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(54) **MULTI-MODAL ACCESS POLICY ENFORCEMENT**

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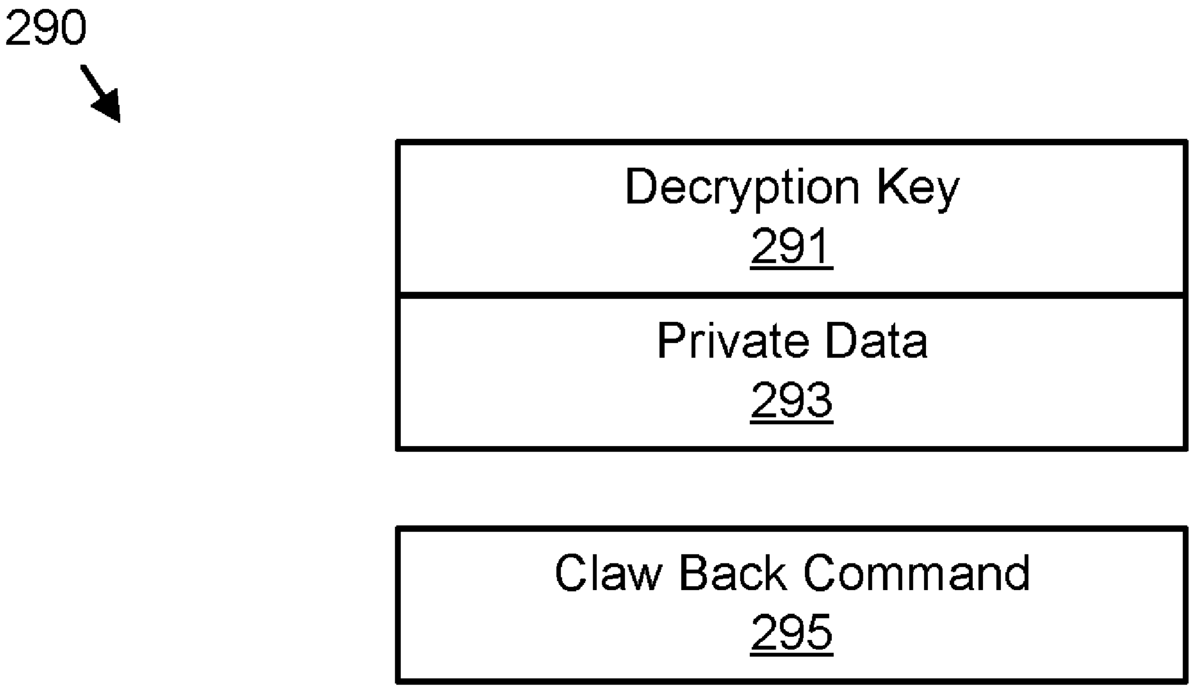
(57) **ABSTRACT**

For access policy enforcement, a method restricts access to a decryption key for private data on an electronic device. The private data is encrypted and includes group communications. The method determines an electronic device profile that includes a device time and a device location of the electronic device. The method releases the decryption key in response to the electronic device profile satisfying an access policy. The method decrypts the private data using the decryption key.



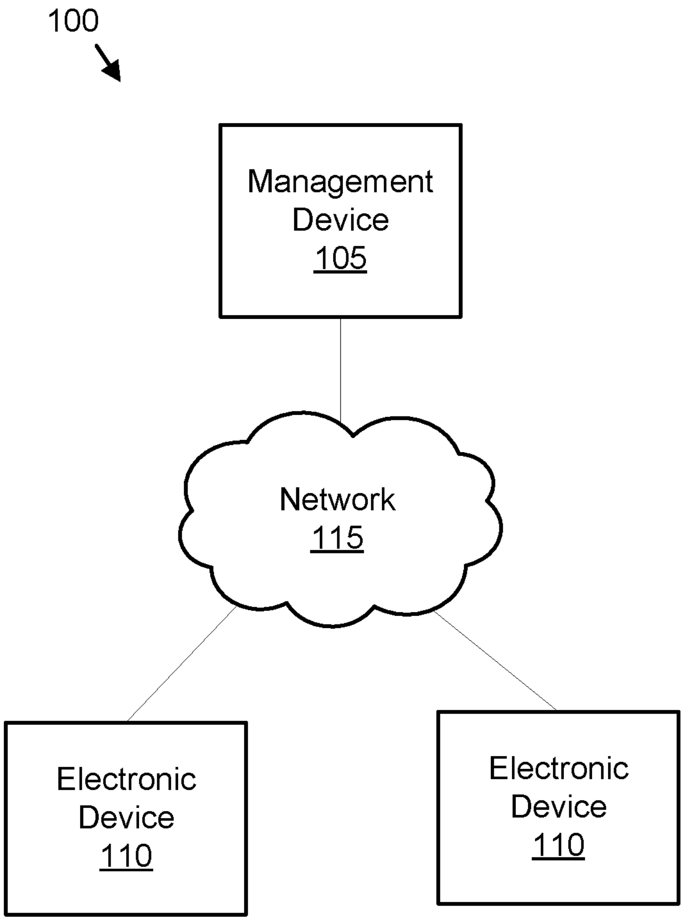

100
Management Device 105
Network 115
Electronic Device 110
Electronic Device 110

FIG. 1A

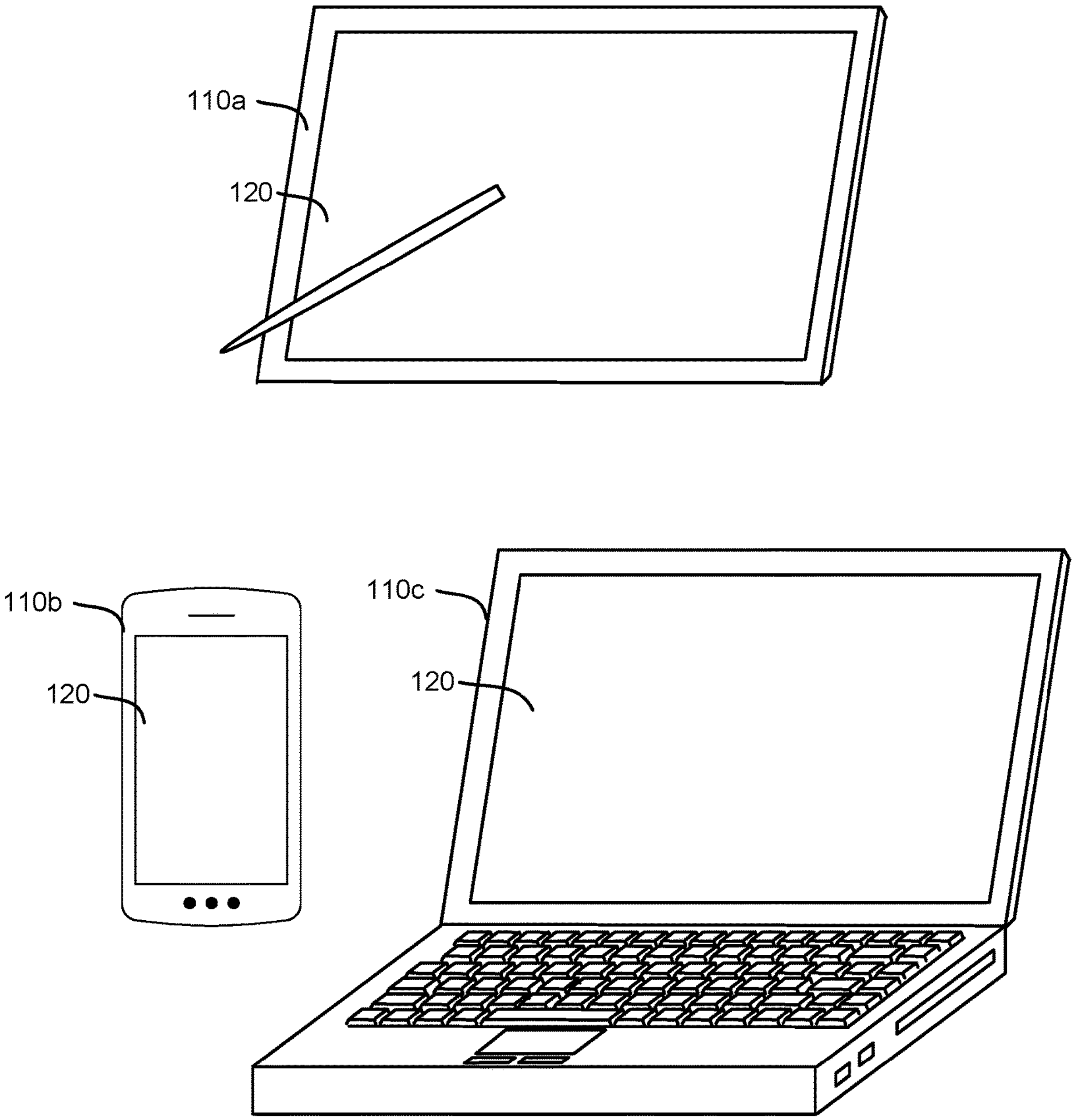


FIG. 1B

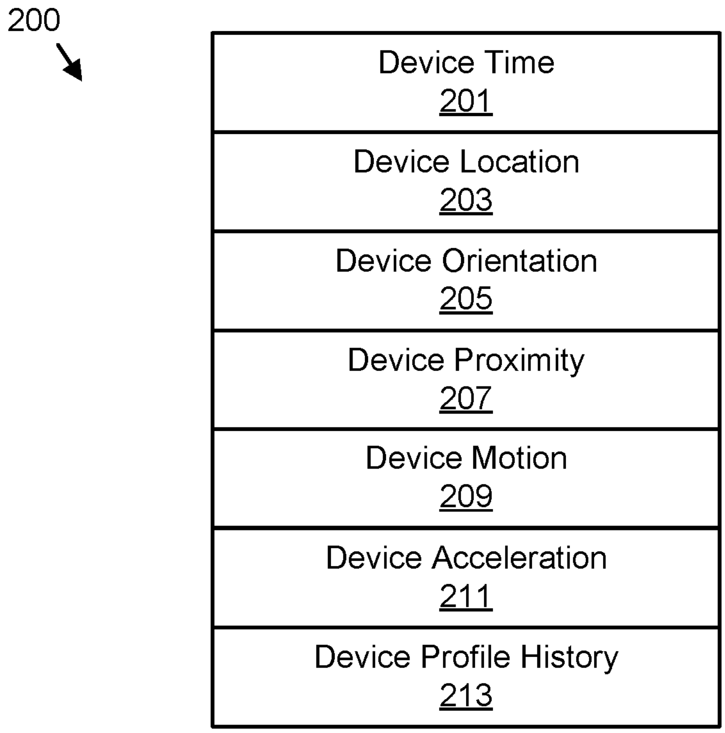

200
Device Time
201
Device Location
203
Device Orientation
205
Device Proximity
207
Device Motion
209
Device Acceleration
211
Device Profile History
213

FIG. 2A

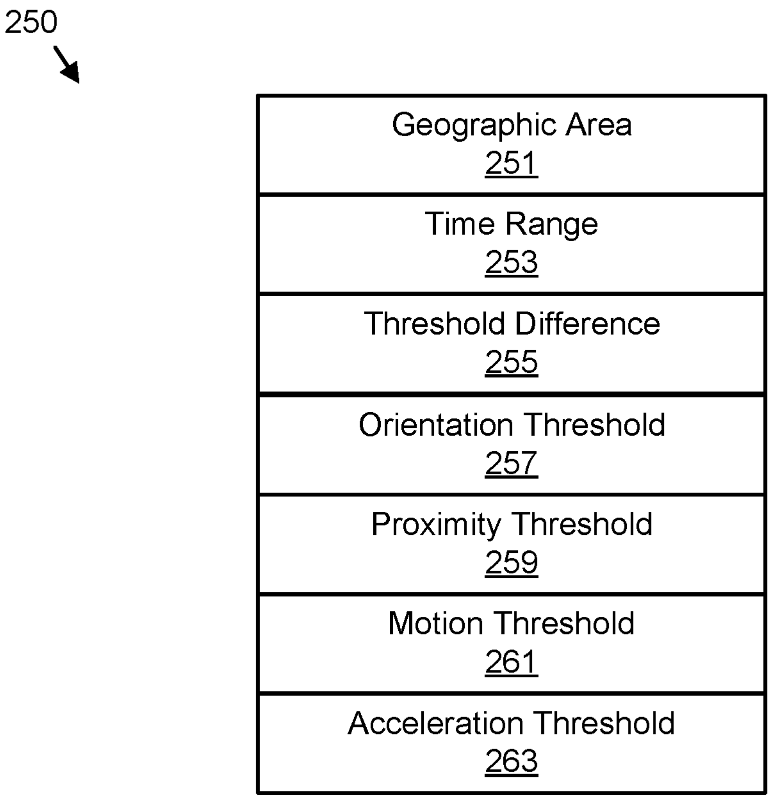

250
Geographic Area
251
Time Range
253
Threshold Difference
255
Orientation Threshold
257
Proximity Threshold
259
Motion Threshold
261
Acceleration Threshold
263

FIG. 2B

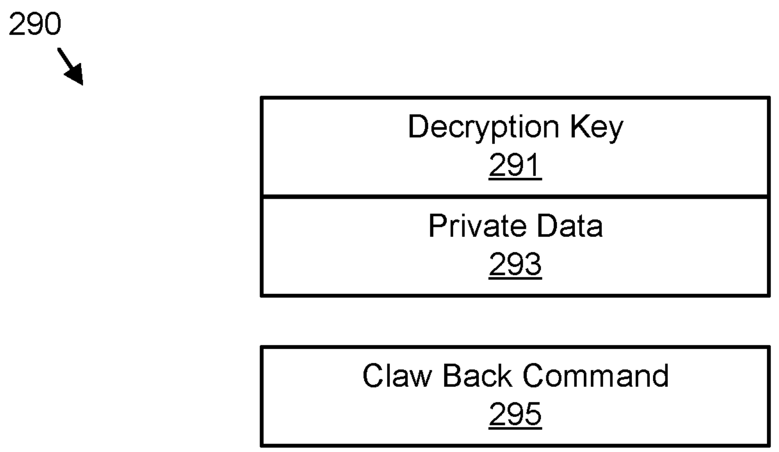
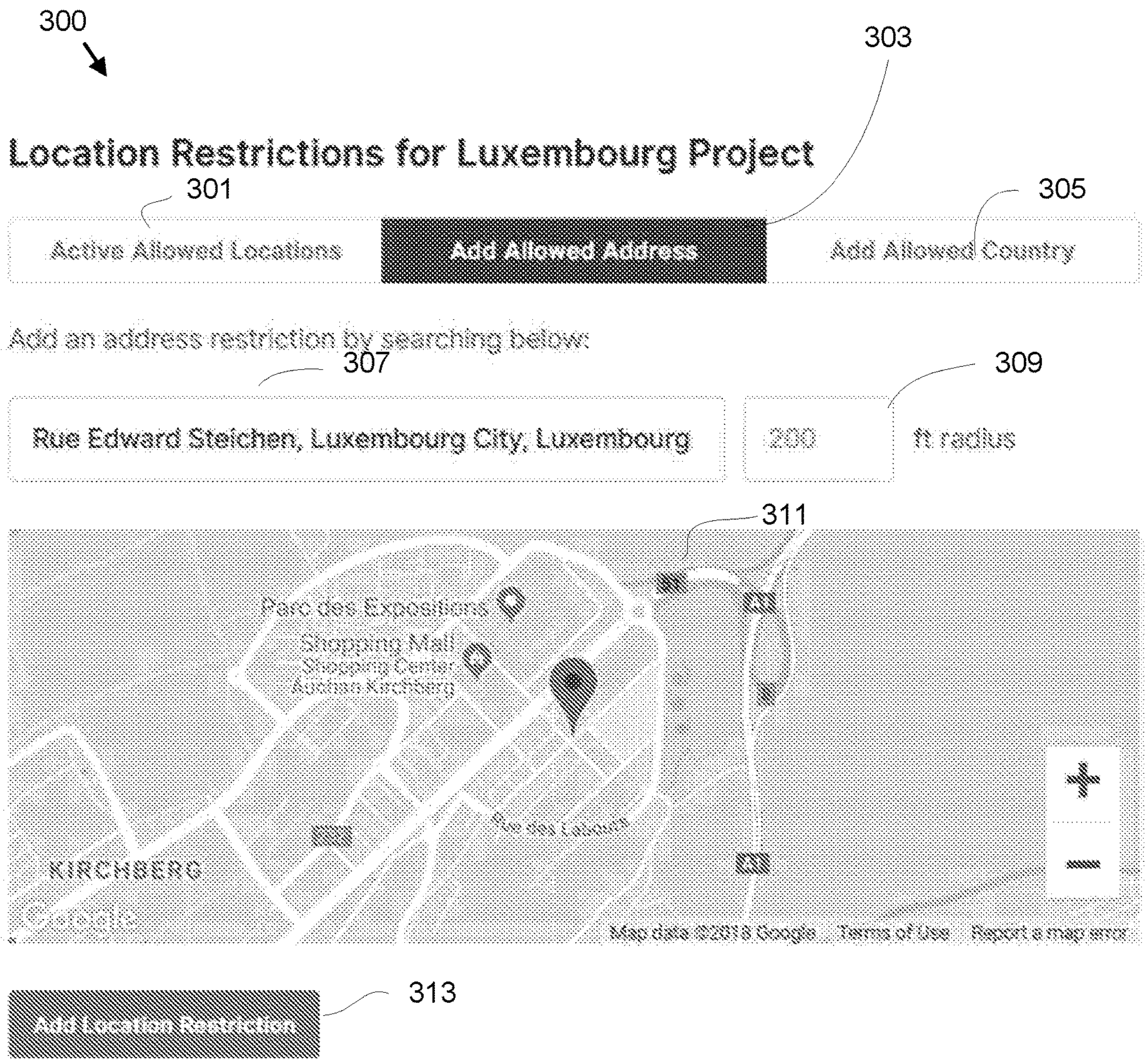

290
Decryption Key
291
Private Data
293
Claw Back Command
295

FIG. 2C



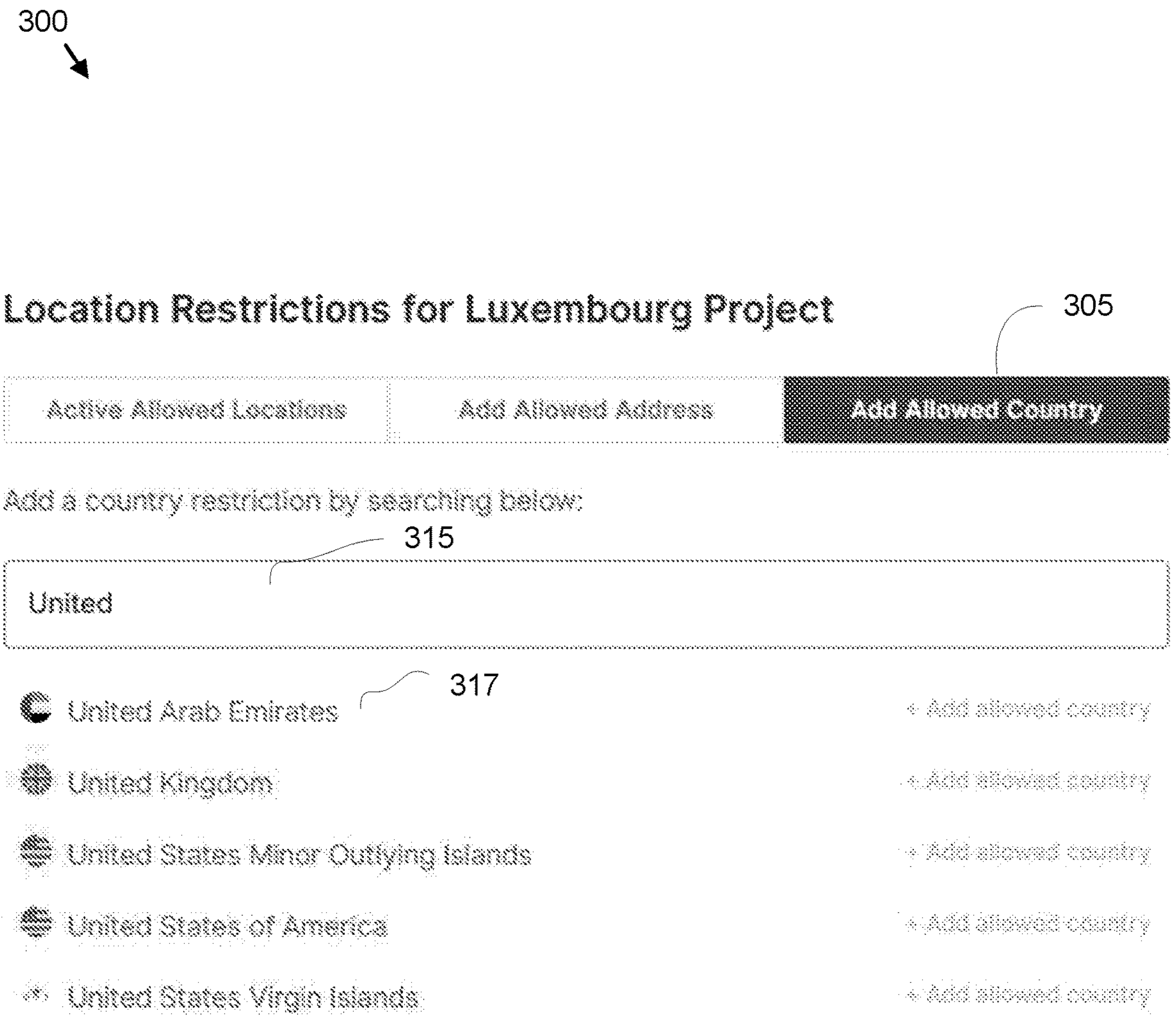
Location Restrictions for Luxembourg Project

Add an address restriction by searching below:

Rue Edward Steichen, Luxembourg City, Luxembourg

200 ft radius

FIG. 3A



Location Restrictions for Luxembourg Project

Add a country restriction by searching below:

United

United Arab Emirates

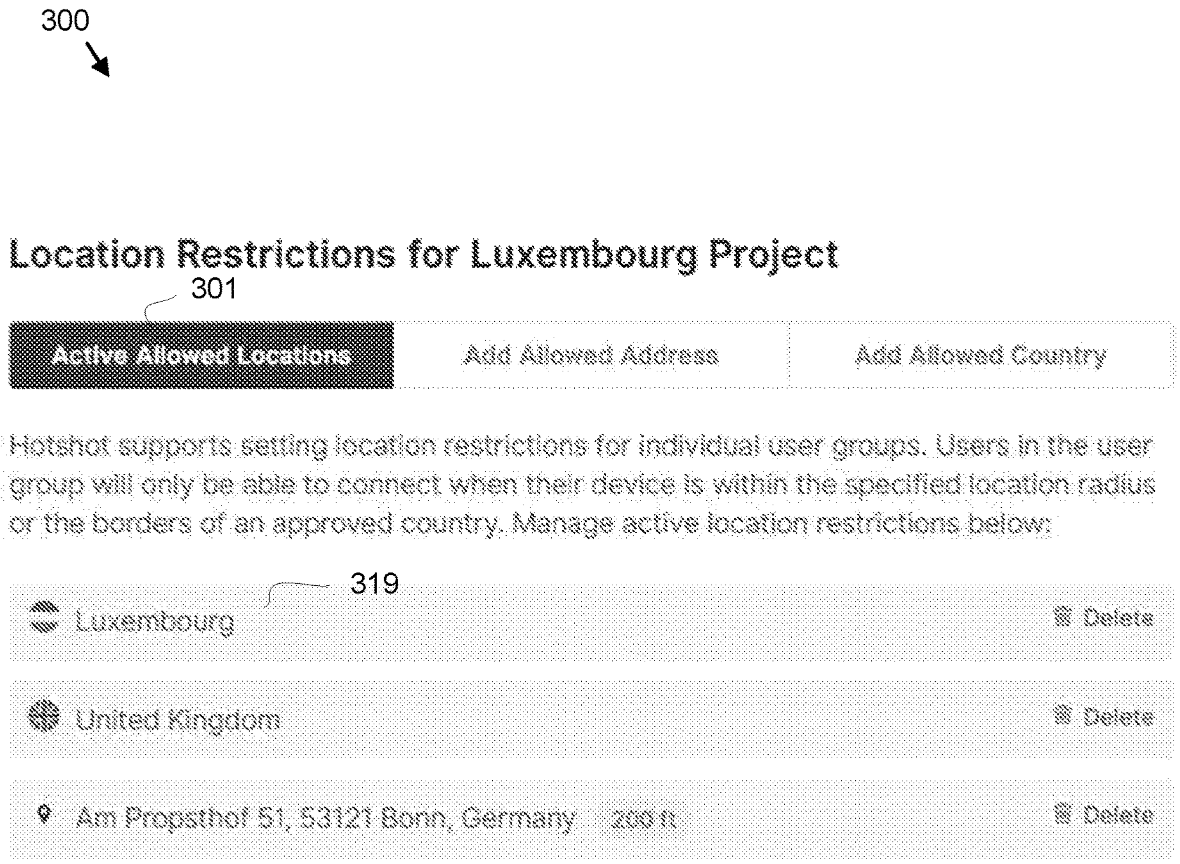
United Kingdom

United States Minor Outlying Islands

United States of America

United States Virgin Islands

FIG. 3B



Location Restrictions for Luxembourg Project

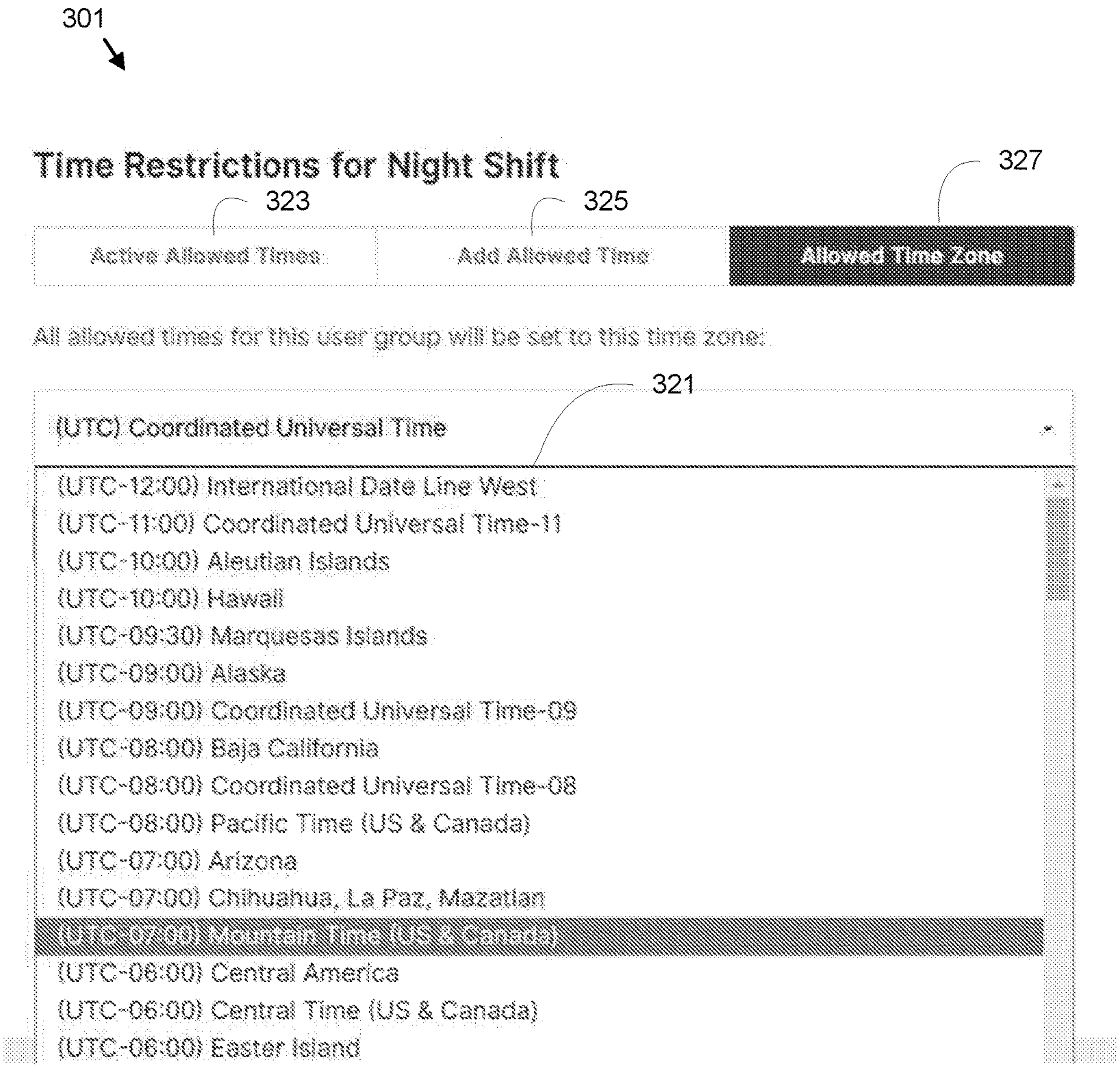
Hotshot supports setting location restrictions for individual user groups. Users in the user group will only be able to connect when their device is within the specified location radius or the borders of an approved country. Manage active location restrictions below:

Luxembourg

United Kingdom

Am Propsthof 51, 53121 Bonn, Germany 200 ft

FIG. 3C



Time Restrictions for Night Shift

All allowed times for this user group will be set to this time zone:

(UTC) Coordinated Universal Time

(UTC-12:00) International Date Line West
(UTC-11:00) Coordinated Universal Time-11
(UTC-10:00) Aleutian Islands
(UTC-10:00) Hawaii
(UTC-09:30) Marquesas Islands
(UTC-09:00) Alaska
(UTC-09:00) Coordinated Universal Time-09
(UTC-08:00) Baja California
(UTC-08:00) Coordinated Universal Time-08
(UTC-08:00) Pacific Time (US & Canada)
(UTC-07:00) Arizona
(UTC-07:00) Chihuahua, La Paz, Mazatlan
(UTC-07:00) Mountain Time (US & Canada)
(UTC-06:00) Central America
(UTC-06:00) Central Time (US & Canada)
(UTC-06:00) Easter Island

FIG. 3D

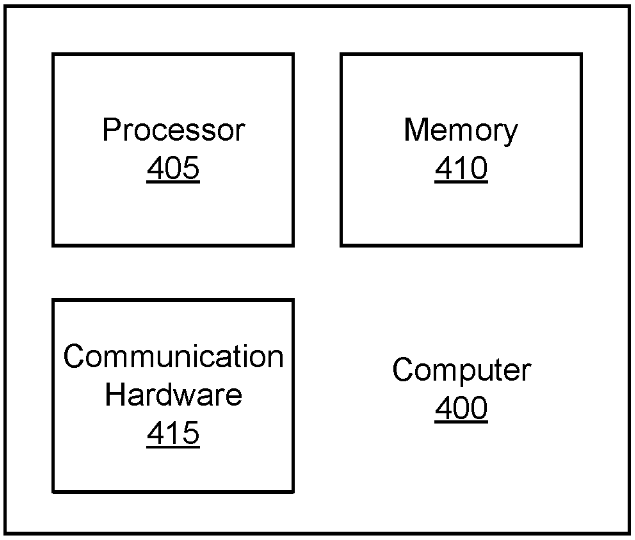

Processor
405
Memory
410
Communication
Hardware
415
Computer
400

FIG. 4

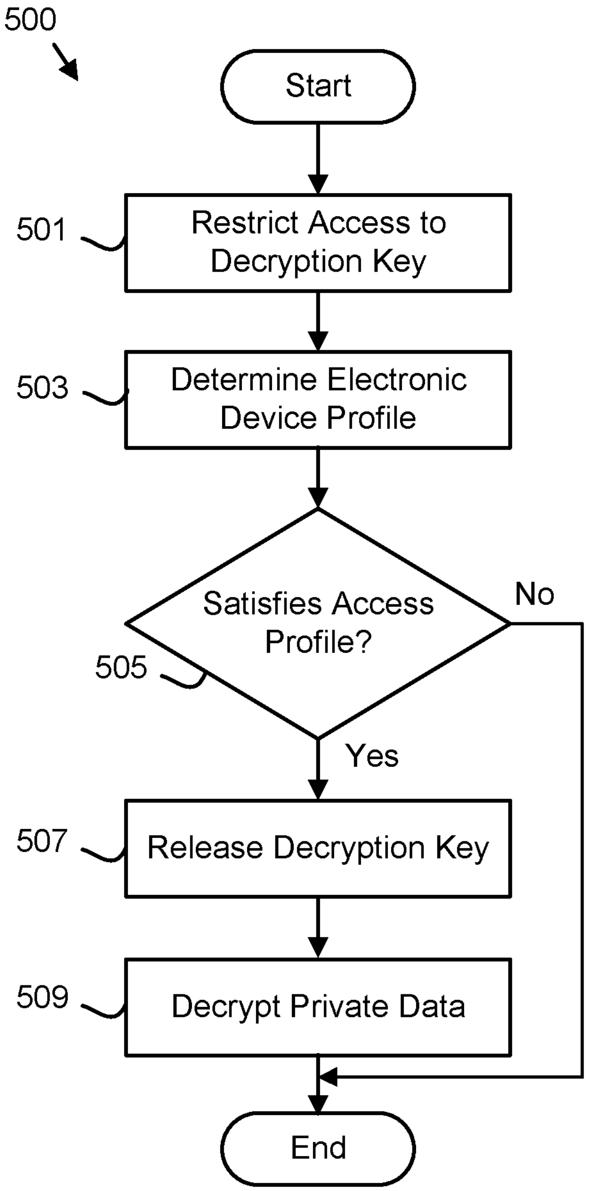

500
Start
501
Restrict Access to Decryption Key
503
Determine Electronic Device Profile
Satisfies Access Profile?
505
No
Yes
507
Release Decryption Key
509
Decrypt Private Data
End

FIG. 5A

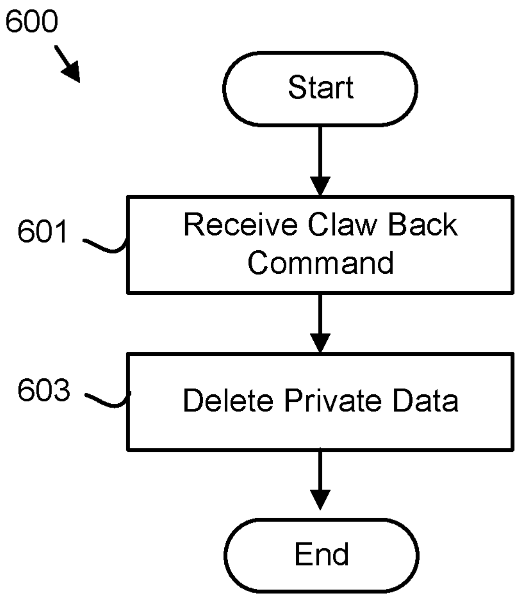

600
Start
601
Receive Claw Back Command
603
Delete Private Data
End

FIG. 5B

MULTI-MODAL ACCESS POLICY ENFORCEMENT

FIELD

[0001] This applications claims priority to U.S. Provisional Patent Application No. 62/665,300 entitled "MULTI-MODAL ENCRYPTION POLICY ENFORCEMENT" and filed on May 1, 2018 for Aaron Turner, which is incorporated herein by reference.

FIELD

[0002] The subject matter disclosed herein relates to multi-modal access policy enforcement.

BACKGROUND

[0003] Private data should only be accessible for authorized uses.

BRIEF SUMMARY

[0004] A method for access policy enforcement is disclosed. The method restricts, by use of a processor, access to a decryption key for private data on an electronic device. The private data is encrypted and comprises group communications. The method determines an electronic device profile comprising a device time and a device location of the electronic device. The method releases the decryption key in response to the electronic device profile satisfying an access policy. The method decrypts the private data using the decryption key. An apparatus and computer program product also perform the functions of the method.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] In order that the advantages of the embodiments of the invention will be readily understood, a more particular description of the embodiments briefly described above will be rendered by reference to specific embodiments that are illustrated in the appended drawings. Understanding that these drawings depict only some embodiments and are not therefore to be considered to be limiting of scope, the embodiments will be described and explained with additional specificity and detail through the use of the accompanying drawings, in which:

[0006] FIG. **1**A is a schematic block diagram illustrating one embodiment of a private data encryption system;

[0007] FIG. **1**B is drawings of embodiments of electronic devices;

[0008] FIG. **2**A is a schematic block diagram illustrating one embodiment of an electronic device profile;

[0009] FIG. **2**B is a schematic block diagram illustrating one embodiment of an access policy;

[0010] FIG. **2**C is a schematic block diagram illustrating one embodiment of system data;

[0011] FIG. **3**A is a drawing illustrating one embodiment of a location restriction screen;

[0012] FIG. **3**B is a drawing illustrating one alternate embodiment of a location restriction screen;

[0013] FIG. **3**C is a drawing illustrating one alternate embodiment of a location restriction screen;

[0014] FIG. **3**D is a drawing illustrating one embodiment of a time restriction screen;

[0015] FIG. **4** is a schematic block diagram illustrating one embodiment of a computer;

[0016] FIG. **5**A is a schematic flow chart diagram illustrating one embodiment of a private data decryption method; and

[0017] FIG. **5**B is a schematic flow chart diagram illustrating one embodiment of a data claw back method.

DETAILED DESCRIPTION

[0018] As will be appreciated by one skilled in the art, aspects of the embodiments may be embodied as a system, method or program product. Accordingly, embodiments may take the form of an entirely hardware embodiment, an entirely software embodiment (including firmware, resident software, micro-code, etc.) or an embodiment combining software and hardware aspects that may all generally be referred to herein as a "circuit," "module" or "system." Furthermore, embodiments may take the form of a program product embodied in one or more computer readable storage devices storing machine readable code, computer readable code, and/or program code, referred hereafter as code. The storage devices may be tangible, non-transitory, and/or non-transmission. The storage devices may not embody signals. In a certain embodiment, the storage devices only employ signals for accessing code.

[0019] Many of the functional units described in this specification have been labeled as modules, in order to more particularly emphasize their implementation independence. For example, a module may be implemented as a hardware circuit comprising custom VLSI circuits or gate arrays, off-the-shelf semiconductors such as logic chips, transistors, or other discrete components. A module may also be implemented in programmable hardware devices such as field programmable gate arrays, programmable array logic, programmable logic devices or the like.

[0020] Modules may also be implemented in code and/or software for execution by various types of processors. An identified module of code may, for instance, comprise one or more physical or logical blocks of executable code which may, for instance, be organized as an object, procedure, or function. Nevertheless, the executables of an identified module need not be physically located together, but may comprise disparate instructions stored in different locations which, when joined logically together, comprise the module and achieve the stated purpose for the module.

[0021] Indeed, a module of code may be a single instruction, or many instructions, and may even be distributed over several different code segments, among different programs, and across several memory devices. Similarly, operational data may be identified and illustrated herein within modules, and may be embodied in any suitable form and organized within any suitable type of data structure. The operational data may be collected as a single data set, or may be distributed over different locations including over different computer readable storage devices. Where a module or portions of a module are implemented in software, the software portions are stored on one or more computer readable storage devices.

[0022] Any combination of one or more computer readable medium may be utilized. The computer readable medium may be a computer readable storage medium. The computer readable storage medium may be a storage device storing the code. The storage device may be, for example, but not limited to, an electronic, magnetic, optical, electromagnetic, infrared, holographic, micromechanical, or semiconductor system, apparatus, or device, or any suitable combination of the foregoing.

[0023] More specific examples (a non-exhaustive list) of the storage device would include the following: an electrical connection having one or more wires, a portable computer diskette, a hard disk, a random access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory (EPROM or Flash memory), a portable compact disc read-only memory (CD-ROM), an optical storage device, a magnetic storage device, or any suitable combination of the foregoing. In the context of this document, a computer readable storage medium may be any tangible medium that can contain, or store a program for use by or in connection with an instruction execution system, apparatus, or device.

[0024] Code for carrying out operations for embodiments may be written in any combination of one or more programming languages including an object oriented programming language such as Python, Ruby, Java, Smalltalk, C++, or the like, and conventional procedural programming languages, such as the "C" programming language, or the like, and/or machine languages such as assembly languages. The code may execute entirely on the user's computer, partly on the user's computer, as a stand-alone software package, partly on the user's computer and partly on a remote computer or entirely on the remote computer or server. In the latter scenario, the remote computer may be connected to the user's computer through any type of network, including a local area network (LAN) or a wide area network (WAN), or the connection may be made to an external computer (for example, through the Internet using an Internet Service Provider).

[0025] Reference throughout this specification to "one embodiment," "an embodiment," or similar language means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment. Thus, appearances of the phrases "in one embodiment," "in an embodiment," and similar language throughout this specification may, but do not necessarily, all refer to the same embodiment, but mean "one or more but not all embodiments" unless expressly specified otherwise. The terms "including," "comprising," "having," and variations thereof mean "including but not limited to," unless expressly specified otherwise. An enumerated listing of items does not imply that any or all of the items are mutually exclusive, unless expressly specified otherwise. The terms "a," "an," and "the" also refer to "one or more" unless expressly specified otherwise.

[0026] Furthermore, the described features, structures, or characteristics of the embodiments may be combined in any suitable manner. In the following description, numerous specific details are provided, such as examples of programming, software modules, user selections, network transactions, database queries, database structures, hardware modules, hardware circuits, hardware chips, etc., to provide a thorough understanding of embodiments. One skilled in the relevant art will recognize, however, that embodiments may be practiced without one or more of the specific details, or with other methods, components, materials, and so forth. In other instances, well-known structures, materials, or operations are not shown or described in detail to avoid obscuring aspects of an embodiment.

[0027] Aspects of the embodiments are described below with reference to schematic flowchart diagrams and/or schematic block diagrams of methods, apparatuses, systems, and program products according to embodiments. It will be understood that each block of the schematic flowchart diagrams and/or schematic block diagrams, and combinations of blocks in the schematic flowchart diagrams and/or schematic block diagrams, can be implemented by code. This code may be provided to a processor of a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions, which execute via the processor of the computer or other programmable data processing apparatus, create means for implementing the functions/acts specified in the schematic flowchart diagrams and/or schematic block diagrams block or blocks.

[0028] The code may also be stored in a storage device that can direct a computer, other programmable data processing apparatus, or other devices to function in a particular manner, such that the instructions stored in the storage device produce an article of manufacture including instructions which implement the function/act specified in the schematic flowchart diagrams and/or schematic block diagrams block or blocks.

[0029] The code may also be loaded onto a computer, other programmable data processing apparatus, or other devices to cause a series of operational steps to be performed on the computer, other programmable apparatus or other devices to produce a computer implemented process such that the code which execute on the computer or other programmable apparatus provide processes for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks.

[0030] The schematic flowchart diagrams and/or schematic block diagrams in the Figures illustrate the architecture, functionality, and operation of possible implementations of apparatuses, systems, methods and program products according to various embodiments. In this regard, each block in the schematic flowchart diagrams and/or schematic block diagrams may represent a module, segment, or portion of code, which comprises one or more executable instructions of the code for implementing the specified logical function(s).

[0031] It should also be noted that, in some alternative implementations, the functions noted in the block may occur out of the order noted in the Figures. For example, two blocks shown in succession may, in fact, be executed substantially concurrently, or the blocks may sometimes be executed in the reverse order, depending upon the functionality involved. Other steps and methods may be conceived that are equivalent in function, logic, or effect to one or more blocks, or portions thereof, of the illustrated Figures.

[0032] Although various arrow types and line types may be employed in the flowchart and/or block diagrams, they are understood not to limit the scope of the corresponding embodiments. Indeed, some arrows or other connectors may be used to indicate only the logical flow of the depicted embodiment. For instance, an arrow may indicate a waiting or monitoring period of unspecified duration between enumerated steps of the depicted embodiment. It will also be noted that each block of the block diagrams and/or flowchart diagrams, and combinations of blocks in the block diagrams and/or flowchart diagrams, can be implemented by special purpose hardware-based systems that perform the specified functions or acts, or combinations of special purpose hardware and code.

[0033] The description of elements in each figure may refer to elements of proceeding figures. Like numbers refer to like elements in all figures, including alternate embodiments of like elements.

[0034] Private data should only be accessible for approved uses. The embodiments only release decryption keys when an access policy is satisfied.

[0035] FIG. 1A is a schematic block diagram illustrating one embodiment of a private data encryption system **100**. In the depicted embodiment, the system **100** includes a management device **105**, one or more electronic devices **110**, and a network **115**. The electronic devices **110** may be mobile telephones, tablet computers, laptop computers, and the like. The network **115** may be the Internet, a mobile telephone network, a wide-area network, a local area network, a Wi-Fi network, or combinations thereof The management device **105** may manage communication between the electronic devices.

[0036] The electronic devices **110** may be organized in a user group. The electronic devices **110** may share private data through the network **115**. In one embodiment, the electronic devices **110** in the user group share the private data. The private data may include group communications such as voice communications, text communications, email communications, shared data files, and the like. The private data **115** is encrypted. As a result, the communications and shared data files are private to the user group.

[0037] In the past, electronic devices **110** in a user group have been able to access the private data without restriction after joining the user group. For example, if a first user joins the user group with an electronic device **110** such as a mobile telephone, the first user is then able to access the private data of the group regardless of the disposition of the mobile device **110**. As a result, the electronic device **110** is able to access the private data in situations where the private data should not be accessed such as outside of secure locations and/or outside of authorize time periods.

[0038] The embodiments disclosed herein restrict access to a decryption key for the private data on the electronic device **110**. The decryption key is only released when an electronic device profile for the electronic device **110** satisfies an access policy. Therefore, the encrypted private data is only accessed on the electronic device **110** if the access policy is satisfied. The electronic device profile may include a device time and/or a device location of the electronic device. Thus the access policy may be satisfied and the decryption key released only if the device time is within a time range of the access policy and/or the device location is within a geographic area of the access policy.

[0039] The embodiments prevent the encrypted private data from being accessed by the electronic device **110** when the electronic device **110** is outside of the geographic area and/or when the device time is not within the time range. The embodiments allow the security of the private data to be managed more effectively. For example, if the electronic device **110** is taken by an unauthorized user and used outside of the geographic area, the private data is still inaccessible even if the unauthorized user gains access to the electronic device **110**. In another example, if the electronic device **110** is temporarily accessed by the unauthorized user outside of the time range, the private data remain secure. As a result, the security of the private data is greatly enhanced.

[0040] FIG. 1B is drawings of embodiments of the electronic devices **110**. In the depicted embodiment, a tablet electronic device **110***a*, a mobile telephone electronic device **110***b*, and a laptop computer electronic device **110***c* are shown. Each electronic device **110** includes a display **120**.

[0041] FIG. 2A is a schematic block diagram illustrating one embodiment of the electronic device profile **200**. The electronic device profile **200** may be organized as a data structure in a memory. In the depicted embodiment, the electronic device profile **200** includes the device time **201**, the device location **203**, a device orientation **205**, a device proximity **207**, a device motion **209**, a device acceleration **211**, and a device profile history **213**.

[0042] The device time **201** may record a current time of the electronic device **110**. The device time **201** may be recorded from an internal clock of the electronic device **110**. Alternatively, the device time **201** may be accessed through the network **115** such as from the management device **105**.

[0043] The device location **203** may record a current location of the electronic device **110**. In one embodiment, the device location **203** is recorded from global positioning system (GPS) coordinates generated by the electronic device **110**. In addition, the device location **203** may include a network identifier from a Wi-Fi network, wide-area network, local area network, and the like. The device location **203** may also include base station information from a mobile telephone network.

[0044] The device orientation **205** may specify the three-dimensional orientation of the electronic device **110** relative to a vertical axis. The device orientation **205** may be recorded from an accelerometer of the electronic device **110**.

[0045] The device proximity **207** may record the proximity of the electronic device **110** to a user. In one embodiment, the device proximity **207** is recorded from a display **120** of the electronic device **110**. The display **120** may be an electrostatic display and may sense proximity to the screen. In one embodiment, the device proximity **207** records the proximity of an object such as a face or hand to the display **120** of the electronic device **110**.

[0046] The device motion **209** may record a motion vector of the electronic device **110**. In one embodiment, the motion vector is calculated from the plurality of GPS coordinates and corresponding device times **201**. In addition, the motion vector may be calculated based on a plurality of device accelerations **211** and corresponding device times **201**.

[0047] The device acceleration **211** may record the acceleration of the electronic device **110**. The device acceleration **211** may be recorded from the accelerometer of the electronic device **110**.

[0048] The device profile history **213** may record a plurality of electronic device profiles **200**. In one embodiment, the device profile history **213** includes electronic device profiles selected at a sampling interval such as each five minutes and/or each 30 seconds.

[0049] FIG. 2B is a schematic block diagram illustrating one embodiment of the access policy **250**. The access policy **250** maybe organized as a data structure in a memory. In the depicted embodiment, the access policy **250** includes the geographic area **251**, the time range **253**, a threshold difference **255**, an orientation threshold **257**, a proximity threshold **259**, a motion threshold **261**, and an acceleration threshold **263**. In one embodiment, one or more of the geographic area **251**, time range **253**, threshold distance **255**, orientation threshold **257**, proximity threshold **259**, motion threshold **261**, and acceleration threshold **263** must be satisfied to satisfy the access policy **250**.

[0050] The geographic area **251** may specify one or more areas where the private data may be accessed. In one embodiment, the geographic area **251** is specified for two-dimensional areas relative to the surface of the earth. The geographic area **251** may not be satisfied if a coordinate comprising a longitude and latitude is outside of the geographic area **251**.

[0051] In addition, the geographic area **251** may be specified for three-dimensional areas relative to the surface of the earth. For example, the geographic area **251** may not be satisfied if a coordinate comprising the longitude, the latitude, and an altitude is outside of the geographic area **251**.

[0052] In one embodiment, the geographic area **251** is specified as a center point and a radius from the point, wherein all coordinates less than the radius from the center point are within the geographic area **251**. In one embodiment, the center point is a street address. In a certain embodiment, the coordinates are projected onto the surface of the earth.

[0053] In one embodiment, the geographic area **251** is specified as a region within a set of closed lines and/or curves. The geographic area **251** may further specify a maximum altitude within the region.

[0054] In a certain embodiment, the geographic area **251** is specified as a political boundary, such as within a national border, a state or provincial border, a city border, or the like. The geographic area **251** may be satisfied if the device location **203** is within the geographic area **251**.

[0055] The time range **253** may comprise one or more time intervals. Each time interval may have a start day, date, and/or time and an end day, date, and/or time. In addition, the time range **253** may include a time zone. The time range **253** may be satisfied if the device time **201** is within one or more of the time intervals.

[0056] The threshold difference **255** may be satisfied if a weighted difference between elements of the electronic device profile **200** and one or more instances of the device profile history **213** are within the threshold difference **255**.

[0057] The orientation threshold **257** may be satisfied if the device orientation **205** is within ranges for a roll, pitch, and yaw for the electronic device **110**. The proximity threshold **259** may be satisfied if the device proximity **207** is less than the proximity threshold **259**. The proximity threshold **259** may be in the range of 0 to 15 centimeters (cm).

[0058] The motion threshold **261** may be satisfied if the device motion **209** is less than the motion threshold **261**. In a certain embodiment, the motion threshold **261** is in the range of 2 to 3 meters/second (m/s). The acceleration threshold **263** may be satisfied if the device acceleration **211** is less than the acceleration threshold **263** for an acceleration time interval. The acceleration threshold **263** may be in the range of 8 to 9 m/s^2.

[0059] FIG. 2C is a schematic block diagram illustrating one embodiment of system data **290**. The system data **290** may be organized as a data structure in a memory. In the depicted embodiment, the system data **290** includes the decryption key **291** and the private data **293**. In addition, the system data **290** may include a claw back command **295**. The private data **293** is encrypted with an encryption key. The decryption key **291** decrypts the encrypted private data **293**.

[0060] In one embodiment, access to the decryption key **291** is restricted by encrypting the decryption key **291** with an access encryption key. In addition, access to the decryption key **291** may be restricted by restricting access to the decryption key **291** in the memory of the electronic device **110**.

[0061] The claw back command **295** may include a security credential that authorizes the deletion of the private data **293** on the electronic device **110**. The security credential may be encrypted.

[0062] FIG. 3A is a drawing illustrating one embodiment of a location restriction screen **300**. The location restriction screen **300** may be presented on the display **120**. In the depicted embodiment, the location restriction screen **300** includes an active allowed locations button **301**, an add allowed address button **303**, an add allowed country button **305**, an address field **307**, a radius field **309**, a map **311**, and an add location restriction button **313**.

[0063] The selected add allowed address button **303** displays the address field **307**, radius field **309**, map **311**, and add location restriction button **313**. The address field **307** may specify the center point of the geographic area **251**. The map **311** may also specify the center point of the geographic area **251**. In addition, the map **311** may show the extent of the geographic area **251**. The radius field **309** may specify the radius of the geographic area **251**. The add location restriction button **313** may add the address field **307** and the radius field **309** to the geographic area **251**.

[0064] FIG. 3B is a drawing illustrating one alternate embodiment of the location restriction screen **300**. In the depicted embodiment, the add allowed country button **305** is selected and a country field **315** is displayed. The country field **315** may be filled with the country selected from a country list **317**. The geographic area **251** may be satisfied if the device location **203** is within the one or more selected countries.

[0065] FIG. 3C is a drawing illustrating one alternate embodiment of the location restriction screen **301**. In the depicted embodiment, the active allowed locations button **301** is selected. In response, a location list **319** of active geographic areas **251** is presented on the display **120**. The geographic area **251** may be satisfied for each of the active geographic areas **251**.

[0066] FIG. 3D is a drawing illustrating one embodiment of a time restriction screen **301**. The time restriction screen **301** may be presented on the display **120**. In the depicted embodiment, the time restriction screen **301** includes an active allowed times button **323**, an add allowed time button **325**, and an allowed time zone button **327**. Selecting the active allowed times button **323** displays a time listing of allowed times in the time range **253**. Selecting the add allowed time button **325** allows the user to add allowed times to the time range **253**. In the depicted embodiment, the allowed time zone button **327** is selected allowing the user to select one or more time zones for the time range **253**.

[0067] FIG. **4** is a schematic block diagram illustrating one embodiment of a computer **400**. The computer **400** may be embodied in the electronic device **110** and/or the management device **105**. In the depicted embodiment, the computer **400** includes a processor **405**, a memory **410**, and communication hardware **415**. The memory **410** may include a semiconductor storage device, hard disk drive, an optical storage device, a micromechanical storage device, or combinations thereof. The memory **410** may store code. The processor **405** may execute the code. The communication hardware **415** may communicate with other devices such as the network **115**.

[0068] FIG. **5**A is a schematic flow chart diagram illustrating one embodiment of a private data decryption method **500**. The method **500** may only decrypt the private data **293** in response to the access policy **250** being satisfied. The method **500** may be performed by the processors **405** of the electronic device **110** and/or the management device **105**.

[0069] The method **500** starts, and in one embodiment, the processor **405** may restrict **501** access to the decryption key **291** for the private data **293** on the electronic device **110**. The private data **293** is encrypted and comprises group communications for a user group. In one embodiment, the processor **405** may encrypt the decryption key **291** with the access encryption key. In addition, the processor **405** may restrict access to the decryption key **291** in the memory **410**. The decryption key **291** may be programmatically unavailable.

[0070] In one embodiment, access to the decryption key **291** is restricted **501** by the management device **105**. The management device **105** may be remote from the electronic device **110**. The management device **105** may communicate a restriction code to the electronic device **110** that restricts **501** access to the decryption key **291**.

[0071] In addition, access to the decryption key **291** may be automatically restricted **501** if the access policy **250** is not satisfied. In one embodiment, access to the decryption key **291** is automatically restricted **501** after a specified restriction time interval such as 24 hours.

[0072] The processor **405** may determine **503** the electronic device profile **200**. In one embodiment, the electronic device profile **200** includes the device time **201** and the device location **203**. In addition, the electronic device profile **200** may comprise the device orientation **205**, the device proximity **207**, the device motion **209**, the device acceleration **211**, and/or the device profile history **213**.

[0073] The processor **405** may release **505** the decryption key **291** in response to the electronic device profile **200** satisfying the access policy **250**. In one embodiment, the access policy **250** is satisfied if the device location **203** is within the specified geographic area **251**. In addition, the access policy **250** may be satisfied if the device time **201** is within the specified time range **253**. In a certain embodiment, the access policy **250** is satisfied if both the device location **203** is within the specified geographic area **251** and the device time **201** is within the specified time range **253**.

[0074] The access policy **250** may be satisfied if a weighted difference between the electronic device profile **200** and the device profile history **213** is within the threshold difference **255**. The weighted difference WD may be calculated using Equation 1, wherein ΔT is a difference between the device time **201** and the mean of the historical device times **201** from the device profile history **213**, ΔL is a difference between the device location **203** and a mean of the historical device locations **203** from the device profile history **213**, ΔO is a difference between the device orientation **205** and a mean of the device orientations **205** from the device profile history **213**, ΔP is a difference between the device proximity **207** and a mean of the historical device proximities **207** from the device profile history **213**, ΔM is a difference between the device motion **209** and a mean of the historical device motions **209** from the device profile history **213**, and ΔA is a difference between the device acceleration **211** a mean of the historical device accelerations **211** from the device profile history **213**, and K1-6 are nonzero constants

$$WD=(K1*\Delta T)+(K2*\Delta L)+(K3*\Delta O)+(K4*\Delta P)+(K5*\Delta M)+(K6*\Delta A) \qquad \text{Equation 1}$$

[0075] In one embodiment, the access policy **250** is not satisfied if one or more of the device orientation **205** exceeds the orientation threshold **257**, the device proximity **207** exceeds a proximity threshold **259**, the device motion **209** exceeds the motion threshold **261**, and the device acceleration **211** exceeds the acceleration threshold **263**.

[0076] The released decryption key **291** may be decrypted. Alternatively, the released decryption key **291** may be made available in the memory **410**.

[0077] In response to releasing **505** the decryption key **291**, the processor decrypts **509** the private data **293** using the decryption key **291** and the method **500** ends. The method **500** prevents access to the private data **293** unless the access policy **250** is satisfied. As a result, the private data **293** is efficiently and reliably protected.

[0078] FIG. **5**B is a schematic flow chart diagram illustrating one embodiment of a data claw back method **600**. The method **600** may claw back private data **293** that was entrusted to the electronic device **110**. The method **600** may be performed by the processor **405** of the electronic device **110** and/or the management device **105**.

[0079] The method **600** starts, and in one embodiment, the processor **405** receives **601** the claw back command **295** from the management device **105**. The processor **405** may further decrypt the security credential from the claw back command **295** and the encrypted security credential stored by the electronic device **110**. If the decrypted security credentials match, the processor **405** may receive **601** the claw back command **295**. The processor **405** may automatically receive **601** the claw back command **295**.

[0080] In response to receiving **501** the claw back command **295** the processor **405** may delete **603** the private data **293** from the electronic device **110** and the method **600** ends. As a result, the private data **293** may be removed from the electronic device **110**.

[0081] The embodiments improve the protection of the private data **293** on the electronic device **110**. In addition to the usual access protections for the electronic device **110**, the private data **293** may only be accessed if the access policy **250** is satisfied. Thus if the device time **201** does not satisfy the time range **253** and/or the device location **203** does not satisfy the geographic area **251**, the private data **293** cannot be accessed even by a user with full access to the electronic device **110**. As a result, the function of the electronic device **110** in protecting the private data **293** is enhanced. In addition, the efficiency of protecting the private data **293** by the electronic device **110** is improved as the protection is automatic.

[0082] Embodiments may be practiced in other specific forms. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

What is claimed is:

1. A method comprising:

restricting, by use of a processor, access to a decryption key for private data on an electronic device, wherein the private data is encrypted and comprises group communications;

determining an electronic device profile comprising a device time and a device location of the electronic device;

releasing the decryption key in response to the electronic device profile satisfying an access policy; and

decrypting the private data using the decryption key.

2. The method of claim **1**, wherein the access policy is satisfied if the device location is within a specified geographic area.

3. The method of claim **1**, wherein the access policy is satisfied if the device time is within a specified time range.

4. The method of claim **1**, wherein the access policy is satisfied if the device location is within a specified geographic area and the device time is within a specified time range.

5. The method of claim **1**, wherein the access policy is satisfied if a weighted difference between the electronic device profile and a device profile history is within a difference threshold.

6. The method of claim **1**, wherein access to the decryption key is restricted by a remote management device.

7. The method of claim **1**, the method further comprising deleting the private data on the electronic device in response to a claw back command from a remote management device.

8. The method of claim **1**, wherein the electronic device profile further comprises one or more of a device orientation of the electronic device, a device proximity of the electronic device to a user, a device motion of the electronic device, and a device acceleration of the electronic device.

9. The method of claim **8**, wherein the access policy is not satisfied if one or more of the device orientation exceeds an orientation threshold, the device proximity exceeds a proximity threshold, the device motion exceeds a motion threshold, and the device acceleration exceeds an acceleration threshold.

10. The method of claim **1**, wherein restricting the decryption key is selected from the group consisting of encrypting the decryption key and restricting access to the decryption key in a memory.

11. An apparatus comprising:

a processor;

a memory storing code executable by the processor to perform:

restricting access to a decryption key for private data on an electronic device, wherein the private data is encrypted and comprises group communications;

determining an electronic device profile comprising a device time and a device location of the electronic device;

releasing the decryption key in response to the electronic device profile satisfying an access policy; and

decrypting the private data using the decryption key.

12. The apparatus of claim **11**, wherein the access policy is satisfied if the device location is within a specified geographic area.

13. The apparatus of claim **11**, wherein the access policy is satisfied if the device time is within a specified time range.

14. The apparatus of claim **11**, wherein the access policy is satisfied if the device location is within a specified geographic area and the device time is within a specified time range.

15. The apparatus of claim **11**, wherein the access policy is satisfied if a weighted difference between the electronic device profile and a device profile history is within a difference threshold.

16. The apparatus of claim **11**, wherein access to the decryption key is restricted by a remote management device.

17. The apparatus of claim **11**, the processor further deleting the private data on the electronic device in response to a claw back command from a remote management device.

18. The apparatus of claim **11**, wherein the electronic device profile further comprises one or more of a device orientation of the electronic device, a device proximity of the electronic device to a user, a device motion of the electronic device, and a device acceleration of the electronic device.

19. The apparatus of claim **18**, wherein the access policy is not satisfied if one or more of the device orientation exceeds an orientation threshold, the device proximity exceeds a proximity threshold, the device motion exceeds a motion threshold, and the device acceleration exceeds an acceleration threshold.

20. A program product comprising a non-transitory computer readable storage medium storing code executable by a processor to perform:

restricting access to a decryption key for private data on an electronic device, wherein the private data is encrypted and comprises group communications;

determining an electronic device profile comprising a device time and a device location of the electronic device;

releasing the decryption key in response to the electronic device profile satisfying an access policy; and

decrypting the private data using the decryption key.

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