

server architecture represents a system having high security for consistency and integrity of the transactions and of the correctness of the settlement of transactions. In addition, the operation server using the two channels for verification is able to monitor the stored value accounts on the mobile phones for the possibility of tampering.

[0218] A robust architecture is presented integrating on-line and off-line transactions unlike the classic prepay, off-line stored value system. The technology described herein includes a central settlement mechanism that supports more flexible scenarios for use in transferring stored value among mobile communication devices, and between carriers of mobile communication devices and merchants. Furthermore, the system is extendable to use both fixed point and mobile communication devices as stored value devices that can interact with the operation server by a variety of communication channels.

[0219] Mobile communication devices as described herein can use both the long-range radio of the telecommunication provider network and short range radio using proximity coupling technology to establish independent channels for communication with the operation server, supporting a wide variety of transactions and applications for transferring value. Furthermore, the architecture supports strong, two-factor security using both the long range and short range communication channels to protect the customers stored value accounts.

[0220] The payment architecture as described herein supports multiple electronic currencies among different business chains, telecom operators, internet service providers, and payment service providers. A 1:1 ratio is shown in several of the preceding embodiments. Different ratios other than 1:1 are also supported to reflect differing underlying contractual payment agreements among the business chains, telecom operators, internet service providers, and payment service providers. The transaction operations server automatically handles the process of currency exchange between multiple currencies issued among different business chains, telecom operators, internet service providers, and payment service providers. Accordingly, the payment architecture supports flexible commerce by allowing a user to add value to a mobile communication device in one business issued electronic currency and perform a transaction using the stored value with a separate business group that issues another electronic currency.

[0221] While the present invention is disclosed by reference to the preferred embodiments and examples detailed above, it is to be understood that these examples are intended in an illustrative rather than in a limiting sense. It is contemplated that modifications and combinations will readily occur to those skilled in the art, which modifications and combinations will be within the spirit of the invention and the scope of the following claims.

What is claimed is:

1. A data processing system supporting mobile payment, comprising:

a transaction operations server with a data processor, including program storage storing programs including instructions executable by the data processor, and having data communication resources supporting a plurality of communication protocols;

said programs being adapted to maintain accounts of stored value in memory accessible by the data processor, and to

authenticate and communicate with a mobile communication device via more than one communication protocol;

said programs including a program adapted to control particular transactions initiated by at least partly wireless communication between 1) a mobile communication device having a stored value represented by data on the mobile communication device and 2) a transaction terminal, including instructions performing:

receiving, at the transaction operations server, a first particular transaction of the mobile communication device, wherein the first transaction adds a first amount of money to the stored value represented by data on the mobile communication device, and wherein the first amount of money is in a first data type representing a first business issued currency honored by a first group of one or more businesses;

receiving, at the transaction operations server, a second particular transaction of the mobile communication device, wherein the second transaction subtracts a second amount of money from the stored value represented by data on the mobile communication device, and wherein the second amount of money is in a second data type representing a second business issued currency honored by a second group of one or more businesses;

exchanging, at the transaction operations server, at least part of the money represented by data on the mobile communication device between the first data type and the second data type.

2. The data processing system of claim 1, wherein said programs include a program including instructions to maintain an accounting database to keep records of a plurality of data types including the first data type and the second data type, each of the plurality of data types representing currency issued by a group of one or more businesses.

3. The data processing system of claim 1, wherein said programs include a program including instructions to maintain an accounting database to keep records of customers of a plurality of providers of communication services for mobile communication devices, the records including billing records to be sent from the data processing system to data processors of the plurality of providers of communication services.

4. The data processing system of claim 1, said programs including a program adapted to perform, for each of the particular transactions:

receiving, at the transaction operations server, a first record of each of the particular transactions from the mobile communication device via a first communication channel through a telephone service provider network;

receiving, at the transaction operations server, a second record of each of the particular transactions from the transaction terminal via a second communications channel through a communication network coupled to the transaction terminal; and

reconciling the first and second records at the transaction server to verify each of the particular transactions.

5. The data processing system of claim 1, wherein said exchanging of the money between the first and second data types is performed at a ratio between the first data type and the second data type, said ratio being 1:1.

6. The data processing system of claim 1, wherein said exchanging of the money between the first and second data