognition result; decoding the aggregation code based on the recognition result; determining whether decoding of the aggregation code succeeds; and if yes, determining a decoding result, rendering an aggregation page based on the decoding result, displaying the aggregation page to a user, determining transaction information in response to an input operation of the user, and paying an acquiring institution based on the transaction information; or if no, sending the aggregation code to a transfer network, so that the transfer network decodes the received aggregation code to determine the decoding result, and sends the decoding result to a payment institution; and rendering the aggregation page based on the received decoding result, displaying the aggregation page to the user, determining the transaction information in response to the input operation of the user, and paying the acquiring institution based on the transaction information.

**[0010]** This specification provides a computer-readable storage medium. The storage medium stores a computer program, and when the computer program is executed by a processor, the above-mentioned cross-border payment method is implemented.

**[0011]** The above-mentioned at least one technical solution used in the embodiments of this specification can achieve at least one of the following beneficial effects: In a cross-border payment scenario, the payment institution first locally performs code processing on the aggregation code, to avoid being limited by impact of a physical distance and quality of an international public network, and more quickly perform code processing on the aggregation code, so that a short time is consumed for obtaining the aggregation page, and the user waits for the aggregation page for a short time, to increase a payment speed of a cross-border payment and bring better experience to the user. In addition, when decoding of the aggregation code fails, the payment institution sends the aggregation code to the transfer network, so that the remote transfer network decodes the received aggregation code, to ensure accuracy of decoding the aggregation code.

## BRIEF DESCRIPTION OF DRAWINGS

**[0012]** The accompanying drawings described herein are used to provide a further understanding of this specification and constitute a part of this specification. The example embodiments of this specification and descriptions thereof are used to explain this specification, and do not constitute an improper limitation on this specification. In the accompanying drawings:

**[0013]** FIG. 1 is a schematic diagram of a cross-border payment system according to this specification;

**[0014]** FIG. 2 is a schematic diagram of an aggregation page according to this specification;

**[0015]** FIG. 3 is a schematic diagram of another cross-border payment system according to the specification of this application;

**[0016]** FIG. 4 is a schematic diagram of a process of obtaining a decoding rule according to this specification;

**[0017]** FIG. 5 is a schematic diagram of a cross-border payment process according to this specification;

**[0018]** FIG. 6 is a schematic diagram of a payment confirmation page according to this specification;

**[0019]** FIG. 7 is a schematic diagram of a payment result page according to this specification;

**[0020]** FIG. 8 is a schematic diagram of a cross-border payment procedure according to this specification;

**[0021]** FIG. 9 is a schematic diagram of another cross-border payment procedure according to this specification;

**[0022]** FIG. 10 is a schematic flowchart of a cross-border payment method according to this specification; and

**[0023]** FIG. 11 is a schematic structural diagram of a computer system corresponding to FIG. 10 according to this specification.

## DESCRIPTION OF EMBODIMENTS

**[0024]** To make the objectives, technical solutions, and advantages of this specification clearer, the following clearly and comprehensively describes the technical solutions of this specification with reference to specific embodiments and corresponding accompanying drawings of this

specification. Clearly, the described embodiments are merely some but not all of embodiments of this specification. All other embodiments obtained by a person of ordinary skill in the art based on the embodiment of this specification without creative efforts shall fall within the protection scope of this specification.

**[0025]** Embodiments of this specification provide a cross-border payment system and method, a storage medium, and an electronic device. The technical solutions provided in the embodiments of this specification are described below in detail with reference to the accompanying drawings.

**[0026]** FIG. 1 is a schematic diagram of a cross-border payment system according to this specification. The system includes a payment institution, a transfer network, and an acquiring institution. The transfer network and the payment institution are deployed in different regions.

**[0027]** The payment institution can be configured to: obtain an aggregation code; and recognize the aggregation code to determine a recognition result. The payment institution can be an international institution or platform that provides a payment service. This is not specifically limited in this specification. In addition, the payment institution and the transfer network are deployed in different regions. The acquiring institution can be deployed in a same region as the payment institution, or can be deployed in a same region as the transfer network. Certainly, the acquiring institution can be deployed in different regions with both the payment institution and the transfer network. This is not specifically limited in this specification. In this specification, in the cross-border payment system shown in FIG. 1, only an example in which the acquiring institution can be deployed in different regions with both the payment institution and the transfer network is used for description. In addition, in the cross-border payment system shown in FIG. 1, only an example in which the acquiring institution is deployed in a region A, the payment institution is deployed in a region B, and the transfer network is deployed in a region C is used. Specific locations of the region A, the region B, and the region C are not specifically limited in this specification. The acquiring institution is a platform or an institution for collection by a merchant. The acquiring institution can be a bank, or can be a third-party platform. A specific platform or institution is not specifically limited in this specification.

**[0028]** The aggregation code, referred to as "one code for a plurality of payments" or "one code pass", is a two-dimensional code that can support a plurality of payment institutions in making payments. The aggregation code can be provided by the merchant. The merchant can be a supermarket, a hotel, a restaurant, or the like. This is not specifically limited in this specification.

A specific format of the aggregation code is not specifically limited in this specification. The format of the aggregation code can be an EMVCo format. The recognition result can be one of a recognition success and a recognition failure. When recognizing the aggregation code to determine the recognition result, the payment institution can recognize the aggregation code by using a recognition algorithm, to determine the recognition result. The recognition result can be one of a recognition success and a recognition failure. The recognition success indicates that the payment institution can perform a decoding operation on the aggregation code. The recognition failure indicates that the payment institution cannot perform a decoding operation on the aggregation code. Specifically, the payment institution can recognize the aggregation code to determine a code value corresponding to the aggregation code; determine whether there is a specified mark in the code value; and if yes, determine that the recognition result is a recognition success; or if no, determine that the recognition result is a recognition failure. The code value is a string. For example, the code value can be as follows:

"00020201021126580014A000000615000101065641600226121258100037168xxxx x02511727350010com.xxxx0117https://xxx.com520458125303458580 2xx5922xxxxx6002xx61055920062240309xxx0537780707xxx8264E56D5F017DAF11B433769511B56278624xxx8E001A75157A270678743A70E29C63044A8C"

**[0029]** The specified mark is preset, and the specified mark can be a string. For example, the specified mark can be "com.xxxx". When there is a specified mark in the code value of the aggregation code, it indicates that the recognition result is a recognition success. When there is no specified mark in the code value of the aggregation code, it indicates that the recognition result is a recognition failure.

**[0030]** Then, the payment institution can decode the aggregation code based on the recognition result.

**[0031]** Then, it is determined whether decoding of the aggregation code succeeds.

**[0032]** Specifically, when the recognition result is a recognition success, the payment institution can decode the aggregation code. Then, the payment institution determines whether decoding of the aggregation code succeeds. When determining whether decoding of the aggregation code succeeds, the payment institution can determine, by determining whether a decoding result is obtained, whether decoding of the aggregation code succeeds. When the payment institution can obtain a corresponding decoding result by decoding the aggregation code,

it indicates that decoding of the aggregation code succeeds; or when the payment institution does not obtain a corresponding decoding result by decoding the aggregation code, it indicates that decoding of the aggregation code fails.

**[0033]** In addition, the payment institution can further determine, by determining whether a format corresponding to the decoding result is correct, whether decoding of the aggregation code succeeds. Specifically, when determining whether decoding of the aggregation code succeeds, the payment institution can determine the decoding result; and determine whether the format of the decoding result meets a preset format. When the format of the decoding result meets the preset format, the payment institution successfully decodes the aggregation code. When the format of the decoding result does not meet the preset format, the payment institution fails to decode the aggregation code. The preset format is preset by the payment institution. The preset format is a format of an address of an aggregation page, and the preset format includes a domain name of the aggregation page and formats of several service parameters.

**[0034]** In addition, if yes, that is, decoding of the aggregation code succeeds, the payment institution can determine the decoding result, render an aggregation page based on the decoding result, display the aggregation page to a user, determine transaction information in response to an input operation of the user, and pay the acquiring institution based on the transaction information.

**[0035]** Specifically, when decoding of the aggregation code succeeds, a specific process is similar to a process 1 in the cross-border payment system shown in FIG. 1. In the process 1, the payment institution can determine the decoding result. The decoding result is a uniform resource locator (URL) of the aggregation page, that is, an address of the aggregation page. In addition to a domain name of the aggregation page, the address of the aggregation page further includes several service parameters. The service parameters can be obtained based on the aggregation code. The service parameter can be a merchant subscription status, merchant information, or the like. This is not specifically limited in this specification. Then, the payment institution can render the aggregation page based on the decoding result, and display the aggregation page to the user. The aggregation page includes merchant information and an input box. The merchant information includes at least a merchant name, and certainly can further include information such as a merchant identifier and a merchant account. This is not specifically limited in this specification. The input box is used for the user to enter a transaction amount. Specifically, the aggregation page can be shown in FIG. 2. FIG. 2 is a schematic diagram of an aggregation page according to this

specification. In this specification, only the aggregation page shown in FIG. 2 is used as an example. The aggregation page shown in FIG. 2 includes the merchant identifier, the merchant account, and the input box. On the aggregation page shown in FIG. 2, an example in which the merchant identifier is x and the merchant account is y is used.

**[0036]** Then, the user can enter the transaction amount in the input box. The payment institution can determine the transaction information in response to the input operation of the user, and pay the acquiring institution based on the transaction information. The transaction information includes at least the transaction amount, and certainly can further include a transaction number, the merchant information, and the like. This is not specifically limited in this specification. The above-mentioned process of paying the acquiring institution based on the transaction information is similar to the following process shown in FIG. 5. Details are not described herein again.

**[0037]** However, if no, that is, decoding of the aggregation code fails, the payment institution can send the aggregation code to the transfer network.

**[0038]** In this case, the transfer network can be configured to: decode the received aggregation code to determine a decoding result, and send the decoding result to the payment institution.

**[0039]** Finally, the payment institution can be configured to: render an aggregation page based on the received decoding result, display the aggregation page to a user, then determine transaction information in response to an input operation of the user, and pay the acquiring institution based on the transaction information.

**[0040]** Specifically, when decoding of the aggregation code fails, a specific process is similar to a process 2 in the cross-border payment system shown in FIG. 1. In the process 2, the payment institution can send the aggregation code to the transfer network, so that the transfer network decodes the received aggregation code to determine the decoding result, and sends the decoding result to the payment institution. The payment institution can render the aggregation page based on the decoding result sent by the transfer network, display the aggregation page to the user, and then determine the transaction information in response to the input operation of the user. Then, the payment institution can pay the acquiring institution based on the transaction information.

**[0041]** When the transfer network decodes the received aggregation code to determine the decoding result, the transfer network can obtain a prestored decoding rule, and decode the received aggregation code by using the decoding rule, to determine the decoding result. The decoding rule is used to decode the aggregation code. The decoding rule includes a meaning represented by each

code value, and the code value is a code value corresponding to the aggregation code. The above-mentioned process of paying the acquiring institution based on the transaction information by the payment institution is also similar to the following process shown in FIG. 5. Details are not described herein again.

**[0042]** Based on this, when decoding the received aggregation code by using the decoding rule, to determine the decoding result, the transfer network can determine the code value corresponding to the aggregation code, and then determine the decoding result by using the decoding rule based on the code value. The decoding result is an address of the aggregation page. In addition to a domain name of the aggregation page, the address of the aggregation page further includes several service parameters. The service parameters can be obtained from the code value, or can be prestored in the transfer network. The service parameter can be a merchant subscription status, merchant information, or the like. This is not specifically limited in this specification. Therefore, the aggregation page subsequently rendered by the payment institution can include the merchant information.

**[0043]** In one or more embodiments of this specification, there is no sequence between execution of the process 1 and execution of the process 2 in the cross-border payment system shown in FIG. 1. In addition, the process 1 and the process 2 cannot be performed in parallel, and only one process needs to be selected from the process 1 and the process 2 for execution. Specifically, when decoding of the aggregation code succeeds, the process 1 is performed; or when decoding of the aggregation code fails, the process 2 is performed. A difference between the process 1 and the process 2 lies in that when decoding of the aggregation code succeeds, that is, when the payment institution can locally decode the aggregation code and decoding succeeds, the payment institution can directly determine the decoding result. However, when decoding of the aggregation code fails, that is, when the payment institution cannot locally decode the aggregation code and decoding fails, the payment institution needs to obtain the decoding result from the transfer network. Processes performed after the payment institution obtains the decoding result are the same in the process 1 and the process 2.

**[0044]** Based on the cross-border payment system shown in FIG. 1, in a cross-border payment scenario, after obtaining an aggregation code, the payment institution can first recognize the aggregation code to determine a recognition result; then decode the aggregation code based on the recognition result; and when decoding of the aggregation code succeeds, directly determine a

decoding result. When decoding of the aggregation code fails, the payment institution sends the aggregation code to the transfer network, so that the transfer network decodes the received aggregation code to determine a decoding result, and sends the decoding result to the payment institution. Subsequently, the payment institution renders an aggregation page based on the decoding result, and displays the aggregation page to a user; and then determines transaction information in response to an input operation of the user. Then, the payment institution can pay the acquiring institution based on the transaction information, to complete a cross-border payment. The payment institution first locally performs code processing on the aggregation code, to avoid being limited by impact of a physical distance and quality of an international public network, and more quickly perform code processing on the aggregation code, so that a short time is consumed for obtaining the aggregation page, and the user waits for the aggregation page for a short time, to increase a payment speed of a cross-border payment and bring better experience to the user. In addition, when decoding of the aggregation code fails, the payment institution sends the aggregation code to the transfer network, so that the remote transfer network decodes the received aggregation code, to ensure accuracy of decoding the aggregation code.

**[0045]** In one or more embodiments of this specification, the transfer network includes a decoding tool and a transfer unit. The transfer unit and the payment institution are deployed in different regions, the decoding tool and the payment institution are deployed in a same region, and the decoding tool stores a decoding rule of the transfer network. Specifically, FIG. 3 is a schematic diagram of another cross-border payment system according to the specification of this application. The cross-border payment system shown in FIG. 3 includes a payment institution, a decoding tool, a transfer network, and an acquiring institution. In the cross-border payment system shown in FIG. 3, only an example in which the acquiring institution can be deployed in different regions with both the payment institution and the transfer network is used for description. In addition, in the cross-border payment system shown in FIG. 3, only an example in which the acquiring institution is deployed in a region A, the payment institution and the decoding tool are deployed in a region B, and the transfer network is deployed in a region C is used. Specific locations of the region A, the region B, and the region C are not specifically limited in this specification.

**[0046]** First, the payment institution obtains an aggregation code; and recognizes the aggregation code to determine a recognition result. When recognizing the aggregation code to determine the recognition result, the payment institution can be specifically configured to send the

aggregation code to the decoding tool. The decoding tool can be a preset program, and the decoding tool is configured to perform code processing on the aggregation code. The code processing includes recognizing the aggregation code and decoding the aggregation code.

**[0047]** Then, the decoding tool can be configured to recognize the received aggregation code to determine a recognition result, and send the recognition result to the payment institution. The recognition result includes one of a recognition success and a recognition failure.

**[0048]** Then, the payment institution can decode the aggregation code based on the recognition result. Specifically, the payment institution can generate a decoding instruction based on the received recognition result, and send the decoding instruction to the decoding tool. The decoding instruction is used to indicate the decoding tool to decode the aggregation code.

**[0049]** Then, the decoding tool can further decode the aggregation code by using a decoding rule in response to the decoding instruction sent by the payment institution. The decoding rule is prestored in the decoding tool, and the decoding rule is consistent with a decoding rule stored in the transfer network. The decoding rule is used to decode the aggregation code. The decoding rule includes a meaning represented by each code value, and the code value is a code value corresponding to the aggregation code.

**[0050]** Then, the payment institution can determine whether decoding of the aggregation code succeeds. Specifically, when the decoding tool successfully decodes the aggregation code, the decoding tool can determine a decoding result, and send the decoding result to the payment institution. However, when the decoding tool fails to decode the aggregation code, the decoding tool cannot determine a decoding result, and cannot send the decoding result to the payment institution. Therefore, when successfully decoding the aggregation code, the decoding tool determines the decoding result, and sends the decoding result to the payment institution. The payment institution can determine whether the decoding result sent by the decoding tool is received, to determine whether decoding of the aggregation code succeeds.

**[0051]** If yes, that is, decoding of the aggregation code succeeds, a specific process is similar to a process 1 in the cross-border payment system shown in FIG. 3. In the process 1, the payment institution can determine the decoding result, render an aggregation page based on the decoding result, display the aggregation page to a user, determine transaction information in response to an input operation of the user, and pay the acquiring institution based on the transaction information. Specifically, when receiving the decoding result sent by the decoding tool, the payment institution

determines that decoding of the aggregation code succeeds. The payment institution can directly determine the decoding result, render the aggregation page based on the decoding result, display the aggregation page to the user, determine the transaction information in response to the input operation of the user, and pay the acquiring institution based on the transaction information. A process performed after decoding of the aggregation code succeeds is consistent with the process 1 shown in FIG. 1. Details are not described herein again.

**[0052]** If no, that is, decoding of the aggregation code fails, a specific process is similar to a process 2 in the cross-border payment system shown in FIG. 3. In the process 2, the payment institution can send the aggregation code to the transfer network. In this case, the transfer network can be configured to: decode the received aggregation code to determine a decoding result, and send the decoding result to the payment institution. Finally, the payment institution can be configured to: render an aggregation page based on the received decoding result, display the aggregation page to a user, then determine transaction information in response to an input operation of the user, and pay the acquiring institution based on the transaction information. A process performed after decoding of the aggregation code fails is consistent with the process 2 shown in FIG. 1. Details are not described herein again.

**[0053]** In one or more embodiments of this specification, there is no sequence between execution of the process 1 and execution of the process 2 in the cross-border payment system shown in FIG. 3. In addition, the process 1 and the process 2 cannot be performed in parallel, and only one process needs to be selected from the process 1 and the process 2 for execution. Specifically, when decoding of the aggregation code succeeds, the process 1 is performed; or when decoding of the aggregation code fails, the process 2 is performed. A difference between the process 1 and the process 2 in the cross-border payment system shown in FIG. 3 lies in that when decoding of the aggregation code succeeds, that is, when the payment institution can locally decode the aggregation code and decoding succeeds, the payment institution can directly determine the decoding result. However, when decoding of the aggregation code fails, that is, when the payment institution cannot locally decode the aggregation code and decoding fails, the payment institution needs to obtain the decoding result from the transfer network. Processes performed after the payment institution obtains the decoding result are the same in the process 1 and the process 2 in the cross-border payment system shown in FIG. 3.

**[0054]** In one or more embodiments of this specification, in the cross-border payment system

shown in FIG. 3, when recognizing the received aggregation code to determine the recognition result, the decoding tool can recognize the received aggregation code to determine a code value corresponding to the aggregation code; determine whether there is a specified mark in the code value; and if yes, determine that the recognition result is a recognition success; or if no, determine that the recognition result is a recognition failure.

**[0055]** Based on this, when the payment institution decodes the aggregation code based on the recognition result, and the received recognition result is a recognition success, the payment institution can generate a decoding instruction, and send the decoding instruction to the decoding tool. Subsequently, the decoding tool can further decode the aggregation code by using a decoding rule in response to the decoding instruction sent by the payment institution. When the recognition result is a recognition success, it indicates that the payment institution can send the decoding instruction to the decoding tool, so that the decoding tool decodes the aggregation code.

**[0056]** In one or more embodiments of this specification, in the cross-border payment system shown in FIG. 3, when the payment institution determines whether decoding of the aggregation code succeeds, the payment institution can further determine, by determining whether a format corresponding to the decoding result is correct, whether decoding of the aggregation code succeeds. Specifically, when determining whether decoding of the aggregation code succeeds, the decoding tool can further determine the decoding result, and send the decoding result to the payment institution. The payment institution can determine the decoding result; and determine whether the format of the decoding result meets a preset format. When the format of the decoding result meets the preset format, the payment institution successfully decodes the aggregation code. When the format of the decoding result does not meet the preset format, the payment institution fails to decode the aggregation code. The preset format is preset by the payment institution. The preset format is a format of an address of an aggregation page, and the preset format includes a domain name of the aggregation page and formats of several service parameters. Regardless of whether the decoding tool succeeds in decoding, a decoding result is generated. If the decoding tool succeeds in decoding, a format of the decoding result generated by the decoding tool meets the preset format. If the decoding tool fails in decoding, a format of the decoding result generated by the decoding tool does not meet the preset format.

**[0057]** In one or more embodiments of this specification, the decoding tool can store a decoding rule of the transfer network, and the decoding rule can be prestored in the decoding tool.

When the decoding rule is prestored, FIG. 4 is a schematic diagram of a process of obtaining a decoding rule according to this specification. The decoding tool can further send a rule obtaining request to the transfer network. The transfer network determines the decoding rule in response to the rule obtaining request sent by the decoding tool, and sends the decoding rule to the decoding tool. The decoding tool receives and stores the decoding rule sent by the transfer network. The rule obtaining request is used to obtain the decoding rule from the transfer network.

**[0058]** In addition, to avoid a problem that the decoding tool fails to decode the aggregation code because the transfer network modifies the decoding rule or adds a new decoding rule but does not synchronize the decoding rule to the decoding tool, the decoding tool can periodically send the rule obtaining request to the transfer network, to update the decoding rule stored in the decoding tool. Therefore, the decoding tool can further send the rule obtaining request to the transfer network based on a specified period. The transfer network can further determine a first rule in response to the rule obtaining request sent by the decoding tool, and send the first rule to the decoding tool. The decoding tool can receive the first rule sent by the transfer network, and update the decoding rule according to the first rule. Subsequently, the decoding tool can decode the aggregation code by using an updated decoding rule.

**[0059]** The specified period is a preset period, and the specified period can be 5 minutes, or can be 10 minutes. This is not specifically limited in this specification. The first rule is a full decoding rule stored in the transfer network. The first rule can be different from the decoding rule stored in the decoding tool, or may not be different from the decoding rule stored in the decoding tool. Therefore, when the decoding tool updates the decoding rule according to the first rule, the decoding tool can update the decoding rule according to the first rule when the first rule can be different from the decoding rule stored in the decoding tool. Certainly, regardless of whether the first rule can be different from the decoding rule stored in the decoding tool, the decoding tool can update the decoding rule according to the first rule.

**[0060]** In addition, when updating the decoding rule according to the first rule, the decoding tool can directly use the first rule as the decoding rule, that is, replace the decoding rule with the first rule. Certainly, the decoding tool can alternatively determine a rule different from the decoding rule from the first rule, and use the rule as an update rule; and then update the decoding rule according to the update rule. When the decoding rule is updated according to the update rule, and there is no rule that is exactly the same as the update rule in the decoding rule, the decoding

tool can add the update rule to the decoding rule, to update the decoding rule. If there is a rule similar to the update rule in the decoding rule, the decoding tool can determine the rule similar to the update rule in the decoding rule, use the rule as a to-be-modified rule, and modify the to-be-modified rule according to the update rule, so that a modified rule is the same as the update rule. The decoding tool can determine a similarity between a rule in the decoding rule and the update rule, and then determine the rule similar to the update rule in the decoding rule based on the similarity.

**[0061]** In one or more embodiments of this specification, to ensure that the decoding rule or the first rule is not disclosed, the decoding rule or the first rule sent by the transfer network to the decoding tool is in a cryptographic state. After receiving the decoding rule or the first rule, the decoding tool can decrypt and store the decoding rule or the first rule in the cryptographic state. Based on this, a process of obtaining the decoding rule is used as an example. A process of updating the decoding rule is similar to the process of obtaining the decoding rule. Details are not described herein again. The decoding tool can further send the rule obtaining request to the transfer network. The transfer network determines the decoding rule in response to the rule obtaining request sent by the decoding tool, and encrypts the decoding rule in a preset encryption manner; and then sends the encrypted decoding rule to the decoding tool. The decoding tool receives the encrypted decoding rule sent by the transfer network, decrypts the encrypted decoding rule in a preset decryption manner, to obtain the decrypted decoding rule, and stores the decoded decoding rule.

**[0062]** The encryption manner and the decryption manner can be any existing encryption manner and decryption manner, and the encryption manner and the decryption manner are pre-agreed upon by the transfer network and the decoding tool. The encryption manner can be symmetric encryption, or can be asymmetric encryption. An encryption key is stored in the transfer network, and a decryption key is stored in the decoding tool.

**[0063]** In one or more embodiments of this description, FIG. 5 is a schematic diagram of a cross-border payment process according to this specification. The process shown in FIG. 5 is the process of paying the acquiring institution based on the transaction information. The payment institution can send the transaction information to a merchant, and the merchant can generate a transaction order based on the transaction information, and send the transaction order to the acquiring institution. The acquiring institution receives and stores the transaction order sent by the merchant, and then sends a first message to the merchant, so that the merchant determines that the

acquiring institution has received the transaction order. The transaction order includes a transaction number, a transaction amount, and a merchant identifier. The first message is used to prompt the merchant that the acquiring institution has received the transaction order. The merchant in the process shown in FIG. 5 is a supermarket, a hotel, and a restaurant, or can be a management system or platform of a merchant such as a supermarket, a hotel, and a restaurant. This is not specifically limited in this specification. Only a merchant is used as an example in FIG. 5 for description.

**[0064]** In addition, the payment institution sends the transaction information to the transfer network, and the transfer network receives the transaction information sent by the payment institution, and sends an order association request to the acquiring institution. The order association request includes at least a transaction number. The acquiring institution receives the order association request sent by the transfer network, queries a transaction order that matches the transaction number in the order association request from the stored transaction order, determines a query result, and returns the query result to the transfer network. The query result is one of a query success and a query failure. If the transaction order that matches the transaction number in the order association request is found, it is determined that the query result is a query success. If the transaction order that matches the transaction number in the order association request is not found, it is determined that the query result is a query failure.

**[0065]** Then, the transfer network sends the query result to the payment institution. The payment institution receives the query result, renders a payment confirmation page based on the query result, and displays the payment confirmation page to the user. A payment instruction is generated in response to a tap operation of the user, and the acquiring institution is paid based on the payment instruction. In addition, a second message generated for a payment is generated, and the second message is sent to the transfer network. The payment instruction is used to indicate the payment institution to pay the acquiring institution. The second message indicates that the payment institution has made a payment, and the second message is used to prompt the transfer network that the payment institution has paid the acquiring institution. When the payment confirmation page is rendered based on the query result, and the query result is a query success, the payment institution can render the payment confirmation page. The payment confirmation page includes at least a transaction amount and a first button. Certainly, the payment confirmation page can further include the transaction information. This is not specifically limited in this specification. The first button represents "confirm to pay". When the user taps the first button, it indicates that the user

confirms to pay. When the user does not tap the first button, it indicates that the user does not confirm to pay. Specifically, the payment confirmation page can be shown in FIG. 6. FIG. 6 is a schematic diagram of a payment confirmation page according to this specification. In this specification, only the payment confirmation page shown in FIG. 6 is used as an example. The payment confirmation page shown in FIG. 6 includes the transaction number, the transaction amount, and the first button, and the first button is an "OK" button in FIG. 6. An example in which the transaction number is 123 and the transaction amount is 456 is used on the payment confirmation page shown in FIG. 6.

**[0066]** Then, the transfer network receives the second message, and sends a third message to the payment institution, so that the payment institution determines that the transfer network has received the second message. The third message is used to prompt the payment institution that the transfer network has received the second message. In addition, the transfer network sends the second message to the acquiring institution. The acquiring institution receives the second message, and sends the second message to the merchant.

**[0067]** Then, the payment institution receives the third message sent by the transfer network, renders a payment result page, and displays the payment result page to the user. The payment result page includes at least prompt information of a payment success, and certainly can further include the transaction information. This is not specifically limited in this specification. Specifically, the payment result page can be shown in FIG. 7. FIG. 7 is a schematic diagram of a payment result page according to this specification. In this specification, only the payment result page shown in FIG. 7 is used as an example. The payment result page shown in FIG. 7 includes the prompt information of a payment success, that is, "Payment successful", and further includes the transaction amount. An example in which the transaction amount is 456 is used on the payment result page shown in FIG. 7.

**[0068]** In one or more embodiments of this specification, the payment institution can actually be a serving end of an international institution or platform that provides a payment service. When the payment institution obtains the aggregation code, the aggregation code can be sent by a client to the payment institution (that is, the serving end). The client can be a client of an international institution or platform that provides a payment service. The client is user-oriented. Specifically, the user can scan the aggregation code by using the client, to obtain the aggregation code, and then send the aggregation code to the serving end. Subsequently, a cross-border payment is made based

on the system shown in FIG. 1 or FIG. 2. In addition, when the aggregation page, the payment confirmation page, or the payment result page is displayed to the user, the serving end can send the aggregation page, the payment confirmation page, or the payment result page to the client, and the client displays the aggregation page, the payment confirmation page, or the payment result page to the user, and determines the transaction information or the payment instruction in response to the input operation or the tap operation of the user.

**[0069]** Based on this, FIG. 8 is a schematic diagram of a cross-border payment procedure according to this specification. A user, a client, a merchant, and an acquiring institution are located in a same region, that is, a region A. A serving end and a decoding tool are deployed in a same region, that is, a region B. A transfer network is located in a region C. The client and the serving end belong to a same international institution or platform that provides a payment service. The cross-border payment procedure shown in FIG. 8 is only from scanning of an aggregation code by the user to display of an aggregation page to the user. A process from display of the aggregation page to display of a payment confirmation page is similar to the following cross-border payment procedure shown in FIG. 9. Details are not described herein again.

**[0070]** The user scans the aggregation code of the merchant by using the client, so that the client obtains the aggregation code of the merchant, and then sends the aggregation code to the serving end. The serving end receives the aggregation code, and sends the aggregation code to the decoding tool. The decoding tool recognizes the received aggregation code to determine a recognition result, and sends the recognition result to the serving end.

**[0071]** Then, the serving end generates a decoding instruction based on the received recognition result, and sends the decoding instruction to the decoding tool. The decoding tool decodes the aggregation code by using a prestored decoding rule in response to the decoding instruction sent by the serving end, to determine a decoding result, and sends the decoding result to the serving end.

**[0072]** Then, the serving end determines whether decoding of the aggregation code succeeds, and if yes, determines the decoding result (that is, obtained by decoding the aggregation code by the decoding tool). If no, the serving end sends the aggregation code to the transfer network, so that the transfer network decodes the received aggregation code to determine a decoding result, and sends the decoding result to the server. A process performed after decoding of the aggregation code fails is a process identified by a dashed line in FIG. 8.

**[0073]** Then, regardless of whether decoding of the aggregation code succeeds, the serving end obtains a decoding result, that is, when decoding succeeds, the decoding result is obtained by decoding the aggregation code by the decoding tool, or when decoding fails, the decoding result is obtained by decoding the aggregation code by the transfer network. In addition, regardless of a decoding result obtained by the serving end, there is a consistent process after the decoding result is obtained. Therefore, FIG. 8 shows that the decoding result in the process performed after the decoding result is obtained is one of a result obtained by decoding the aggregation code by the decoding tool and a result obtained by decoding the aggregation code by the transfer network. Specifically, the serving end can render an aggregation page based on the decoding result (that is, obtained by decoding the aggregation code by the decoding tool) or the received decoding result (that is, obtained by decoding the aggregation code by the transfer network) sent by the transfer network, and send the aggregation page to the client, so that the client displays the received aggregation page to the user.

**[0074]** After the aggregation page is displayed to the user, FIG. 9 is a schematic diagram of another cross-border payment procedure according to this specification. A user, a client, a merchant, and an acquiring institution are located in a same region, that is, a region A. A serving end and a decoding tool are deployed in a same region, that is, a region B. A transfer network is located in a region C. The client and the serving end belong to a same international institution or platform that provides a payment service. The cross-border payment procedure shown in FIG. 9 is only from display of an aggregation page to display of a payment confirmation page. A process from scanning of an aggregation code by the user to display of the aggregation page to the user, that is, a process performed before the aggregation page is displayed, is the cross-border payment procedure shown in FIG. 8. Details are not described herein again.

**[0075]** The client determines transaction information in response to an input operation of the user, and sends the transaction information to the serving end. In addition, the client sends the transaction information to the merchant, so that the merchant generates a transaction order based on the transaction information, and sends the transaction order to the acquiring institution. The acquiring institution receives and stores the transaction order sent by the merchant, and then sends a first message to the merchant, so that the merchant determines that the acquiring institution has received the transaction order.

**[0076]** Then, the serving end sends the transaction information to the transfer network, and the

transfer network receives the transaction information sent by the serving end, and sends an order association request to the acquiring institution. The acquiring institution receives the order association request sent by the transfer network, queries a transaction order that matches a transaction number in the order association request from the stored transaction order, determines a query result, and returns the query result to the transfer network.

**[0077]** Then, the transfer network sends the query result to the serving end. The serving end receives the query result, renders a payment confirmation page based on the query result, and sends the payment confirmation page to the client, so that the client displays the received payment confirmation page to the user. The client generates a payment instruction in response to a tap operation of the user, and sends the payment instruction to the serving end. The serving end pays the acquiring institution based on the payment instruction. In addition, the serving end generates a second message generated for a payment, and sends the second message to the transfer network.

**[0078]** Then, the transfer network receives the second message, and sends a third message to the serving end, so that the serving end determines that the transfer network has received the second message. In addition, the transfer network sends the second message to the acquiring institution. The acquiring institution receives the second message, and sends the second message to the merchant.

**[0079]** Then, the serving end receives the third message sent by the transfer network, renders a payment result page, and sends the payment result page to the client, so that the client displays the received payment result page to the user.

**[0080]** This specification further provides a cross-border payment method. The method is applied to a payment institution, and the payment institution is deployed in a cross-border payment system. The cross-border payment system includes the payment institution, a transfer network, and an acquiring institution. The transfer network and the payment institution are deployed in a same region, as shown in FIG. 10. FIG. 10 is a schematic flowchart of a cross-border payment method according to this specification. The method specifically includes the following steps.

**[0081]** S100: Obtain an aggregation code.

**[0082]** S102: Recognize the aggregation code to determine a recognition result.

**[0083]** The payment institution can obtain the aggregation code; and recognize the aggregation code to determine the recognition result. The payment institution can be an international institution or platform that provides a payment service. This is not specifically limited in this specification.

In addition, the payment institution and the transfer network are deployed in different regions. The acquiring institution can be deployed in a same region as the payment institution, or can be deployed in a same region as the transfer network. Certainly, the acquiring institution can be deployed in different regions with both the payment institution and the transfer network. This is not specifically limited in this specification. The acquiring institution is a platform or an institution for collection by a merchant. The acquiring institution can be a bank, or can be a third-party platform. A specific platform or institution is not specifically limited in this specification.

**[0084]** The aggregation code is a two-dimensional code that can support a plurality of payment institutions in making payments, and can be provided by the merchant. The merchant can be a supermarket, a hotel, a restaurant, or the like. This is not specifically limited in this specification. A specific format of the aggregation code is not specifically limited in this specification. The format of the aggregation code can be an EMVCo format. The recognition result can be one of a recognition success and a recognition failure.

**[0085]** When recognizing the aggregation code to determine the recognition result, the payment institution can recognize the aggregation code by using a recognition algorithm, to determine the recognition result. The recognition result can be one of a recognition success and a recognition failure. The recognition success indicates that the payment institution can perform a decoding operation on the aggregation code. The recognition failure indicates that the payment institution cannot perform a decoding operation on the aggregation code. Specifically, the payment institution can recognize the aggregation code to determine a code value corresponding to the aggregation code; determine whether there is a specified mark in the code value; and if yes, determine that the recognition result is a recognition success; or if no, determine that the recognition result is a recognition failure. The code value is a string. The specified mark is preset, and the specified mark can be a string. For example, the specified mark can be "com.xxxx". When there is a specified mark in the code value of the aggregation code, it indicates that the recognition result is a recognition success. When there is no specified mark in the code value of the aggregation code, it indicates that the recognition result is a recognition failure.

**[0086]** S104: Decode the aggregation code based on the recognition result.

**[0087]** S106: Determine whether decoding of the aggregation code succeeds. If yes, step S108 is performed. If no, step S110 is performed.

**[0088]** When the recognition result is a recognition success, the payment institution can

decode the aggregation code. Then, the payment institution determines whether decoding of the aggregation code succeeds. If yes, step S108 is performed. If no, step S110 is performed. When determining whether decoding of the aggregation code succeeds, the payment institution can determine, by determining whether a decoding result is obtained, whether decoding of the aggregation code succeeds. When the payment institution can obtain a corresponding decoding result by decoding the aggregation code, it indicates that decoding of the aggregation code succeeds; or when the payment institution does not obtain a corresponding decoding result by decoding the aggregation code, it indicates that decoding of the aggregation code fails.

**[0089]** In addition, the payment institution can further determine, by determining whether a format corresponding to the decoding result is correct, whether decoding of the aggregation code succeeds. Specifically, when determining whether decoding of the aggregation code succeeds, the payment institution can determine the decoding result; and determine whether the format of the decoding result meets a preset format. When the format of the decoding result meets the preset format, the payment institution successfully decodes the aggregation code. When the format of the decoding result does not meet the preset format, the payment institution fails to decode the aggregation code. The preset format is preset by the payment institution. The preset format is a format of an address of an aggregation page, and the preset format includes a domain name of the aggregation page and formats of several service parameters.

**[0090]** S108: Determine a decoding result, render an aggregation page based on the decoding result, display the aggregation page to a user, determine transaction information in response to an input operation of the user, and pay the acquiring institution based on the transaction information.

**[0091]** When decoding of the aggregation code succeeds, the payment institution can determine the decoding result. Then, the payment institution can render the aggregation page based on the decoding result, and display the aggregation page to the user. Then, the user can enter a transaction amount in an input box. The payment institution can determine the transaction information in response to the input operation of the user, and pay the acquiring institution based on the transaction information. A process performed after decoding of the aggregation code succeeds is similar to the process 1 in FIG. 1 or FIG. 2. Details are not described herein again.

**[0092]** The decoding result is a uniform resource locator (URL) of the aggregation page, that is, an address of the aggregation page. In addition to a domain name of the aggregation page, the address of the aggregation page further includes several service parameters. The service

parameters can be obtained based on the aggregation code. The service parameter can be a merchant subscription status, merchant information, or the like. This is not specifically limited in this specification. The aggregation page includes merchant information and an input box. The merchant information includes at least a merchant name, and certainly can further include information such as a merchant identifier and a merchant account. This is not specifically limited in this specification. The input box is used for the user to enter a transaction amount. Specifically, the aggregation page can be shown in FIG. 2. The transaction information includes at least the transaction amount, and certainly can further include a transaction number, the merchant information, and the like. This is not specifically limited in this specification. The above-mentioned process of paying the acquiring institution based on the transaction information is similar to the process shown in FIG. 5. Details are not described herein again.

**[0093]** S110: Send the aggregation code to the transfer network, so that the transfer network decodes the received aggregation code to determine the decoding result, and sends the decoding result to the payment institution; and render the aggregation page based on the received decoding result, display the aggregation page to the user, determine the transaction information in response to the input operation of the user, and pay the acquiring institution based on the transaction information.

**[0094]** When decoding of the aggregation code fails, the payment institution can send the aggregation code to the transfer network, so that the transfer network decodes the received aggregation code to determine the decoding result, and sends the decoding result to the payment institution. The payment institution can render the aggregation page based on the decoding result sent by the transfer network, display the aggregation page to the user, and then determine the transaction information in response to the input operation of the user. Then, the payment institution can pay the acquiring institution based on the transaction information. A process performed after decoding of the aggregation code fails is similar to the process 2 in FIG. 1 or FIG. 2. Details are not described herein again.

**[0095]** When the transfer network decodes the received aggregation code to determine the decoding result, the transfer network can obtain a prestored decoding rule, and decode the received aggregation code by using the decoding rule, to determine the decoding result. The decoding rule is used to decode the aggregation code. The decoding rule includes a meaning represented by each code value, and the code value is a code value corresponding to the aggregation code. The above-

mentioned process of paying the acquiring institution based on the transaction information is also similar to the process shown in FIG. 5. Details are not described herein again.

**[0096]** Based on this, when decoding the received aggregation code by using the decoding rule, to determine the decoding result, the transfer network can determine the code value corresponding to the aggregation code, and then determine the decoding result by using the decoding rule based on the code value. The decoding result is an address of the aggregation page. In addition to a domain name of the aggregation page, the address of the aggregation page further includes several service parameters. The service parameters can be obtained from the code value, or can be prestored in the transfer network. The service parameter can be a merchant subscription status, merchant information, or the like. This is not specifically limited in this specification. Therefore, the aggregation page subsequently rendered by the payment institution can include the merchant information.

**[0097]** It can be learned from the above-mentioned method in FIG. 10 that in a cross-border payment scenario, the payment institution can first obtain an aggregation code; then recognize the aggregation code to determine a recognition result; then decode the aggregation code based on the recognition result; and when decoding of the aggregation code succeeds, directly determine a decoding result. When decoding of the aggregation code fails, the payment institution sends the aggregation code to the transfer network, so that the transfer network decodes the received aggregation code to determine a decoding result, and sends the decoding result to the payment institution. Subsequently, the payment institution renders an aggregation page based on the decoding result, and displays the aggregation page to a user; and then determines transaction information in response to an input operation of the user. Then, the payment institution can pay the acquiring institution based on the transaction information, to complete a cross-border payment. The payment institution first performs code processing on the aggregation code, to avoid being limited by impact of a physical distance and quality of an international public network, and more quickly perform code processing on the aggregation code, so that a short time is consumed for obtaining the aggregation page, and the user waits for the aggregation page for a short time, to increase a payment speed of a cross-border payment and bring better experience to the user. In addition, when decoding of the aggregation code fails, the payment institution sends the aggregation code to the transfer network, so that the transfer network decodes the received aggregation code, to ensure accuracy of decoding the aggregation code.

**[0098]** In one or more embodiments of this specification, the transfer network includes a decoding tool and a transfer unit. The transfer unit and the payment institution are deployed in different regions, the decoding tool and the payment institution are deployed in a same region, and the decoding tool stores a decoding rule of the transfer network. Based on this, in step S102, the payment institution can send the aggregation code to the decoding tool, so that the decoding tool recognizes the received aggregation code to determine a recognition result, and sends the recognition result to the payment institution. Then, the payment institution receives the recognition result sent by the decoding tool. The decoding tool can be a preset program. The code processing includes recognizing the aggregation code and decoding the aggregation code.

**[0099]** In one or more embodiments of this specification, when the aggregation code is decoded based on the recognition result in step S104, the payment institution can generate a decoding instruction based on the received recognition result, and send the decoding instruction to the decoding tool, so that the decoding tool decodes the aggregation code by using the decoding rule in response to the decoding instruction sent by the payment institution. The decoding instruction is used to indicate the decoding tool to decode the aggregation code. The decoding rule is prestored in the decoding tool, and the decoding rule is consistent with a decoding rule stored in the transfer network. The decoding rule is used to decode the aggregation code. The decoding rule includes a meaning represented by each code value, and the code value is a code value corresponding to the aggregation code. The decoding rule is stored in the decoding tool through interaction between the decoding tool and the transfer network. A specific process is similar to the process in FIG. 4. Details are not described herein again.

**[0100]** In one or more embodiments of this specification, when it is determined, in step S106, whether decoding of the aggregation code succeeds, and when the decoding tool successfully decodes the aggregation code, the decoding tool can determine the decoding result, and send the decoding result to the payment institution. However, when the decoding tool fails to decode the aggregation code, the decoding tool cannot determine the decoding result, and cannot send the decoding result to the payment institution. Therefore, the payment institution can determine whether the decoding result sent by the decoding tool is received, to determine whether decoding of the aggregation code succeeds.

**[0101]** In addition, when the payment institution determines whether decoding of the aggregation code succeeds, the payment institution can further determine, by determining whether

a format corresponding to the decoding result is correct, whether decoding of the aggregation code succeeds. Specifically, when determining whether decoding of the aggregation code succeeds, the decoding tool can further determine the decoding result, and send the decoding result to the payment institution. The payment institution can determine the decoding result; and determine whether the format of the decoding result meets a preset format. When the format of the decoding result meets the preset format, the payment institution successfully decodes the aggregation code. When the format of the decoding result does not meet the preset format, the payment institution fails to decode the aggregation code. The preset format is preset by the payment institution. The preset format is a format of an address of an aggregation page, and the preset format includes a domain name of the aggregation page and formats of several service parameters. Regardless of whether the decoding tool succeeds in decoding, a decoding result is generated. If the decoding tool succeeds in decoding, a format of the decoding result generated by the decoding tool meets the preset format. If the decoding tool fails in decoding, a format of the decoding result generated by the decoding tool does not meet the preset format.

**[0102]** In one or more embodiments of this specification, the recognition result includes one of a recognition success and a recognition failure. When the aggregation code is decoded based on the recognition result in step S104, and when the received recognition result is a recognition success, the payment institution can generate a decoding instruction, and send the decoding instruction to the decoding tool, so that the decoding tool decodes the aggregation code by using the decoding rule in response to the decoding instruction sent by the payment institution.

**[0103]** The specification also provides a computer-readable non-transitory storage medium, wherein the storage medium stores a computer program, which, when executed by a processor, can be used to perform one or more steps of one or more methods described or illustrated herein or provides functionality described or illustrated herein. Herein, the computer-readable non-transitory storage medium or media may include one or more semiconductor-based or other integrated circuits (ICs) (such, as for example, field-programmable gate arrays (FPGAs) or application-specific ICs (ASICs)), hard disk drives (HDDs), hybrid hard drives (HHDs), optical discs, optical disc drives (ODDs), magneto-optical discs, magneto-optical drives, floppy diskettes, floppy disk drives (FDDs), magnetic tapes, solid-state drives (SSDs), RAM-drives, SECURE DIGITAL cards or drives, any other suitable computer-readable non-transitory storage media, or any suitable combination of two or more of these, where appropriate. A computer-readable non-

transitory storage medium may be volatile, non-volatile, or a combination of volatile and non-volatile, where appropriate.

**[0104]** The specification also provides a computer system. FIG. 11 illustrates an example computer system 1100. In particular embodiments, one or more computer systems 1100 perform one or more steps of one or more methods described or illustrated herein. In particular embodiments, one or more computer systems 1100 provide functionality described or illustrated herein. In particular embodiments, software running on one or more computer systems 1100 performs one or more steps of one or more methods described or illustrated herein or provides functionality described or illustrated herein. Particular embodiments include one or more portions of one or more computer systems 1100. Herein, reference to a computer system may encompass a computing device, and vice versa, where appropriate. Moreover, reference to a computer system may encompass one or more computer systems, where appropriate.

**[0105]** This disclosure contemplates any suitable number of computer systems 1100. This disclosure contemplates computer system 1100 taking any suitable physical form. As example and not by way of limitation, computer system 1100 may be an embedded computer system, a system-on-chip (SOC), a single-board computer system (SBC) (such as, for example, a computer-on-module (COM) or system-on-module (SOM)), a desktop computer system, a laptop or notebook computer system, an interactive kiosk, a mainframe, a mesh of computer systems, a mobile telephone, a personal digital assistant (PDA), a server, a tablet computer system, or a combination of two or more of these. Where appropriate, computer system 1100 may include one or more computer systems 1100; be unitary or distributed; span multiple locations; span multiple machines; span multiple data centers; or reside in a cloud, which may include one or more cloud components in one or more networks. Where appropriate, one or more computer systems 1100 may perform without substantial spatial or temporal limitation one or more steps of one or more methods described or illustrated herein. As an example and not by way of limitation, one or more computer systems 1100 may perform in real time or in batch mode one or more steps of one or more methods described or illustrated herein. One or more computer systems 1100 may perform at different times or at different locations one or more steps of one or more methods described or illustrated herein, where appropriate.

**[0106]** In particular embodiments, computer system 1100 includes a processor 1102, memory 1104, storage 1106, an input/output (I/O) interface 1108, a communication interface 1110, and a

bus 1112. Although this disclosure describes and illustrates a particular computer system having a particular number of particular components in a particular arrangement, this disclosure contemplates any suitable computer system having any suitable number of any suitable components in any suitable arrangement.

**[0107]** In particular embodiments, processor 1102 includes hardware for executing instructions, such as those making up a computer program. As an example and not by way of limitation, to execute instructions, processor 1102 may retrieve (or fetch) the instructions from an internal register, an internal cache, memory 1104, or storage 1106; decode and execute them; and then write one or more results to an internal register, an internal cache, memory 1104, or storage 1106. In particular embodiments, processor 1102 may include one or more internal caches for data, instructions, or addresses. This disclosure contemplates processor 1102 including any suitable number of any suitable internal caches, where appropriate. As an example and not by way of limitation, processor 1102 may include one or more instruction caches, one or more data caches, and one or more translation lookaside buffers (TLB s). Instructions in the instruction caches may be copies of instructions in memory 1104 or storage 1106, and the instruction caches may speed up retrieval of those instructions by processor 1102. Data in the data caches may be copies of data in memory 1104 or storage 1106 for instructions executing at processor 1102 to operate on; the results of previous instructions executed at processor 1102 for access by subsequent instructions executing at processor 1102 or for writing to memory 1104 or storage 1106; or other suitable data. The data caches may speed up read or write operations by processor 1102. The TLBs may speed up virtual-address translation for processor 1102. In particular embodiments, processor 1102 may include one or more internal registers for data, instructions, or addresses. This disclosure contemplates processor 1102 including any suitable number of any suitable internal registers, where appropriate. Where appropriate, processor 1102 may include one or more arithmetic logic units (ALUs); be a multi-core processor; or include one or more processors 1102. Although this disclosure describes and illustrates a particular processor, this disclosure contemplates any suitable processor.

**[0108]** In particular embodiments, memory 1104 includes main memory for storing instructions for processor 1102 to execute or data for processor 1102 to operate on. As an example and not by way of limitation, computer system 1100 may load instructions from storage 1106 or another source (such as, for example, another computer system 1100) to memory 1104. Processor

1102 may then load the instructions from memory 1104 to an internal register or internal cache. To execute the instructions, processor 1102 may retrieve the instructions from the internal register or internal cache and decode them. During or after execution of the instructions, processor 1102 may write one or more results (which may be intermediate or final results) to the internal register or internal cache. Processor 1102 may then write one or more of those results to memory 1104. In particular embodiments, processor 1102 executes only instructions in one or more internal registers or internal caches or in memory 1104 (as opposed to storage 1106 or elsewhere) and operates only on data in one or more internal registers or internal caches or in memory 1104 (as opposed to storage 1106 or elsewhere). One or more memory buses (which may each include an address bus and a data bus) may couple processor 1102 to memory 1104. Bus 1112 may include one or more memory buses, as described below. In particular embodiments, one or more memory management units (MMUs) reside between processor 1102 and memory 1104 and facilitate accesses to memory 1104 requested by processor 1102. In particular embodiments, memory 1104 includes random access memory (RAM). This RAM may be volatile memory, where appropriate. Where appropriate, this RAM may be dynamic RAM (DRAM) or static RAM (SRAM). Moreover, where appropriate, this RAM may be single-ported or multi-ported RAM. This disclosure contemplates any suitable RAM. Memory 1104 may include one or more memories 1104, where appropriate. Although this disclosure describes and illustrates particular memory, this disclosure contemplates any suitable memory.

**[0109]** In particular embodiments, storage 1106 includes mass storage for data or instructions. As an example and not by way of limitation, storage 1106 may include a hard disk drive (HDD), a floppy disk drive, flash memory, an optical disc, a magneto-optical disc, magnetic tape, or a Universal Serial Bus (USB) drive or a combination of two or more of these. Storage 1106 may include removable or non-removable (or fixed) media, where appropriate. Storage 1106 may be internal or external to computer system 1100, where appropriate. In particular embodiments, storage 1106 is non-volatile, solid-state memory. In particular embodiments, storage 1106 includes read-only memory (ROM). Where appropriate, this ROM may be mask-programmed ROM, programmable ROM (PROM), erasable PROM (EPROM), electrically erasable PROM (EEPROM), electrically alterable ROM (EAROM), or flash memory or a combination of two or more of these. This disclosure contemplates mass storage 1106 taking any suitable physical form. Storage 1106 may include one or more storage control units facilitating communication between

processor 1102 and storage 1106, where appropriate. Where appropriate, storage 1106 may include one or more storages 1106. Although this disclosure describes and illustrates particular storage, this disclosure contemplates any suitable storage.

**[0110]** In particular embodiments, I/O interface 1108 includes hardware, software, or both, providing one or more interfaces for communication between computer system 1100 and one or more I/O devices. Computer system 1100 may include one or more of these I/O devices, where appropriate. One or more of these I/O devices may enable communication between a person and computer system 1100. As an example and not by way of limitation, an I/O device may include a keyboard, keypad, microphone, monitor, mouse, printer, scanner, speaker, still camera, stylus, tablet, touch screen, trackball, video camera, another suitable I/O device or a combination of two or more of these. An I/O device may include one or more sensors. This disclosure contemplates any suitable I/O devices and any suitable I/O interfaces 1108 for them. Where appropriate, I/O interface 1108 may include one or more device or software drivers enabling processor 1102 to drive one or more of these I/O devices. I/O interface 1108 may include one or more I/O interfaces 1108, where appropriate. Although this disclosure describes and illustrates a particular I/O interface, this disclosure contemplates any suitable I/O interface.

**[0111]** In particular embodiments, communication interface 1110 includes hardware, software, or both providing one or more interfaces for communication (such as, for example, packet-based communication) between computer system 1100 and one or more other computer systems 1100 or one or more networks. As an example and not by way of limitation, communication interface 1110 may include a network interface controller (NIC) or network adapter for communicating with an Ethernet or other wire-based network or a wireless NIC (WNIC) or wireless adapter for communicating with a wireless network, such as a WI-FI network. This disclosure contemplates any suitable network and any suitable communication interface 1110 for it. As an example and not by way of limitation, computer system 1100 may communicate with an ad hoc network, a personal area network (PAN), a local area network (LAN), a wide area network (WAN), a metropolitan area network (MAN), or one or more portions of the Internet or a combination of two or more of these. One or more portions of one or more of these networks may be wired or wireless. As an example, computer system 1100 may communicate with a wireless PAN (WPAN) (such as, for example, a BLUETOOTH WPAN), a WI-FI network, a WI-MAX network, a cellular telephone network (such as, for example, a Global System for Mobile Communications (GSM) network), or other suitable

wireless network or a combination of two or more of these. Computer system 1100 may include any suitable communication interface 1110 for any of these networks, where appropriate. Communication interface 1110 may include one or more communication interfaces 1110, where appropriate. Although this disclosure describes and illustrates a particular communication interface, this disclosure contemplates any suitable communication interface.

**[0112]** In particular embodiments, bus 1112 includes hardware, software, or both coupling components of computer system 1100 to each other. As an example and not by way of limitation, bus 1112 may include an Accelerated Graphics Port (AGP) or other graphics bus, an Enhanced Industry Standard Architecture (EISA) bus, a front-side bus (FSB), a HYPERTRANSPORT (HT) interconnect, an Industry Standard Architecture (ISA) bus, an INFINIBAND interconnect, a low-pin-count (LPC) bus, a memory bus, a Micro Channel Architecture (MCA) bus, a Peripheral Component Interconnect (PCI) bus, a PCI-Express (PCIe) bus, a serial advanced technology attachment (SATA) bus, a Video Electronics Standards Association local (VLB) bus, or another suitable bus or a combination of two or more of these. Bus 1112 may include one or more buses 1112, where appropriate. Although this disclosure describes and illustrates a particular bus, this disclosure contemplates any suitable bus or interconnect.

**[0113]** The above-mentioned descriptions are merely embodiments of this specification, and are not intended to limit this specification. A person skilled in the art can make various modifications and changes to this specification. Any modification, equivalent replacement, improvement, and the like made without departing from the spirit and principle of this specification shall fall within the scope of the claims in this specification.

## CLAIMS

What is claimed is:

1. A cross-border payment system, wherein the system comprises a payment institution, a transfer network, and an acquiring institution, and the transfer network and the payment institution are deployed in different regions;

the payment institution is configured to: obtain an aggregation code; recognize the aggregation code to determine a recognition result; decode the aggregation code based on the recognition result; determine whether decoding of the aggregation code succeeds; and if yes, determine a decoding result, render an aggregation page based on the decoding result, display the aggregation page to a user, determine transaction information in response to an input operation of the user, and pay the acquiring institution based on the transaction information; or if no, send the aggregation code to the transfer network;

the transfer network is configured to: decode the received aggregation code to determine the decoding result, and send the decoding result to the payment institution; and

the payment institution is configured to: render the aggregation page based on the received decoding result, display the aggregation page to the user, determine the transaction information in response to the input operation of the user, and pay the acquiring institution based on the transaction information.

2. The system according to claim 1, wherein the transfer network comprises a decoding tool and a transfer unit, the transfer unit and the payment institution are deployed in different regions, the decoding tool and the payment institution are deployed in a same region, and the decoding tool stores a decoding rule of the transfer network;

the payment institution is configured to send the aggregation code to the decoding tool; and

the decoding tool is configured to: recognize the received aggregation code to determine a recognition result, and send the recognition result to the payment institution.

3. The system according to claim 2, wherein the payment institution is configured to: generate a decoding instruction based on the received recognition result, and send the decoding instruction to the decoding tool; and

the decoding tool is further configured to decode the aggregation code by using the decoding rule in response to the decoding instruction sent by the payment institution.

4. The system according to claim 2, wherein the decoding tool is further configured to: send a rule obtaining request to the transfer network based on a specified period; and receive a first rule sent by the transfer network, and update the decoding rule according to the first rule; and

the transfer network is further configured to: determine the first rule in response to the rule obtaining request sent by the decoding tool, and send the first rule to the decoding tool.

5. The system according to claim 2, wherein the decoding tool is configured to: recognize the received aggregation code to determine a code value corresponding to the aggregation code; determine whether there is a specified mark in the code value; and if yes, determine that the recognition result is a recognition success; or if no, determine that the recognition result is a recognition failure.

6. The system according to claim 5, wherein the payment institution is configured to: when the received recognition result is a recognition success, generate a decoding instruction, and send the decoding instruction to the decoding tool; and

the decoding tool is further configured to decode the aggregation code by using the decoding rule in response to the decoding instruction sent by the payment institution.

7. A cross-border payment method, wherein the method is applied to a payment institution, and the payment institution is deployed in a cross-border payment system; the cross-border payment system comprises the payment institution, a transfer network, and an acquiring institution, and the transfer network and the payment institution are deployed in a same region; and the method comprises:

obtaining an aggregation code;

recognizing the aggregation code to determine a recognition result;

decoding the aggregation code based on the recognition result;

determining whether decoding of the aggregation code succeeds; and

if yes, determining a decoding result, rendering an aggregation page based on the decoding result, displaying the aggregation page to a user, determining transaction information in response to an input operation of the user, and paying the acquiring institution based on the transaction information; or

if no, sending the aggregation code to the transfer network, so that the transfer network decodes the received aggregation code to determine the decoding result, and sends the decoding result to the payment institution; and rendering the aggregation page based on the received

decoding result, displaying the aggregation page to the user, determining the transaction information in response to the input operation of the user, and paying the acquiring institution based on the transaction information.

8. The method according to claim 7, wherein the transfer network comprises a decoding tool and a transfer unit, the transfer unit and the payment institution are deployed in different regions, the decoding tool and the payment institution are deployed in a same region, and the decoding tool stores a decoding rule of the transfer network; and

the recognizing the aggregation code to determine a recognition result comprises:

sending the aggregation code to the decoding tool, so that the decoding tool recognizes the received aggregation code to determine a recognition result, and sends the recognition result to the payment institution; and

receiving the recognition result sent by the decoding tool.

9. The method according to claim 8, wherein the decoding the aggregation code based on the recognition result comprises:

generating a decoding instruction based on the received recognition result, and sending the decoding instruction to the decoding tool, so that the decoding tool decodes the aggregation code by using the decoding rule in response to the decoding instruction sent by the payment institution.

10. The method according to claim 7, wherein the decoding rule is stored in the decoding tool through interaction between the decoding tool and the transfer network.

11. The method according to claim 7, wherein the determining whether decoding of the aggregation code succeeds comprises:

determining the decoding result; and

determining whether a format of the decoding result meets a preset format.

12. The method according to claim 8, wherein the recognition result comprises one of a recognition success and a recognition failure; and

the decoding the aggregation code based on the recognition result comprises:

when the received recognition result is a recognition success, generating the decoding instruction, and sending the decoding instruction to the decoding tool, so that the decoding tool decodes the aggregation code by using the decoding rule in response to the decoding instruction sent by the payment institution.

13. A computer system, comprising a storage, a processor, and a computer program that is

stored in the storage and that is capable of running on the processor, wherein when the processor executes the program, the following steps are implemented:

obtaining an aggregation code;

recognizing the aggregation code to determine a recognition result;

decoding the aggregation code based on the recognition result;

determining whether decoding of the aggregation code succeeds; and

if yes, determining a decoding result, rendering an aggregation page based on the decoding result, displaying the aggregation page to a user, determining transaction information in response to an input operation of the user, and paying an acquiring institution based on the transaction information; or

if no, sending the aggregation code to a transfer network, so that the transfer network decodes the received aggregation code to determine the decoding result, and sends the decoding result to a payment institution; and rendering the aggregation page based on the received decoding result, displaying the aggregation page to the user, determining the transaction information in response to the input operation of the user, and paying the acquiring institution based on the transaction information.

14. The computer system according to claim 13, wherein the transfer network comprises a decoding tool and a transfer unit, the transfer unit and the payment institution are deployed in different regions, the decoding tool and the payment institution are deployed in a same region, and the decoding tool stores a decoding rule of the transfer network; and

the recognizing the aggregation code to determine a recognition result comprises:

sending the aggregation code to the decoding tool, so that the decoding tool recognizes the received aggregation code to determine a recognition result, and sends the recognition result to the payment institution; and

receiving the recognition result sent by the decoding tool.

15. The computer system according to claim 14, wherein the decoding the aggregation code based on the recognition result comprises:

generating the decoding instruction based on the received recognition result, and sending the decoding instruction to the decoding tool, so that the decoding tool decodes the aggregation code by using the decoding rule in response to the decoding instruction sent by the payment institution.

16. The computer system according to claim 13, wherein the decoding rule is stored in the

decoding tool through interaction between the decoding tool and the transfer network.

17. The computer system according to claim 13, wherein the determining whether decoding of the aggregation code succeeds comprises:

determining the decoding result; and

determining whether a format of the decoding result meets a preset format.

18. The computer system according to claim 14, wherein the recognition result comprises one of a recognition success and a recognition failure; and

the decoding the aggregation code based on the recognition result comprises:

when the received recognition result is a recognition success, generating the decoding instruction, and sending the decoding instruction to the decoding tool, so that the decoding tool decodes the aggregation code by using the decoding rule in response to the decoding instruction sent by the payment institution.

19. A computer-readable storage medium, wherein the storage medium stores a computer program, and when the computer program is executed by a processor, the method according to any one of claims 7 to 12 is implemented.