CLAIMS

1. A package delivery and collection system for use with a plurality of wireless communication devices communicating via a communications network, the system comprising:

a plurality of locker assemblies;

each locker assembly comprising a plurality of lockers;

each locker including a door and a lock unit, the lock unit including a lock, the lock being operable to lock the door to secure a package inside the locker and to unlock the door to permit the package to be removed from the locker;

a central computer system;

and a program running on each of said devices, wherein each respective program is an instance of a delivery program or a collection program or a combined delivery and collection program;

each lock unit further including a processor and a short range wireless communication means for communicating with each of said devices when proximate the lock unit;

each lock unit having at least one validation code unique to said lock unit, the validation code being available to the central computer system;

the processor being configured to receive via the communication means an access request from the program running on one of said devices proximate the lock unit,

and to validate the access request based on at least the validation code,

and responsive to at least successful validation of the access request, to initiate an event including unlocking the locker door to allow access to the locker,

the event being one of a delivery event during which a package is delivered to the locker, and a collection event during which a package is collected from the locker;

wherein the plurality of lockers of each locker assembly are grouped together so that the communication means of each of the plurality of lockers can communicate with said one of the devices when proximate the lock unit of any one of the plurality of lockers;

wherein the access request is based on an enabling message generated by the central computer system and transmitted via the communications network in modified or unmodified form, directly or indirectly to said device,

the central computer system being arranged to generate the enabling message by reference to the at least one validation code for the respective lock unit;

and characterised in that

each lock unit includes a memory,

and the processor is arranged to store in the memory, event details of at least said delivery events or said collection events initiated by the lock unit responsive to successfully validating access requests from any of said devices;

and after terminating a communication session with a respective one of the devices during which an access request initiating an event was received, to transmit the event details of said event stored in the memory, via the communication means, during a subsequent communication session, to one or more of said devices not limited to said respective one of the devices from which the access request initiating said event was received;

and the program is arranged to transmit said event details, when received from the communication means, via the communications network in modified or unmodified form, directly or indirectly to the central computer system.

2. A system according to claim 1, wherein the processor is arranged to transmit the event details of each event during more than one said subsequent communication session;

and the central computer system is arranged to compare, for each locker, a plurality of event details received from the devices for the same locker and to identify an anomalous event condition responsive to receiving inconsistent event details for the same locker.

3. A system according to claim 2, wherein the processor is configured to change the validation code responsive to a change code message generated by the central computer system,

and the central computer system is configured to send the change code message to the lock, in modified or unmodified form, directly or indirectly via the program running on one or more of said devices responsive to identifying said anomalous event condition.

4. A system according to claim 1, wherein the program is configured to include at least in each access request for a collection event or in each access request for a delivery event a device identifier or user identifier unique to the respective device or the user of the device on which the program is running, and the event details for each said event include at least the device identifier or user identifier of the device or the user of the device from which the respective access request was received.

5. A system according to claim 1, wherein the program is configured to include in the access request for each delivery event a package ID unique to a package, the package ID being received via an input means of the respective device on which the program is running;

and the lock unit is configured, on successfully validating the access request for a delivery event and unlocking and re-locking the respective door, to include the package ID in the event details stored in the memory of the lock unit in respect of said delivery event,

and to transmit the event details of each delivery event, including said package ID, during said subsequent communication session, to said one or more of said devices.

6. A system according to claim 1, wherein each lock unit includes a battery for powering the lock unit, and the processor is configured to include an indication of a status of the battery in the event details transmitted in said subsequent communication session to said one or more of the devices.

7. A system according to claim 1, wherein the processor is arranged to transmit said event details to a respective one of the devices, during said subsequent communication session, responsive to the processor successfully validating an access request from said respective one of the devices.

8. A system according to claim 1, wherein the program is configured to initiate a said communication session by transmitting a locker status enquiry via the respective device on which the program is running to each of a plurality of lock units proximate the device;

and each lock unit is configured, responsive to receiving the locker status enquiry from a device proximate said lock unit, to generate and transmit to said device, via the communication means, a locker status response indicating a status of the respective locker;

and the program is further configured to transmit the access request to a selected one of said lock units from which a locker status response was received.

9. A system according to claim 8, wherein the program is configured, responsive to receiving a locker status response from each of one or more lock units, to communicate an indication of the status of each of said one or more lock units as indicated in the respective locker status response, directly or indirectly to the central computer system via the communications network.

10. A system according to claim 9, wherein each lock unit includes a battery for powering the lock unit, and the processor is configured to include an indication of a status of the battery in the locker status response.

11. A system according to claim 8, wherein the program is configured to include in the access request for each delivery event a package ID unique to a package, the package ID being received via an input means of the respective device on which the program is running;

and the lock unit is configured, on successfully validating the access request for a delivery event and unlocking and re-locking the respective door, to include the package ID in the event details stored in the memory of the lock unit in respect of said delivery event;

and if, when a locker status enquiry is received by a respective lock unit, the last event for said lock unit was a delivery event, then the locker status response includes the package ID stored in the memory in respect of said delivery event;

and the program is configured, responsive to receiving a locker status response including a package ID from each of one or more lock units for which the last event was a delivery event, to communicate an indication of the status of the locker of each of said one or more lock units, including the respective package ID as indicated in the respective locker status response, in modified or unmodified form, directly or indirectly to the central computer system via the communications network.

12. A system according to claim 1, wherein the lock is configured to change the validation code responsive at least to a change code message generated by the central computer system, and the central computer system is configured to send the change code message in modified or unmodified form, directly or indirectly to the lock via the program running on one or more of said devices.

13. A system according to claim 12, wherein the change code message includes a new validation code, and the lock unit is configured to replace the validation code with the new validation code responsive at least to receiving the change code message;

and the lock unit includes a second validation code unique to the lock unit, the second validation code being available to the central computer system but not to the program,

and the new validation code is encrypted by the central computer system based on the second validation code and decrypted by the processor but not by the program.

14. A system according to claim 1, wherein the processor is arranged to transmit to the program running on a respective one of said devices, via the communication means, during a communication session with said device, after successfully validating an access request from said device during said communication session, event details of an event initiated by the lock unit responsive to said access request, said event including unlocking the respective locker door;

and the program is arranged to transmit said event details, when received from the communication means, directly or indirectly, in modified or unmodified form, via the communications network to the central computer system.

15 A system according to claim 1, wherein the processor is arranged to transmit to the program running on a respective one of said devices, via the communication means, during a communication session with said device, after successfully validating an access request from said device during said communication session, event details of a delivery event initiated by the lock unit responsive to said access request, said delivery event including unlocking the respective locker door to receive a package;

and the program is arranged to transmit, responsive to receiving said event details, in modified or unmodified form, directly or indirectly via the communications network to the central computer system, a package ID unique to said package, the package ID being received via an input means of the respective device on which the program is running.

16. A system according to claim 1, wherein the central computer system includes a database having:

a list of package IDs, each package ID uniquely identifying a package to be delivered to a customer via one of the lockers, and

a list of device identifiers or user identifiers, each device identifier or user identifier uniquely identifying a respective one of the devices or the user of a respective one of the devices;

each package ID being associated with the device identifier or user identifier of a respective one of the devices or the user of a respective one of the devices to be used to collect the respective package in a collection event after delivery to one of the lockers;

and the lock unit is configured, on receiving in a communication session with one of said devices an access request for a delivery event, and successfully validating the access request and unlocking and re-locking the respective door to receive a package in the respective locker in said delivery event, to transmit, via the communication means, delivery event details of the delivery event to at least one of :

- said one of the devices from which the access request initiating the delivery event was received, during said communication session, and

- another one of the devices with which said lock unit establishes a further communication session after terminating said communication session during which said access request was received;

and the program running on the device to which the delivery event details are transmitted is arranged to transmit said delivery event details, when received from the communication means, directly or indirectly, in modified or unmodified form, via the communications network to the central computer system;

and the central computer system is configured, responsive to receiving said delivery event details from the program, to identify the device identifier of the respective device, or the user identifier of the user of the respective device, associated with the respective package,

and to generate and transmit either directly or indirectly to said device, via the communications network, a further enabling message by reference to the respective validation code for the respective lock unit from which the delivery event details of the delivery event were transmitted.

17. A system according to claim 16, wherein the delivery event details include the device identifier of the device, or the user identifier of the user of the device, from which the access request initiating the delivery event was received.

18. A system according to claim 16, wherein the program running on the device from which the access request for the delivery event is received is configured to receive, for each said delivery event, via input means of the device on which the program is running, the package ID of the package to be delivered,

and the central computer system is configured to receive said package ID included in modified or unmodified form with the delivery event details transmitted via the

communications network from the program running on the device to which the delivery event details are transmitted by the communication means of the lock unit.

19. A system according to claim 18, wherein the lock unit is configured to transmit said delivery event details to said one of the devices from which the access request initiating the delivery event is received, during said communication session during which the access request initiating the delivery event is received;

and said one of the devices from which the access request initiating the delivery event was received is configured to transmit the delivery event details together with the package ID, directly or indirectly, in modified or unmodified form, to the central computer system.

20. A system according to claim 18, wherein said one of the devices from which the access request initiating the delivery event is received is configured to transmit the package ID, in modified or unmodified form, during said communication session during which the access request initiating the delivery event is received, to the lock unit;

and the lock unit is configured to store the delivery event details including the package ID in a memory,

and to transmit the delivery event details including the package ID to said another one of the devices during said further communication session;

and the program running on said another one of the devices is configured to transmit the delivery event details including the package ID, in modified or unmodified form, directly or indirectly, via the communications network to the central computer system.

21. A system according to claim 1, wherein the central computer system includes a database having:

a list of device identifiers or user identifiers, each device identifier or user identifier uniquely identifying a respective one of the devices or a user of a respective one of the devices,

a list of package IDs, each package ID uniquely identifying a respective package contained in a respective one of the lockers following a respective delivery event, and

a list of product IDs, each product ID uniquely identifying a respective product type;

each product ID being associated with one or more package IDs;

each package ID being associated with a respective product ID and with the authorisation code of the respective one of the lockers containing the package;

and the central computer system is configured to receive a request from a customer for a product type having a respective product ID, said request or said customer being associated with a respective one of the device identifiers or user identifiers,

and responsive to the request to select a respective one of the package IDs associated with the requested product ID,

and to generate the enabling message based on the authorisation code associated with the respective package ID,

and to send the enabling message, via the communications network, either directly or indirectly to the respective device associated with the respective user identifier or device identifier which is associated with said request or said customer.

22. A system according to claim 21, wherein for each delivery event in which the package comprises a re-usable product which is delivered to the respective locker, the program is configured to receive, via an input means of the device on which the program is running, a condition indication indicating whether the product is undamaged;

and the central computer system is configured to receive the condition indication transmitted, directly or indirectly, in modified or unmodified form, via the communications network from the program running on one or more respective ones of the devices,

and responsive to said request, to select said respective one of the package IDs for which the associated condition indication indicates that the product is undamaged.

23. A system according to claim 21, wherein for each delivery event in which the package comprises a re-usable product which is delivered to the respective locker, the program is configured to receive, via an input means of the device on which the program is running, a package ID of the package together with a condition indication indicating whether the product is undamaged;

and the central computer system is configured to receive the package ID and the condition indication transmitted, directly or indirectly, in modified or unmodified form, via the communications network from the program running on one or more respective ones of the devices,

and responsive to said request, to select said respective one of the package IDs for which the associated condition indication indicates that the product is undamaged.

24. A system according to claim 1, wherein the lock units and the central computer system are configured to provide communication of data between each lock unit and the central computer system via the program running on a respective one of the devices, wherein the communication is encrypted so that the data is not available to the respective device or to the program running on the device.

25. A method of operating a package delivery and collection system for use with a plurality of wireless communication devices communicating via a communications network, the system comprising:

a plurality of locker assemblies;

each locker assembly comprising a plurality of lockers;

each locker including a door and a lock unit, the lock unit including a lock, the lock being operable to lock the door to secure a package inside the locker and to unlock the door to permit the package to be removed from the locker;

a central computer system;

and a program running on each of said devices, wherein each respective program is an instance of a delivery program or a collection program or a combined delivery and collection program;

each lock unit further including a processor, a memory, and a short range wireless communication means for communicating with each of said devices when proximate the lock unit;

each lock unit having at least one validation code unique to said lock unit, the validation code being available to the central computer system;

the method comprising:

receiving, by the processor, via the communication means, an access request from the program running on one of said devices proximate the lock unit;

validating, by the processor, the access request based on at least the validation code;

and responsive to at least successful validation of the access request, initiating, by the processor, an event including unlocking the locker door to allow access to the locker,

the event being one of a delivery event during which a package is delivered to the locker, and a collection event during which a package is collected from the locker;

wherein the plurality of lockers of each locker assembly are grouped together so that the communication means of each of the plurality of lockers can communicate with said one of the devices when proximate the lock unit of any one of the plurality of lockers;

wherein the access request is based on an enabling message generated by the central computer system and transmitted via the communications network in modified or unmodified form, directly or indirectly to said device,

the central computer system being arranged to generate the enabling message by reference to the at least one validation code for the respective lock unit;

and characterised by

storing in the memory, by the processor, event details of at least said delivery events or said collection events initiated by the lock unit responsive to successfully validating access requests from any of said devices;

and after terminating a communication session with a respective one of the devices during which an access request initiating an event was received, transmitting the event details of said event stored in the memory, via the communication means, during a subsequent communication session, to one or more of said devices not limited to said respective one of the devices from which the access request initiating said event was received;

and then,

when said event details are received from the communication means, transmitting said event details, by the program, via the communications network in modified or unmodified form, directly or indirectly to the central computer system.