Consumer Access Device

The present invention relates to a consumer access device (CAD) for use with at least one smart utility meter or other usage measuring device, a home area network utilising the CAD and to methods of operating the CAD.

Consumer access devices are known to be provided to domestic utility consumers to inform them of their current energy consumption and also communicate some data to the cloud. In more sophisticated cases they can also inform a consumer when a cheaper tariff is available. CADs should not be confused with in-home displays (IHD) that simply display locally-acquired data regarding energy consumption on the premises.

However, the display on such devices (both CADs and IHDs) is usually limited to showing various, rather dry, facts and takes no account of a consumer's particular interests or how best to display their consumption data to them. Consequently, the consumer is unlikely to engage meaningfully with the information and take any beneficial steps that may be available.

Security concerns over treatment of consumer data and cost of CADs has hampered innovation in this field.

It is an object of the present invention to ameliorate these problems.

Aspects of the invention are defined in the independent claims. Some optional features of the invention are defined in the dependent claims.

According to a first aspect of the present invention, there is provided a consumer access device for a smart energy system, the consumer access device comprising:

a processor,

first memory for storing a plurality of applications,

second memory for secure storage of consumer utility usage,

first communication means for receiving secure data representing utility usage, and

second communication means for communicating with at least one server to download at least new applications for the consumer access device, the processor being programmed to store secure data representing utility usage via the first communication means in the second memory,

the processor also being programmed to download a plurality of applications to the first memory and to execute applications stored in the first memory,

CLAIMS

1. A consumer access device for a smart energy system, the consumer access device comprising:

a processor,

first memory for storing a plurality of applications,

second memory for secure storage of data representing consumer utility usage,

first communication means for communicating with a domestic smart meter to receive secure data representing utility usage from the domestic smart meter, and

second communication means for communicating with at least one server to download at least new applications for the consumer access device,

the processor being programmed to store secure data representing utility usage received via the first communication means in the second memory,

the processor also being programmed to download a plurality of applications to the first memory and to execute applications stored in the first memory,

the processor further being programmed in response to a request for secure data from an application, to provide the secure data from the second memory to the first memory for use by the application.

2. A consumer access device as claimed in claim 1, further comprising a display.

3. A consumer access device as claimed in claim 1 or claim 2, wherein the processor is further programmed to pair with at least one user device to provide a user interface.

4. A consumer access device as claimed in claim 3, wherein the processor is further programmed only to transmit secure data representing utility usage to the user device in encrypted form.

5. A consumer access device as claimed in claim 3 or claim 4, wherein the processor is further programmed to pair with at least two user devices to provide user interfaces.

6. A consumer access device as claimed in claim 5, wherein the processor is further programmed to limit functionality of at least one of the user devices.

7. A consumer access device as claimed in any one of the claims 1 to 6, further comprising a third communication means comprising a short range wireless transceiver.

8. A consumer access device as claimed in claim 7 wherein the third communication means comprises a Bluetooth™ transceiver.

9. A consumer access device as claimed in any one of the claims 1 to 8, wherein the processor is programmed to provide the secure data to an application using a public/private key pair.

10. A consumer access device as claimed in any one of the claims 1 to 9, wherein the first communication means comprises a ZigBee™ transceiver.

11. A consumer access device as claimed in any one of the claims 1 to 10, wherein the second communication means comprises a WiFi™ transceiver.

12. A consumer access device as claimed in any one of the claims 1 to 11, further comprising a fourth communication means for communicating with appliances.

13. A consumer access device as claimed in claim 12, wherein the fourth communication means comprises a Machine-to-Machine transceiver.

14. A consumer access device as claimed in claim 12, wherein the fourth communication means comprises a powerline transceiver.

15. A consumer access device as claimed in any one of the claims 1 to 14, wherein the processor is further programmed to receive data representing usage of more than one utility.

16. A consumer access device as claimed in any one of the claims 1 to 15, wherein the processor is programmed to execute a plurality of applications in succession.

17. A consumer access device as claimed in claim 16, wherein the processor is programmed to execute successive applications after a predetermined time.

18. A consumer access device as claimed in any one of the claims 1 to 16, wherein the processor is programmed to execute one or more of the plurality of applications automatically and to execute one or more further applications on consumer request.

19. A home area network comprising at least one smart meter, a consumer access device as claimed in any one of the claims 1 to 18, and a user device, the at least one smart meter arranged to transmit data representing utility usage to the consumer access device in encrypted form, and the consumer access device and the user device being arranged to interact via a server.

20. A method of operating a consumer access device as claimed in any one of the claims 1 to 18, the method comprising:

sending a request, by the processor under control of one of the plurality of applications, for secure data representing utility usage stored in the second memory,

receiving the request, by the processor under control of secure software, for the secure data,

verifying the request, by the processor under control of secure software, to ensure that the one of the plurality of applications is entitled to the requested secure data, and

sending, by the processor under control of secure software, the requested secure data to the one of the plurality of applications.

21. A method of operating a consumer access device as claimed in claim 20, wherein the step of sending the requested secure data comprises storing the secure data in a container in the first memory, which container is unique to the one of the plurality of applications.

22. A method of operating a consumer access device as claimed in claim 20 or claim 21, the method further comprising abstracting the secure data representing utility usage before sending the data to the one of the plurality of applications.

23. A method of downloading an application to a consumer access device as claimed in any one of the claims 1 to 18, the method comprising:

receiving a request, by a message from a user device to a server, for an application software to be downloaded,

receiving, at the consumer access device, the application software from a server,

installing, at the consumer access device, the application software, and

sending, for receipt at the user device, confirmation of the installation.

24. A method of pairing a consumer access device as claimed in any one of the claims 1 to 18 with a user device, the method comprising:

receiving a message, from the user device at a server, requesting that the user device be paired with the consumer access device,

sending, to the user device, a reply from the server, the reply instructing user activation of the consumer access device,

sending, by the consumer access device, at least one message to the user device,

receiving, from the user device, at least one message at the consumer access device,

sending, to the user device, the at least one message from the consumer access device,

receiving, at the consumer access device, the at least one message from the user device,

storing, at the consumer access device, pairing information received from the user device, and

sending, for storing at the user device, pairing information from the consumer access device.

25. A method of pairing a consumer access device as claimed in any one of the claims 1 to 18 with a user device, the method comprising:

receiving, at a server, a message from the user device, the message requesting that the user device be paired with an identified consumer access device,

confirming, at the server, that the user device is associated with the same consumer as the identified consumer access device, and

storing, at the server, pairing information for the user device and the identified consumer access device.