accumulators/counters, their limits and balances. It is not possible for the Display Control to directly access any of the information in the Chip.

Moreover, the architectures of the DCKs in Figures 1 and 2 are not scalable. Their electronic circuitry is designed for specific functions; to provide a new function, such as to temporarily disable information transfer over the contactless interface, would require a change in the electrical and physical configuration of the DCKs.

The DCKs in Figures 1 and 2 both comprise batteries. The battery in each DCK is used to power only the Display Card and not the Chip. The Chip is powered by the point of interaction, POI, terminal, either through the Chip's contacts or by electromagnetic induction through an antenna. A further problem with known DCKs is that their operation is restricted by the technique of powering the Chip.

Summary of the Invention

According to a first aspect of the invention, there is provided a card for providing a plurality of services, the card comprising: an external interface for communication with a terminal external from the card; a Chip comprising one or more servers for storing one or more applications, wherein the Chip is arranged to communicate with the external interface; a user interface for interacting with a user of the card; a micro-terminal for controlling the provision of a plurality of services, wherein the micro-terminal is arranged to communicate with the user interface; and the Chip and micro-terminal are arranged to communicate with each other via an internal interface of the Chip; wherein the micro-terminal is a reconfigurable processor; and the micro-terminal is arranged to provide a new service by performing logical operations only and without changing the electrical configuration of the card.

Herein disclosed is a card for providing one or more services, the card comprising: an external interface for communication with a terminal external from the card; a Chip comprising one or more servers for storing one or more applications, wherein the Chip is arranged to communicate with the external interface; a user interface for interacting with a user of the card; a micro-terminal for controlling the provision of one or more services, wherein the micro-terminal is arranged to communicate with the user interface; and the Chip and micro-terminal are arranged to communicate with each other via an internal interface of the Chip.

Advantageously, the communication between the chip and the micro-terminal allows greatly improved functionality over known cards since the micro-terminal is able to obtain information from within the Chip.

Preferably, the external interface comprises: a contact interface for communication with the external terminal over a non-wireless connection; and/or a contactless interface for wireless communication with the external terminal.

Preferably, the user interface comprises one or more of: a keyboard; a display; and LEDs.

Preferably the Chip is configured to send information to the micro-terminal via the internal interface in response to receiving one or more commands from the micro-terminal.

Preferably, the Chip is configured to send information to the external terminal via the external interface in response to receiving one or more commands from the external terminal.

Preferably, the one or more commands are Command Application Protocol Data Units, C-APDUs, and the information sent in response to receiving the one or more commands are Response Application Protocol Data Units, R-APDUs as per ISO 7814-4.

Preferably, the card further comprises a battery arranged to provide the power supply of both the Chip and the micro-terminal.

~~Preferably~~As mentioned in the first aspect, the micro-terminal is a reconfigurable processor.

Preferably, the Chip comprises a plurality of servers.

Preferably, the Chip comprises an interception application for controlling the operation of the servers of the Chip when providing the services of the micro-terminal.

Preferably, the interception application is arranged between the external interface, the internal interface and the servers of the Chip.

Preferably, the interception application comprises an engine arranged to control logical switching and filtering operations.

Preferably, the Chip has permanent electrical connections to the components of the external interface; and the interception application is configured to logically switch on and off communication between the Chip and the components of the external interface without physically changing the electrical connections to the components of the external interface.

Preferably, the micro-terminal is arranged to send one or more commands to the Chip and to use the information received in one or more responses to provide one or more of the following services: display an account balance of the card; display a log of operations performed by the card; display a one time use password generated by the card; and verify, by the card, a PIN of a user that is input to the user interface of the card.

~~Preferably~~As mentioned in the first aspect, the micro-terminal is arranged to provide a new service by performing logical operations only and without changing the electrical configuration of the card.

Preferably, the new service comprises disabling any of the components of the external or user interfaces of the card, such as disabling contactless communication with the card.

Preferably, a service is provided in response to the user interface of the card receiving a selection of the service from a user.

Brief Description of the Drawings

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows a known architecture of a DCK;

Claims

1. A card for providing ~~one or more~~a plurality of services, the card comprising:

an external interface for communication with a terminal external from the card;

a Chip comprising one or more servers for storing one or more applications, wherein the Chip is arranged to communicate with the external interface;

a user interface for interacting with a user of the card;

a micro-terminal for controlling the provision of ~~one or more~~a plurality of services, wherein the micro-terminal is arranged to communicate with the user interface; and

the Chip and micro-terminal are arranged to communicate with each other via an internal interface of the Chip;

wherein the micro-terminal is a reconfigurable processor; and

the micro-terminal is arranged to provide a new service by performing logical operations only and without changing the electrical configuration of the card.

2. The card of claim 1, wherein the external interface comprises:

a contact interface for communication with the external terminal over a non-wireless connection; and/or

a contactless interface for wireless communication with the external terminal.

3. The card according to claim 1 or 2, wherein the user interface comprises one or more of:

a keyboard;

a display; and

LEDs.

4. The card according to any preceding claim, wherein the Chip is configured to send information to the micro-terminal via the internal interface in response to receiving one or more commands from the micro-terminal.

5. The card according to any preceding claim, wherein the Chip is configured to send information to the external terminal via the external interface in response to receiving one or more commands from the external terminal.

6. The card according to any of claims 4 or 5, wherein the one or more commands are Command Application Protocol Data Units, C-APDUs, and the information sent in response to receiving the one or more commands are Response Application Protocol Data Units, R-APDUs.

7. The card according to any preceding claim, further comprising a battery arranged to provide the power supply of the Chip, the micro-terminal and the user interface.

~~8. The card according to any preceding claim, wherein the micro-terminal is a reconfigurable processor.~~

~~9~~8. The card according to any preceding claim, wherein the Chip comprises a plurality of servers.

~~10~~9. The card according to claim ~~9~~8, wherein the Chip comprises an interception application for controlling the operation of the servers of the Chip when providing the services of the micro-terminal.

~~11~~10. The card according to claim ~~10~~9, wherein the interception application is arranged between the external interface, the internal interface and the servers of the Chip.

~~12~~11. The card according to claim ~~10~~9 or ~~11~~10, wherein the interception application comprises an engine arranged to control logical switching and filtering operations.

~~13~~12. The card according to any of claims ~~10~~9 to ~~12~~11, wherein:

the Chip has permanent electrical connections to the components of the external interface; and

the interception application is configured to logically switch on and off communication between the Chip and the components of the external interface without ~~physically~~ changing the electrical ~~connections to the components of the external interface~~ configuration of the card.

~~14~~13. The card according to any preceding claim, wherein the micro-terminal is arranged to send one or more commands to the Chip and to use the information received in one or more responses to provide one or more of the following services:

display an account balance of the card;

display a log of operations performed by the card;

display a one time use password generated by the card; and

verify, by the card, a PIN of a user that is input to the user interface the card.

~~15. The card according to any preceding claim, wherein the micro-terminal is arranged to provide a new service by performing logical operations only and without changing the electrical configuration of the card.~~

~~16~~14. The card according to any preceding claim ~~15~~, wherein the new service comprises disabling any of the components of the external or user interfaces of the card, such as disabling contactless communication with the card.

~~17~~15. The card according to any of claims ~~14 to 16~~13 or 14, wherein the card is arranged to provide a service in response to the user interface receiving a selection of the service from a user.