Abstract: Summarizing, the application relates to a network server system that is utilized for a data exchange between a mobile device (110) of a sender (118) and a remote computing device (116) of a target, wherein the network server system comprises an interaction server (112) and an account server (114). The interaction server (112) is operable to receive a request, from the mobile device (110), for initiating a transaction application operated by the account server (114), wherein the request contains a target identifier of the target of the transaction application. After the completion of the initiation, a request for executing the transaction application from the mobile device (110) is processed, wherein the request contains a content identifier to be processed by the transaction application. The interaction server (112) transmits the request for executing the transaction application to the account server (114). The account server (114) is operable to execute the transaction application and to process the content identifier by the transaction application. In addition, the account server (114) is operable to forward a target processing result to the interaction server (112). Furthermore, the interaction server (112) is operable to forward the target processing result to the remote computing device (116) of the target.
Description

Technical Field

The following description relates to enabling data exchange between a mobile device of a sender and a remote computing device of a target via a network server system. In particular, the description relates to a network server system, a method for data exchange, a computer program product, an interaction server, as well as a computer implemented account modification application.

Background

It is desirable to facilitate the use of mobile devices, such as mobile phones or other hand-held devices, for enabling data exchange between a mobile device of a sender and a remote computing device of a target. In particular, it is desirable to facilitate the data exchange between two or more accounts residing on an account server, wherein the data exchange is initiated by the mobile device and wherein the data exchange is with an account of the user of a remote computing device. The user and/or the owner of the remote computing device may be referred to as a target. In other words, the target may be a human person, that is the user of the remote computing device. The target may be an artificial person, that is a legal person such as a company or the like. It is further desirable to facilitate for the user of the remote computing device verification of whether the data exchange has been successful.
Technical Definitions

A mobile network may be implemented as a group of interconnected computers and/or mobile devices, at least one of which communicates wirelessly, e.g. via the mobile cellular network with one or more of the remaining devices of the network.

A mobile device may refer to a device in the mobile network capable of wireless communication. Examples of mobile devices are smart phones, mobile phones, personal digital systems, pagers, and other electronic devices that can connect to a mobile network, and can be used to transmit and receive data. A mobile device may communicate wirelessly using local area technologies such as wireless fidelity (WiFi), or wide area wireless technologies such as global system for mobile communication (GSM), general package radio service (GPRS), enhanced data rates for global evolution (EDGE), universal mobile telecommunications system (UMTS), high speed downlink/uplink packet access (HSDPA, HSUPA), long-term evolution (LTE), or world wide interoperability for microwave access (WIMAX). Other suitable communication technologies available today or in the future are also possible.

Aspects of the Invention

According to an aspect of the invention, a network server system is utilized for data exchange between a mobile device of a sender and a remote computing device of a target, wherein the network server system comprises an interaction server and an account server. The interaction server is operable to receive a request from the mobile device for initiating a transaction application operated by the account server. The request contains a target identifier of the target of the transaction application. After the completion of the initiation, a request for executing the transaction application from the mobile device is processed. The request contains a content identifier to be processed by the transaction application. The interaction server transmits the request for executing the transaction application to the account server. The account server is operable to execute the transaction application and to process the content identifier by the transaction application. In addition, the account server is
operable to forward a target processing result to the interaction server. Further, the interaction server is operable to forward the target processing result to the remote computing device of the target.

The above described network server system enables a sender, that utilizes a mobile device, to perform a data exchange between the mobile device and the remote computing device by initiating a transaction application that is operated and executed on an account server. A processing result is then forwarded the remote computing device and e.g. displayed on the remote computing device without any further interaction of the user of the remote computing device being required. The technical effect of the above is that the man-machine interaction is improved because a user of the mobile device may initiate a data transfer via a mobile phone by requesting a transaction application that resides on a server. The transaction application is provided with a content identifier that is to be processed by the transaction application. However, the results that are achieved by the transaction application are provided to the target of the data transfer, in particular to the remote computing device without any further interaction needed. Hence, man machine interaction is improved, since with little or no interaction by the user of the remote computing device, the transaction application is executed on the account server and the results thereof are forwarded to the remote computing device without any interaction of the user of the remote computing device being necessary. In other words, the target processing result is data obtained or generated at the account server, which data is ultimately intended for and forwarded to the remote computing device.

Moreover, man machine interaction is improved, since due to the separation of the initiation process and the execution of the transfer application the system in total operates more stable. For example, incompatibilities between the mobile device and the remote computing device can be detected at an early stage, e.g. before executing the transfer application.

According to a preferred embodiment of the network server system, the interaction server system is further operable to transmit the target identifier to the account
According to a preferred embodiment of the network server system, the account server is operable to process the target identifier; and the interaction server is operable to receive a response from the account server. According to an embodiment of the network server system, the response includes target authentication data.

According to a preferred embodiment of the network server system, the interaction server is further operable to transmit the target authentication data to the mobile device. According to an embodiment of the network server system, transmitting the target authentication data to the mobile device completes the initiation.

The above features enable the sender that utilizes the mobile device to verify the target identifier identifying the target utilizing the remote computing device prior to sending the request for executing the transaction application. The technical effect of these features is enhanced security as the receiver, i.e. the target can be verified by the user of the mobile device in order to avoid a data exchange with a non-authorized target.

According to a preferred embodiment of the network server system, the interaction server is further operable to receive the request for executing the transaction application from the mobile device.

According to a preferred embodiment of the network server system, the account server is operable to forward a mobile device processing result to the interaction server. In an embodiment of the network server system, the interaction server is operable to forward the mobile device processing result to the mobile device. In other words, the mobile device processing result is data obtained or established at the account server, which data is intended for and ultimately forwarded to mobile device.

The above features lead to the technical effect that the sender utilizing the mobile
device is provided with an acknowledgment that the data has been successfully transferred. The remote computing device needs not be involved in order to acknowledge that the transaction application has been successfully executed, i.e. the remote computing device needs not be involved in acknowledging the data transfer. Hence, no manipulation from the remote computing device, that may also be referred to as target, device is possible.

According to a preferred embodiment of the network server system, the interaction server is operable to authenticate the mobile device prior to receiving a request from the mobile device. The authentication and the receiving of the request may be simultaneously.

The above feature has the technical effect that the mobile device is uniquely identified by the interaction server, such that no manipulated requests or target identifiers can be sent from the mobile device.

In a preferred embodiment of the network server system, a mobile device user is holding a mobile device user account residing on the account server. In an embodiment of the network server system, a target is holding a target account residing on the account server. The target may also be referred to as a remote computing device user. Accordingly, the remote computing device user may be holding a remote device user account residing on the account server.

Moreover, man machine interaction is improved, since due to the separation of the initiation process and the execution of the transfer application the system in total operates more stable. For example, incompatibilities between the accounts can be detected at an early stage, e.g. before executing the transfer application.

The feature has the technical effect that a data exchange between two accounts on the account server may be performed when executing the transaction application on the account server. Accordingly, the data does not have to be transmitted over a network. The security of the data transfer is increased.
According to a preferred embodiment of the network server system, executing the transaction application includes immediately performing an irreversible data transfer between the mobile device user account and the remote device user account, i.e. the target account.

The above feature has the technical effect that the target can depend on the data transfer. In particular the target can rely thereon that the sender may not undo the data transfer.

According to a preferred embodiment of the network server system, the request for executing the transaction application includes an identifier of the data to be transferred between the mobile device user account and the remote device user account, i.e. the target account.

According to a preferred embodiment of the network server system, the target processing result includes a notification to be displayed at the remote computing device that the data to be transferred between the mobile device user account and the remote device user account has been successfully transferred. According to an embodiment of the network server system, the mobile device processing result further includes a notification to be displayed at the mobile device that the data transfer of the data to be transferred between the mobile device user account and the remote device user account has been executed.

This leads to the technical effect that the sender and the target are provided with a confirmation of a successful data transfer between two accounts, in particular without the need of any human interaction at the remote computer and/or without any human interaction at the mobile device.

According to a preferred embodiment of the network server system, the data to be transferred includes an amount of money to be transferred. According to an embodiment of the network server system, the mobile device user account, that is
the target account, is a bank account. According to an embodiment of the network server system, the remote device user account is a bank account.

The technical effect of the above feature is that a money transfer can be remotely initiated by a sender, securely performed on a bank account server between two bank accounts residing on said account server. A further technical effect is that the money is transferred instantly from one bank account to another. A further technical effect is that the receiver of the money, i.e. the target, is provided instantly with the confirmation that the amount of money has been successfully transferred. Further, this improves the man-machine interaction, as the sender does not have to carry a card that is utilized in order to initiate a payment instruction. Further to that, the target does not have to provide a device that has to be utilized in order to initiate the payment procedure. Rather, the payment is initiated by the user of the mobile device, in particular by using the mobile device. Moreover, the amount of money, i.e. the data to be transferred between the two accounts, is defined and input at the mobile device and not at the remote computer, thereby improving the man machine interaction for the user of the remote computer. Moreover, the total man machine interaction, i.e. the sum of interaction at the mobile device and remote computer is improved by initiating the transaction application already in advance, i.e. before inputting the money amount to be transferred. Hence, once the money amount to be transferred is input by the user of the mobile device, the transaction application can be timely, particularly immediately executed upon request of the user of the mobile device. Accordingly, the waiting time between requesting executing of the transaction application and transferring the data between the accounts is reduced, since authentication and e.g. a handshake between the mobile device and the remote computer need not be carried out. Finally, also the security for the target is improved as the money transfer is performed instantly.

According to a preferred embodiment of the network server system, the mobile device verifies whether the mobile device user account has sufficient funds prior to processing the initiation of the data transfer.
This feature reduces the time consumed for a payment process, as the sender is provided with the information that his balance is not sufficient. The trial and error process as known from utilizing smart cards is avoided. Hence, man machine interaction is reduced.

According to a preferred embodiment of network server system, the interaction server and the account server are communicating via a secure communication protocol.

According to a preferred embodiment of the network server system, the mobile device is using a secure mobile communication protocol. According to an embodiment of the network server system, the mobile device uses encryption software to encrypt any requests prior to sending the requests to the interaction server.

According to a preferred embodiment of the network server system, the interaction server comprises decryption software in order to decrypt the encrypted requests received from the mobile device.

The effect of the above features is improved security, as the data are encrypted prior to be transferred between the entities (i.e. mobile device, transaction server and account server).

According to a preferred embodiment of the network server system, the target identifier includes data scanned from a QR code. In an embodiment of the network server system wherein the identifier includes data received via a GPS sensor. In a further embodiment, the identifier includes data received from mobile network cell data.

An aspect of the invention relates to a computer-implemented method for a data exchange between a mobile device of a sender and a remote computing device of a target using a network server system, wherein the network server system comprises an interaction server and an account server. The computer-implemented method
includes the step of receiving, at the interaction server, a request, from the mobile
device, for initiating a transaction application operated by the account server, wherein
the request contains a target identifier of the target of the transaction application.
Further, after completion of the initiation, the method includes the step of processing
a request from the mobile device for executing the transaction application. The
request contains a content identifier to be processed by the transaction application.
The method further includes the step of transmitting, from interaction server, the
request for executing the transaction application to the account server. In addition,
the method includes the step of executing, at the account server, the transaction
application and processing the content identifier by the transaction application.
Further, the method includes the step of forwarding a target processing result from
the account server to the interaction server and the step of forwarding the target
processing result from the interaction server to the remote computing device of the
target.

According to a preferred embodiment, the method includes the step of transmitting,
from the interaction server system, the target identifier to the account server.

According to a preferred embodiment, the method includes the step of processing, at
the account server, the target identifier and the step of receiving, at the interaction
server, a response from the account server. According to an embodiment of the
computer-implemented method, the response includes target authentication data.

According to a preferred embodiment, the method includes the step of transmitting,
from the interaction server, the target authentication data to the mobile device.
According to an embodiment of the computer-implemented method, the step of
transmitting the target authentication data to the mobile device completes the
initiation.

According to a preferred embodiment, the method includes the step of receiving, at
the interaction server, the request for executing the transaction application from the
mobile device.
According to a preferred embodiment, the method includes the step of forwarding, from the account server, a mobile device processing result to the interaction server.

In an embodiment of the computer-implemented method, the method includes the step of forwarding, from interaction server, the mobile device processing result to the mobile device.

According to a preferred embodiment, the method includes the step of authenticating, at the interaction server, the mobile device prior to receiving, at the interaction server, a request from the mobile device.

In a preferred embodiment of the method, a mobile device user is holding a mobile device user account residing on the account server. In an embodiment of the method, a remote computing device user is holding a remote device user account residing on the account server.

According to a preferred embodiment of the method, the step of executing the transaction application includes immediately performing an irreversible data transfer between the mobile device user account and the remote device user account.

According to a preferred embodiment of the method, the request for executing the transaction application includes an identifier of the data to be transferred between the mobile device user account and the remote device user account.

According to a preferred embodiment of the method, the target processing result includes a notification to be displayed at the remote computing device that the data to be transferred between the mobile device user account and the remote device user account has been successfully transferred. According to an embodiment of the computer-implemented method, the mobile device processing result further includes a notification to be displayed at the mobile device that the data transfer of the data to be transferred between the mobile device user account and the remote device user account has been executed.
According to a preferred embodiment of the method, the data to be transferred includes an amount of money to be transferred. According to an embodiment of the method, the mobile device user account is a bank account. According to an embodiment of the method, the remote device user account is a bank account.

According to a preferred embodiment of the method, the mobile device verifies whether the mobile device user account has sufficient funds prior to the step of processing the initiation of the data transfer.

According to a preferred embodiment of the method, the communication steps between the interaction server and the account server are performed via a secure communication protocol.

According to a preferred embodiment of the method, the mobile device is using a secure mobile communication protocol. According to an embodiment of the computer-implemented method, the mobile device uses encryption software to encrypt any requests prior to sending the requests to the interaction server.

According to a preferred embodiment of the method, the interaction server comprises decryption software in order to decrypt the encrypted requests received from the mobile device.

According to a preferred embodiment of the method, the target identifier includes data scanned from a QR code. In an embodiment of the computer-implemented method wherein the identifier includes data received via a GPS sensor. In a further embodiment, the identifier includes data received from mobile network cell data.

An aspect of the invention relates to a computer program product comprising computer-readable instructions, which, when loaded and executed on a network server system, cause the network server system to perform method steps according to the computer-implemented method outlined above.
An aspect of the invention relates to an interaction server for data exchange between a mobile device of a sender, a remote computing device of a target and an account server. The interaction server is operable to receive a request, from the mobile device, for initiating a transaction application operated by the account server. The request contains a target identifier of a target of the transaction application. After completion of the initiation a request from the mobile device for executing the transaction application is processed, wherein the request contains a content identifier to be processed by the transaction application. The request for executing the transaction application is transmitted to the account server such that the account server is executing the transaction application which processes the content identifier. In addition, a target processing result is received from the account server and the target processing result is forwarded to the remote computing device of the target.

According to a preferred embodiment, the interaction server is operable to transmit the target identifier to the account server.

According to a preferred embodiment, the interaction server is operable to receive a response from the account server. According to an embodiment, the response includes target authentication data.

According to a preferred embodiment, the interaction server is operable to transmit the target authentication data to the mobile device. According to an embodiment, transmitting the target authentication data to the mobile device completes the initiation.

According to a preferred embodiment, the interaction server is operable to receive the request for executing the transaction application from the mobile device.

According to a preferred embodiment, the interaction server is operable to receive a mobile device processing result from the account server. According to a preferred embodiment, the interaction server is operable to forward the mobile device
processing result to the mobile device.

According to a preferred embodiment, the interaction server is operable to authenticate the mobile device prior to receiving a request from the mobile device.

According to a preferred embodiment, a mobile device user is holding a mobile device user account residing on the account server. In an embodiment, a remote computing device user is holding a remote device user account residing on the account server.

According to a preferred embodiment, the execution of the transaction application by the application server includes immediately performing an irreversible data transfer between the mobile device user account and the remote device user account.

According to a preferred embodiment, the request for executing the transaction application includes an identifier of the data to be transferred between the mobile device user account and the remote device user account.

According to a preferred embodiment, the target processing result includes a notification to be displayed at the remote computing device that the data to be transferred between the mobile device user account and the remote device user account has been successfully transferred. According to an embodiment, the mobile device processing result further includes a notification to be displayed at the mobile device that the data transfer of the data to be transferred between the mobile device user account and the remote device user account has been executed.

According to a preferred embodiment, the data to be transferred includes an amount of money to be transferred. According to an embodiment, the mobile device user account is a bank account. According to an embodiment, the remote device user account is a bank account.

According to a preferred embodiment, the mobile device is operable to verify whether
the mobile device user account has sufficient funds prior to processing the initiation of the data transfer.

According to a preferred embodiment, the interaction server and the account server are communicating via a secure communication protocol.

According to a preferred embodiment, the mobile device is using a secure mobile communication protocol. In an embodiment, the mobile device uses encryption software to encrypt any requests prior to sending the requests to the interaction server.

According to a preferred embodiment, the interaction server comprises decryption software in order to decrypt the encrypted requests received from the mobile device.

According to a preferred embodiment, the target identifier includes data scanned from a QR code. In an embodiment, the identifier includes data received via a GPS sensor. In an embodiment, the identifier includes data received from mobile network cell data.

An aspect of the invention relates to a computer-implemented account modification application for a mobile device. The computer-implemented account modification application is operable by a user. The account modification application is operable to perform the step of receiving a target identifier of a target. Then, the step of transmitting a request for initiating a transaction application to an interaction server is performed, wherein the request contains the target identifier of the target of the account modification. Further, the account modification application is operable to perform the steps of receiving, at the mobile device, a content identifier from the user and of transmitting a request for executing a transaction application to the interaction server, wherein the request contains the content identifier. Further, the application is operable to perform the step of receiving a mobile device processing result from the interaction server, wherein the mobile device processing result includes a notification that the transaction application has been executed.
According to a preferred embodiment, the computer-implemented account modification application comprises the step of receiving, from the transaction server, a response to the request for initiating the transaction application. The response is preferably provided simultaneously with or after completion of the initiation process and before transmitting the request for execution of the transfer application. The response may include target authentication data. According to a preferred embodiment, the target authentication data is displayed on the mobile device.

receive (S120), from the interaction server (112), a response to the request for initiating the transaction application, wherein the response includes target authentication data;

-display, on the mobile device (110), the target authentication data.

Accordingly, the above aspects and embodiments, in addition to the described improved man machine interaction and other technical advantages, overcome a conventionally known hurdle at a cash desk of a strongly frequented sales point, such as a whole seller, an individual seller, a gas station, a micro business or the like. The sales point may be referred to as a target. Personnel of the sales point may be referred to as a user of a remote computing device. In case of a small sales point or an individual seller or a micro business or the like, the target and the user of the remote computing device may be identical persons.

The above aspects and embodiments overcome the conventionally known hurdle of a sales point that customers may accept delay in the payment process by another customer slowly collecting the money coins and bills need for the payment transaction but the same customers would not accept delay due to electronic payment. Due to the above described splitting of the payment in two, namely the initiating part and the execution of the transaction application part, no delay will happen; the process is even faster than payment with cash money. Hence, the machine aided transfer - in addition to the above described - improves the payment
workflow at a sales point. This may be particularly the case, since due to the ignition step, all the necessary connections will be established and the data needed for the payment will be verified upfront, i.e. before the payment process. At the actual payment process, i.e. execution of the transaction application, nothing more than executing the transaction application is necessary. Hence, the likelihood of interruptions of the payment process or even an abort of the payment process are reduced, thereby increasing the effectiveness of data processing of the machine.

Moreover, due to the above described splitting of the process and the use of the two mentioned servers, complicated, time consuming and error prone introduction steps between a device of the sales point, e.g. a cash machine, and a device of the customer, e.g. a mobile phone, can be avoided. It is not necessary, that these devices exchange data directly. Rather, direct data exchange is avoided, since any data exchange is routed and/or carried out by the two servers described above. Hence, it is not necessary, that the cash machine and the mobile device exchange data via QR codes, NFC, or the like.

Summarizing, according to the above described invention, the following steps are applied, preferably in this order:

1. while the customer, i.e. the user of the mobile device, is doing the shopping or waiting in the line of the cash machine, the customer starts the application, in particular the above described account modification application;
2. the customer selects money transfer from the application;
3. the customer selects the target;
4. the account modification application shows the name of the target and the customer can verify the correctness of the target;
5. the sales person, i.e. the user of the remote computer, indicates the money amount to be paid. For example, the sales person simply tells the customer the money amount. The customer enters this money amount and requests the money transfer, i.e. the request for executing the transaction application, using the money amount entered;
6. the sales person can see the money amount transferred to his account
on the display of the remote computer, which can be a tablet pc, a smart phone, or the like or part of his cash machine. The sales person concludes the payment process by acknowledging the money transfer to the customer. In addition or alternatively, on the same display device or on a different display device, an indication may appear to the customer that the transaction is complete, so that the customer does not need to wait for the acknowledgement of the sales person.

Advantageously there is sufficient time for the customer to verify that the money is transferred to the correct sales point. Since according to an embodiment of the invention the name and/or the address of the target is provided to the customer, the customer can verify that he is not deceived. Among others, this is also achieved, since according the above described features, the customer announced payment (initiation of the process) without defining a specific money amount. The money amount (content identifier) will only be indicated at a later time (request for executing the transaction application). Typically this request is carried out while the sales person is occupied with completing the order.

One or more features of the above described aspects and/or embodiments may be isolated from each other and combined with each other to create one or more additional or adapted aspects and/or embodiments.

**Brief Description of the Figures**

Aspects and/or preferred embodiments are exemplary described in relation to figures 1 to 6, wherein

**Fig. 1** shows a use case diagram of a network server system suitable for enabling data exchange between a mobile device of a sender and a remote computing device of a target and the steps performed between the mobile device of the sender and the remote computing device of the target;

**Fig. 2** shows a home screen as can be displayed on a mobile device of an exemplary
account modification application showing exemplary functionalities provided by the account modification application;

**Fig. 3** shows two prerequisites that need to be met prior to initiation of the transaction application operated by an account server;

**Fig. 4** represents the screen which is displayed to the user of the mobile device when selecting and/or activating the icon for initiating a money transfer;

**Fig. 5** shows the mobile devices processing result displayed at the mobile device;

**Fig. 6** shows a computer system including a mobile computing environment coupled to a remote device.

**Detailed Description of the Figures**

In the following, a detailed description of examples will be given with references to the figures. It should be understood that various modifications to the examples may be made without deviating from the invention. In particular, one or more elements of the examples may be combined and used in other examples to form new examples.

Figure 1 shows a network service system as well as steps that are carried out in relation to the network service system. The network service system may comprise a mobile device 110 as well as an interaction server 112 and an account server 114. The interaction server 112 may also be referred to as a push server. The interaction server 112 and the account server 114 may be arranged on one single hardware device as two different software implementations. As such, the interaction server 112 and the accounting server 114 may be two independent software applications or programs. The interaction server 112 and the accounting server 114 may be implemented as by one software application and be different services of this one software application. In an embodiment, the interaction server 112 and the account server 114 may be implemented as two different hardware devices.
The mobile device 110 may be operable to transmit requests to the interaction server 112, and the mobile device 110 may further be operable to receive requests from the interaction server 112. The interaction server 112 may be able to receive requests and transmit, e.g. push requests or content of requests to the account server 114. In addition, the interaction server 112 may receive a response from the account server 114 to a request forwarded to the account server 114. Further, the interaction server 112 may transmit, e.g. push the response received from the account server 114 to a mobile device 110 or a remote computing device 116. The remote computing device 116 can be a conventional cashing device of a sales person or the like. The remote computing device 116 can be a conventional personal computer or a mobile device such as a mobile phone, smart phone, a tablet pc or the like.

The account server 114 is operable to receive requests from the interaction server 112 and to execute a transaction application operated by the account server 114. The transaction application may be triggered by a request from the interaction server 112 for executing the transaction application. The transaction application may be any kind of application known by a person skilled in the art, e.g. a service application, a daemon or the like. In particular the transaction application may be operable to transfer a certain money amount from one account, namely the account of the owner of the mobile device 110, to the account of a target, such as a sales person or a sales company. The transaction application may be operable to transfer a certain money amount from one account, namely the account of the owner of an application operated on and/or by the mobile device 110, to the account of a target, such as a sales person or a sales company.

Further to that, the account server 114 is operable to forward processing results of the execution of the transaction application to the interaction server 112. The remote computing device 116 may not be operable to communicate with the interaction server 112, that is preferably there may exclusively exist a one way communication path between the remote computing device 116 and the interaction server 112 such that messages can be received from the interaction server 112 at the remote
computing device 116. As an example, a message may be pushed from the interaction server 112 to the remote computing device 116, but not vice versa. The remote computing device 116 may receive notifications from the interaction server 112.

With respect to Figure 1, an exemplary data exchange between the mobile device 110 of the user 118 of the mobile device 10 and the remote computing device 116 of the target of the transaction application is shown. The user 118 of the mobile device 110 may also be referred to as sender 118.

At step S110, the mobile device 110 may receive from the sender 118 an indication that a data exchange is to be initiated. Such an indication can be made by pressing or selecting a respective button, icon or the like on the mobile device 110.

At step S112, the mobile device 110 may receive a target identifier of the target of the transaction application. The target identifier may be any kind of identifier suitable for identifying a target, e.g.

- by scanning a QR code, wherein the QR code is a code of identification data of the target,
- by utilizing a GPS sensor in order to localize a position,
- by typing data into the mobile device 110, e.g. a telephone number or an identifier etc;
- by selecting a button indicating a favorite target.

In other words, Step S112 may include, for example, scanning a bar code, a QR code, or the like, using the mobile device 110.

At step S114 the mobile device 110 may transmit a request to the interaction server 112 for initiating the transaction application, which resides on the account server 114. The request for initiating the transaction application may include the target identifier that represents the target or personnel 120 of the target of the transaction application. The request for initiating the transaction application may include an
identifier of the target. The identifier may be a number and/or an id of the target that
the account server 114 can identify. The request may be transmitted via a mobile
network. Further, the request may be transmitted using a secure mobile
communication protocol. In addition, the mobile device 110 may optionally use
encryption software to encrypt any requests prior to sending the request to the
interaction server 112.

At step S116 the interaction server 112 may transmit the target identifier to the
account server 114. The account server 114 may process the target identifier,
wherein processing the target identifier may include detecting whether the target,
which is identified by the target identifier, holds a remote device user account on the
account server 114. If the target holds the remote device user account on the
account server 114, the account server 114 may process at step S118 a response to
the interaction server 112. The response may be or contain a variable indicating that
the target holds an account on the account server 114 or not. The response to the
interaction server 112 may also include target authentication data, such as name
and/or address of the target.

Next, at step S120, the interaction server 112 may transmit the target authentication
data and/or the parameter indicating that the target holds an account at the account
server 114 to the mobile device 110. Step S120 may be the step that completes the
initiation.

It is noted that the target identifier and the target authentication data may not be
identical. For example, the target identifier may be data scanned by the mobile
device 110 from a QR code. The target identifier may be a telephone number and/or
a machine processable number. The mobile device 110 transmits the telephone
number to the interaction server 112. The interaction server 112 transmits the
telephone number to the application server 114. The application server searches its
account-holder-database for the telephone number. In case the telephone number is
found, the account server 114 has successfully detected that a target holds an
account on the account server 114 and has the telephone number received from the
interaction server 112. Accordingly, the account server 114 may extract further information about the target, i.e. the account holder, e.g. his name and/or his address, which represents parts or all of the authentication data. Further to that, the account server 114 may transmit the authentication data to the interaction server 112, and the interaction server 112 may transmit the authentication data to the mobile device 110. The authentication data may then be displayed to the user of the mobile device 110. Accordingly, the user of the mobile device 110 can verify the target that has been chosen based on the target identifier.

However, the initiation of the transaction application may be executed with fewer steps. The mobile device 110 may contain a list of favorite targets. The list of favorite targets may be maintained by the user 118 of the mobile device 110. The list of favorite targets may include target identifiers. The user 118 of the mobile device 110 may be able to choose the target identifier from the list of favorites. Accordingly, the mobile device 110 may receive at step S112 the target identifier from the list of favorites. If the target is selected from the list of favorites, it may be assumed that the target owns a remote device user account on the account server 114. However, at step S114, the mobile device 110 transmits the request for initiating the transaction application which may include the target identifier of the target from the list of favorites. At step S116 the interaction server 112 may transmit the target identifier to the account server 114. The account server 114 may verify whether the remote device user account of the target identified by the target identifier is still valid. With verifying the remote device user account of the target, the initiation process may be completed.

After having verified the target authentication data of the target of the transaction application at step S124, the user 120 of the remote computer 116 may communicate at step S126 to the sender 118 a content identifier of the data to be transferred, e.g. an amount of money to be transferred. Step S124 may comprise a verbal communication between sender 118 and user 120. Additionally or alternatively Step S124 may comprise that the remote computer 116 provides the content identifier. That is, the remote computer 116 may display a money amount that needs to be
transferred. Additionally or alternatively, the remote computer 116 may send via a wireless connection, such as WiFi or Bluetooth the content identifier to the mobile device 110.

Accordingly, at step S128, the mobile device 110 may receive the content identifier of the data to be transferred from the sender 118 manually e.g. through the user 118 or (semi) automatically from the remote computer 116. At step S130, the interaction server 112 may receive a request for executing the transaction application from the mobile device 110, wherein the request may include the verified target identifier and the content identifier.

At step S132, the interaction server 112 may transmit the request for executing the transaction application to the account server 114. At step S134, the account server 114 may process the transaction application. Processing the transaction application may include identifying a mobile device 110 user account held by the sender 118, e.g. by utilizing log-in data of the sender 118 or by utilizing a unique device identification number of the mobile device 110 utilized by the sender 118. Further, processing the transaction application may include identifying the remote device user account of the target of the transaction application by the target identifier. Further to that, processing the transaction application may include a data transfer of the data identified by the content identifier from the mobile device 110 user account to the remote device user account of the receiver. For example, if the content identifier is an identifier of an amount of money to be transferred, the amount of money may be transferred from the mobile device 110 user account to the remote device user account, i.e. the target user account.

The transfer of the data between the mobile device 110 user account and the remote device user account may be performed immediately. In another embodiment, the transfer of the data may be performed at a later point in time. The data transfer may be irreversible.
In step S136, the interaction server 112 may receive a mobile device 110 processing result from the account server 114, wherein the mobile device 110 processing result may include a notification to be displayed at the mobile device 110 indicating that the data transfer of the data to be transferred between the mobile device 110 user account and the remote device user account has been executed successfully.

At step S138, the mobile device 110 may receive the mobile device 110 processing result and display it on the mobile device 110 display. For example, if the data to be transferred between the mobile device 110 user account and the remote device user account is an amount of money to be transferred between two bank accounts, the mobile device 110 processing result may include the new account balance of the account of the sender 118.

At step S140, the account server 114 may transmit a target processing result to the interaction server 112, wherein the target processing result may include a notification to be displayed at the remote computing device 116, indicating that the data to be transferred between the mobile device 110 user account and the remote device user account has been successfully transferred. At step S142, the interaction server 112 may transmit the target processing result to the remote computing device 116. Accordingly, at step S144, the remote computing device 116 may display the notification to be displayed on its display.

Steps S142 and S144 may be carried out in the above order or in a reversed order or simultaneously.

According to an embodiment of the invention, the interaction server 112 may be a push server. According to a further embodiment of the invention, the interaction server 112 and the account server 114 may communicate via a secure communication protocol like for example HTTPS (hypertext transfer protocol secure).

According to a further embodiment of the invention, a unique identifier of the mobile
device 110 may be stored at the interaction server 112 such that whenever the interaction server 112 receives a request from the mobile device 110, the interaction server 112 may transmit the request from the mobile device 110 together with the unique identification number of the mobile device 110 to the account server 114. Accordingly, the account server 114 may be able to identify the mobile device 110 user account.

According to a further embodiment of the invention the sender 118 may be forced to perform a log in procedure by e.g. using an account modification application. Hence, the user may be able to be logged-in via any mobile device 110 to the interaction server 112 because the interaction server 112 can uniquely identify the sender 118 from the log in data.

According to a further embodiment of the invention, steps S136 and S140, i.e. transmitting the target processing result and the mobile device 110 processing result from the account server 114 to the interaction server 112, may be performed simultaneously. In another embodiment, in case the user utilizes the list of favorites, steps S110, S112 and S128 may be performed simultaneously.

In view of the above, the present invention provides the advantage that a data transfer, such as a money transfer from one account to another account, can be completely initiated before the actual data transfer is, i.e. the money transfer, is requested. Hence, once such a request for transfer is made, the request can be processed immediately. Therefore, the computer-implemented method provides the advantage that a money transfer once items to be bought are selected, is faster than a conventional money transfer using a debit card or even using money coins and bills, since only one amount has to be entered by the user 118 and a request button selected. The processing has been prepared by the initiation as described above and the actual transfer is faster than even selecting coins in purse or using a debit card, swiping the same through a reader and entering a pin.

Figure 2 shows a home screen of an exemplary account modification application.
The account modification application may be able to be utilized by any mobile device 110. The home screen includes icon 210 which, if triggered, e.g. by being touched or clicked, may initiate a screen which may be utilized by the sender 118 to perform a QR code scan. As outlined above, the QR code scanner may be utilized in order to scan and/or read out the target. That is, QR codes may be positioned in a store and a user 118 may scan such QR codes using his mobile phone 110 or tablet 110.

Icon 212 represents an icon which, if triggered, may provide a read out to the sender 118 utilizing the account modification application, wherein the readout displays a list of all transactions that have been completed from the mobile device 110 user account. Icon 214 represents an icon which, if triggered, may open a view that may enable the sender 118 utilizing the account modification application to collect money. Accordingly, money may be collected from any remote account, e.g. from a second bank account held by the sender 118, and transferred to the mobile device 110 user account. Icon 216 may, if triggered, be used to initiate a money transfer from the mobile device 110 user account to a remote device user account. Accordingly, icon 216 is the one that would be triggered by the sender 118 if the sender 118 wants to perform the data exchange between his mobile device 110 and a remote computing device 116 as explained above. Icon 218 represents an icon which, if triggered, may initiate a screen that may enable the sender 118 to identify dealers, i.e. targets, that are located nearby. This identification can be based, for example, on GPS (global positioning system) data, on RFID (radio frequency identification) data or on data received from mobile network cell data. Icon 220 represents an icon which, if triggered, may initiate a screen that allows the user to modify the account modification application, wherein the modification includes for example modification of favorites, the selection of a language, the selection of colors etc.

Field 222 represents a read out of the amount of money that may be available on the mobile device 110 user account the sender 118 is holding.

Field 224 represents a read out for an online status of the mobile device 110. The icon which is exemplarily represented as a heart icon may indicate that the mobile
device 110 is connected to the interaction server 112.

**Figure 3** focuses on the two fields which represent the requirements that may have to been met in order to initiate the transaction application operated by the account server 114 as outlined above. The first requirement may be that the amount of money which needs to be transferred be available on the mobile device 110 user account. In a further embodiment, in case the mobile device 110 user account does not have the required amount of money the user may be able to collect the money from another account. In another embodiment, the money transfer may be performed even though there is not enough money on the mobile device 110 user account. The money may then be collected from another account connected to the user. The second requirement for successfully initiating a transaction application operated by the account server 114 may be a connection between the mobile device 110 and the interaction server 112. In another embodiment, an online connection between the mobile device 110 and the interaction server 112 may not be necessary. Accordingly, digital certificates may have to be utilized.

**Figure 4** represents the screen which may be displayed to the user of the mobile device 110 when pressing the icon for initiating a money transfer. In order to successfully initiate the transaction application, which is operated by the account server 114, the user may need to provide a target identifier of a target of the transaction application. Icon 410, if triggered, may allow the user to select the target identifier of a list of favorites. Icon 412, if triggered, may enable the user to enter a telephone number which may be used as target identifier. Icon 414, if triggered, may enable the user to scan a QR code such that the scanned data may be used as target identifier. Icon 416, if triggered, may enable the user to switch back to the home screen of the account modification application as represented in Figure 2. Field 418 represents a readout of the amount of money that may be to be transferred from the mobile device 110 user account to the remote device user account. The fact that no amount of money has been inserted in field 418 may provide the interaction server 112 with the information that it is the request for initiating the transaction application rather than the request for executing the transaction application.
Figure 5 represents the screen which may be displayed to the user after the target authentication data has been transmitted to the mobile device 110. The target authentication data may have been identified by the account server 114 and transmitted from the interaction server 112. Field 510 represents the read out for the user of the amount of money which may be intended to be transferred. Field 512 represents a display for the target authentication data that may have been received at the mobile device 110 as response to the request for initiating the data transfer. Accordingly, the sender 118 is able to verify the target authentication data of the target.

Figure 6 represents the push screen that may be presented as a read out for the target processing result to the user 120 of the remote computing device 116. The display on the remote computing device 116 may be updated at given time intervals, such as e.g. every 5 seconds, every 10 seconds, every 15 seconds, or the like. The interval may be at least 5 seconds and at most 60 seconds.

Field 610 represents a payment which may have been performed more than a predefined period of time ago, for example more than thirty minutes ago. Accordingly, the read out may appear smaller in the screen as the chances that the user of the remote computing device 116 has already perceived the incoming payment are considered to be high. Field 612 represents a payment which may have been performed prior to the predefined period of time ago, for example less than five minutes ago. Accordingly, the field may be represented bigger. Further, only a fixed amount of number of the latest transactions may be displayed on the push screen, e.g. the last 6 transactions. As an example between 1 and 20 latest transactions may be displayed. According to another example between 5 and 15 latest transactions may be displayed. The push screen may be implemented as a news ticker. In the push screen older transactions may be less visible than newer transactions. As an example, older transactions may fade out slowly by reducing color intensity and/or brightness. The user interface may not be utilized for any interactions like canceling a money transfer. However, the remote computing device 116 may utilize a specific
application that enable the user 120 of cancellations of money transactions that have been executed according to the invention as outlined above.

Providing the user 120 of the remote computing device 116 with a screen, which pushes the target processing result to the remote computing device 116 of the target, wherein the result is displayed on the remote computing device 116, may enable an improved man-machine interaction. Conventionally, the user 120 needs to perform a conventional log in into the target's bank account in order to verify whether a payment has been executed or not. Further to that, conventionally, the payment is not performed instantly. Accordingly, the user 120 would not be able to check whether a money transfer has been performed as he would have to wait a certain amount of time for the booking. However, according to the present invention the user 120 is relieved from this problem, as any payment that needs to be performed on the remote device user account is performed on the fly and pushed to the remote computing device 116. Hence, the user of the remote computing device 116 may identify any payment.
Applicant: XCOM AG
"Network server system, method for data exchange, computer program product, interaction server, and computer implemented account modification application "
Our Ref: X 1007WO - hy / mgo

Claims

1. A network server system for data exchange between a mobile device (110) of a sender and a remote computing device (116) of a target, the network server system comprising an interaction server (112) and an account server (114) wherein the interaction server (112) is operable to

5 - receive (S 114) a request, from the mobile device (110), for initiating a transaction application operated by the account server (114), wherein the request contains a target identifier of the target of the transaction application;

- after completion of the initiation, process a request from the mobile device (110) for executing the transaction application, wherein the request (S130) contains a content identifier to be processed by the transaction application;

10 - transmit (S 132) the request for executing the transaction application to the account server (114);

wherein the account server (114) is operable to

15 - execute (S 134) the transaction application and process the content identifier by the transaction application and

- forward (S 140) a target processing result to the interaction server (112)

wherein the interaction server (112) is operable to

20 - forward (S142) the target processing result to the remote computing device (116) of the target.
2. The network server system of claim 1, wherein the interaction server (112) is further operable to transmit (S1 16) the target identifier to the account server (114).

3. The network server system of claim 2, wherein the account server (114) is further operable to process the target identifier; and wherein the interaction server (112) is further operable to receive (S1 18) a response from the account server (114), wherein the response includes target authentication data.

4. The network server system of claim 3, wherein the interaction server (112) is further operable to transmit (S120) the target authentication data to the mobile device (110), wherein transmitting (S120) the target authentication data to the mobile device (110) completes the initiation.

5. The network server system of any one of the preceding claims, wherein the interaction server (112) is further operable to receive (S130), from the mobile device (110), the request for executing the transaction application.

6. The network server system of any one of the preceding claims, wherein the account server (114) is further operable to forward (S136) a mobile device processing result to the interaction server (112), and wherein the interaction server (112) is further operable to forward (S138) the mobile device processing result to the mobile device (110).

7. The network server system of any one of the preceding claims, wherein the interaction server (112) is further operable to authenticate the mobile device (110) prior to receiving (S 114, S 130) a request from the mobile device (110).

8. The network server system of any one of the preceding claims, wherein a mobile device user (118) is holding a mobile device user account residing on the account server (114) and wherein a remote computing device user (120) is holding a remote
device user account residing on the account server (114).

9. The network server system of claim 8, wherein executing (S134) the transaction application includes immediately performing an irreversible data transfer between the mobile device user account and the remote device user account.

10. The network server system of claim 9, wherein the request (S130) for executing the transaction application includes an identifier of the data to be transferred between the mobile device user account and the remote device user account.

11. The network server system of claim 10, wherein the target processing result includes a notification to be displayed at the remote computing device (116), that the data to be transferred between the mobile device user account and the remote device user account has been successfully transferred; and

wherein the mobile device processing result further includes a notification to be displayed at the mobile device (110), that the data transfer of the data to be transferred between the mobile device (110) user account and the remote device user account has been executed.

12. The network server system of any of claims 8 to 11, wherein the data to be transferred includes an amount of money to be transferred; and

wherein the mobile device (110) user account is a bank account; and

wherein the remote device user account is a bank account.

13. The network server system of claim 12, wherein the mobile device (110) is operable to verify whether the mobile device (110) user account has sufficient funds prior to processing the initiation of the data transfer.

14. The network server system of any one of the preceding claims, wherein the interaction server (112) and the account server (114) are communicating (S116,
S118, S132, S136, S140, S142) via a secure communication protocol.

15. The network server system of any one of the preceding claims, wherein the mobile device (110) is using a secure mobile communication protocol; and wherein the mobile device (110) further uses encryption software to encrypt any requests prior to sending the requests to the interaction server (112).

16. The network server system of claim 15, wherein the interaction server (112) comprises decryption software in order to decrypt the encrypted requests received from the mobile device (110).

17. The network server system of any one of the preceding claims, wherein the target identifier includes data scanned from a QR code; and/or wherein the identifier includes data received via a GPS sensor; and/or wherein the identifier includes data received from mobile network cell data.

18. A method for data exchange between a mobile device (110) of a sender and a remote computing device (116) of a target using a network server system, wherein the network server system comprises an interaction server (112) and an account server (114) wherein the method includes the steps of

- receiving (S114), at the interaction server (112), a request, from the mobile device (110), for initiating a transaction application operated by the account server (114), wherein the request contains a target identifier of the target of the transaction application;

- after completion of the initiation, processing a request from the mobile device (110) for executing the transaction application, wherein the request contains a content identifier to be processed by the transaction application;

- transmitting (S132), from interaction server (112), the request for executing the transaction application to the account server (114);

- executing (S134), at the account server (114), the transaction...
application and processing the content identifier by the transaction
application;
- forwarding (S140) a target processing result from the account
server (114) to the interaction server (112);
- forwarding (S142) the target processing result from the
interaction server (112) to the remote computing device (116) of the target

19. A computer program product comprising computer-readable instructions,
which, when loaded and executed on a network server system, cause the network
server system to perform method steps according to claim 18.

20. An interaction server (112) for data exchange between a mobile device
(110) of a sender, a remote computing device (116) of a target and an account server
(114), wherein the interaction server (112) is operable to
- receive (S114) a request, from the mobile device (110), for
initiating a transaction application operated by the account server (114),
wherein the request contains a target identifier of a target of the transaction
application;
- after completion of the initiation, process a request from the
mobile device (110) for executing the transaction application, wherein the
request contains a content identifier to be processed by the transaction
application;
- transmit (S132) the request for executing the transaction
application to the account server (114);
- receive (S140) a target processing result from the account server
(114); and
- forward (S142) the target processing result to the remote
computing device (116) of the target.

21. A computer-implemented account modification application for a mobile
device (110) operated by a user, wherein the account modification application is
operable to perform the following steps:
receive a target identifier of a target;
- transmit (S114), to an interaction server (112), a request for initiating a transaction application, wherein the request contains the target identifier of the target of the account modification;
- receive (S128) at the mobile device from the user, a content identifier;
- transmit (S130), to the interaction server (112), a request for executing a transaction application, wherein the request contains the content identifier;
- receive (S138), from the interaction server (112), a mobile device (110) processing result, wherein the mobile device (110) processing result includes a notification that the transaction application has been executed.

22. The computer-implemented account modification application according to claim 21, wherein the account modification application is operable to perform the following steps:
- receive (S120), from the interaction server (112), a response to the request for initiating the transaction application, wherein the response includes target authentication data;
- display, on the mobile device (110), the target authentication data.
Fig. 3

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Fig. 5
Fig. 6
### A. CLASSIFICATION OF SUBJECT MATTER

**INV.** G06Q20/10  G06Q20/32

According to International Patent Classification (IPC) or to both national classification and IPC

### B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

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### C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Authorized officer: Wolles, Bart
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