US010552830B2

(12) **United States Patent**
Khan et al.

(10) **Patent No.: US 10,552,830 B2**
(45) **Date of Patent: Feb. 4, 2020**

(54) **DELETION OF CREDENTIALS FROM AN ELECTRONIC DEVICE**

(71) Applicant: **Apple Inc.**, Cupertino, CA (US)

(72) Inventors: **Ahmer A. Khan**, Cupertino, CA (US); **Joakim Linde**, Cupertino, CA (US); **Christopher Sharp**, Cupertino, CA (US); **Jerrold V. Hauck**, Cupertino, CA (US)

(73) Assignee: **APPLE INC.**, Cupertino, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 362 days.

(21) Appl. No.: **14/475,292**

(22) Filed: **Sep. 2, 2014**

(65) **Prior Publication Data**

US 2015/0178723 A1 Jun. 25, 2015

Related U.S. Application Data

(60) Provisional application No. 61/920,029, filed on Dec. 23, 2013.

(51) **Int. Cl.**

G06Q 20/32	(2012.01)
G06Q 20/38	(2012.01)
H04W 12/08	(2009.01)
H04W 12/00	(2009.01)

(52) **U.S. Cl.**

CPC ***G06Q 20/3821*** (2013.01); ***G06Q 20/3226*** (2013.01); ***G06Q 20/3278*** (2013.01); ***H04W 12/0023*** (2019.01); ***H04W 12/0802*** (2019.01); ***H04W 12/0806*** (2019.01)

(58) **Field of Classification Search**

None

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

8,196,131	B1 *	6/2012	von Behren	G06Q 20/367 705/64
9,317,704	B2 *	4/2016	Brudnicki	G06F 21/604
2002/0040936	A1 *	4/2002	Wentker	G06F 8/60 235/492
2012/0130838	A1 *	5/2012	Koh	G06Q 20/352 705/26.1
2012/0238207	A1 *	9/2012	Marcovecchio	H04L 63/0492 455/41.1

(Continued)

FOREIGN PATENT DOCUMENTS

WO	2013/067521	5/2013

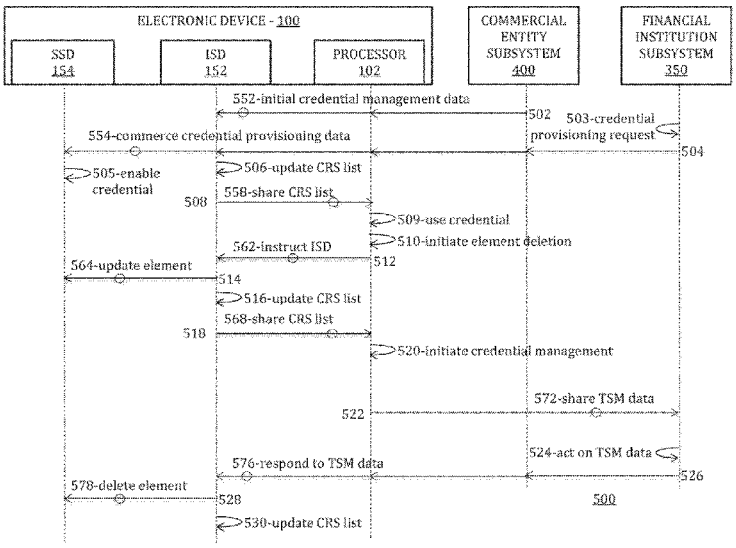
Primary Examiner — Fatoumata Traore

(74) *Attorney, Agent, or Firm* — Morgan, Lewis & Bockius LLP

(57) **ABSTRACT**

Systems, methods, and computer-readable media for managing credentials are provided. In one example embodiment, an electronic device may include a secure element with a security domain element stored on the secure element. The electronic device may also include a processor component that may be configured to, inter alia, permanently terminate the functionality of the security domain element, after the functionality has been permanently terminated, communicatively couple the electronic device to a trusted service manager, and transmit data to the communicatively coupled trusted service manager that may be usable by the trusted service manager to determine that the functionality has been permanently terminated. Additional embodiments are also provided.

33 Claims, 6 Drawing Sheets

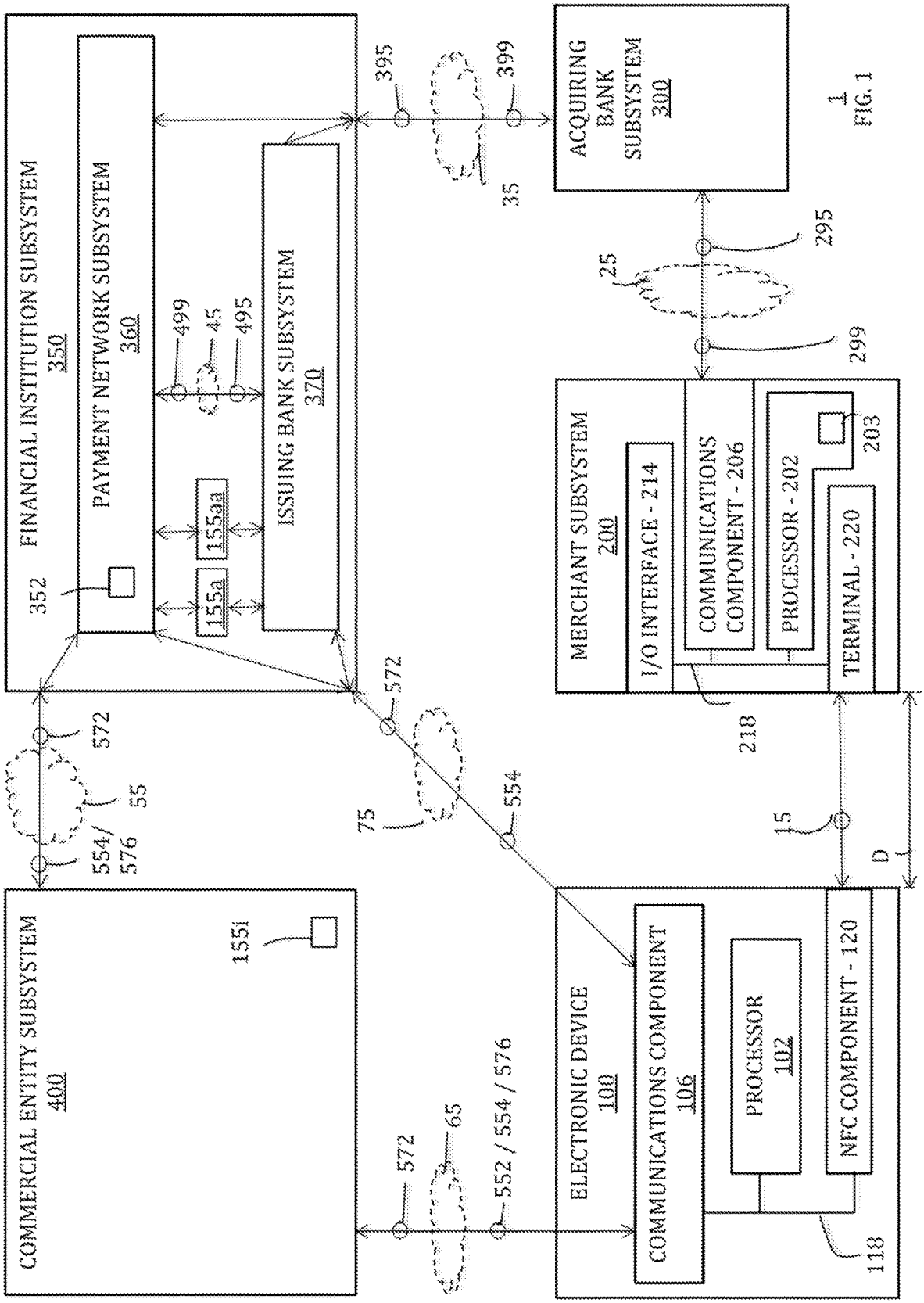


(56) **References Cited**

U.S. PATENT DOCUMENTS

2012/0300932	A1*	11/2012	Cambridge	H04L 9/3234 380/270
2013/0109308	A1*	5/2013	Singh	H04L 67/34 455/41.1

* cited by examiner


FINANCIAL INSTITUTION SUBSYSTEM
350
PAYMENT NETWORK SUBSYSTEM
360
ISSUING BANK SUBSYSTEM
370
352
155a
155aa
499
45
495
395
399
35
ACQUIRING BANK SUBSYSTEM
300
25
295
299
MERCHANT SUBSYSTEM
200
I/O INTERFACE - 214
COMMUNICATIONS COMPONENT - 206
PROCESSOR - 202
TERMINAL - 220
203
218
572
554/ 576
55
75
554
15
D
COMMERCIAL ENTITY SUBSYSTEM
400
155i
572
65
552 / 554 / 576
ELECTRONIC DEVICE
100
COMMUNICATIONS COMPONENT
106
PROCESSOR
102
NFC COMPONENT - 120
118
1
FIG. 1

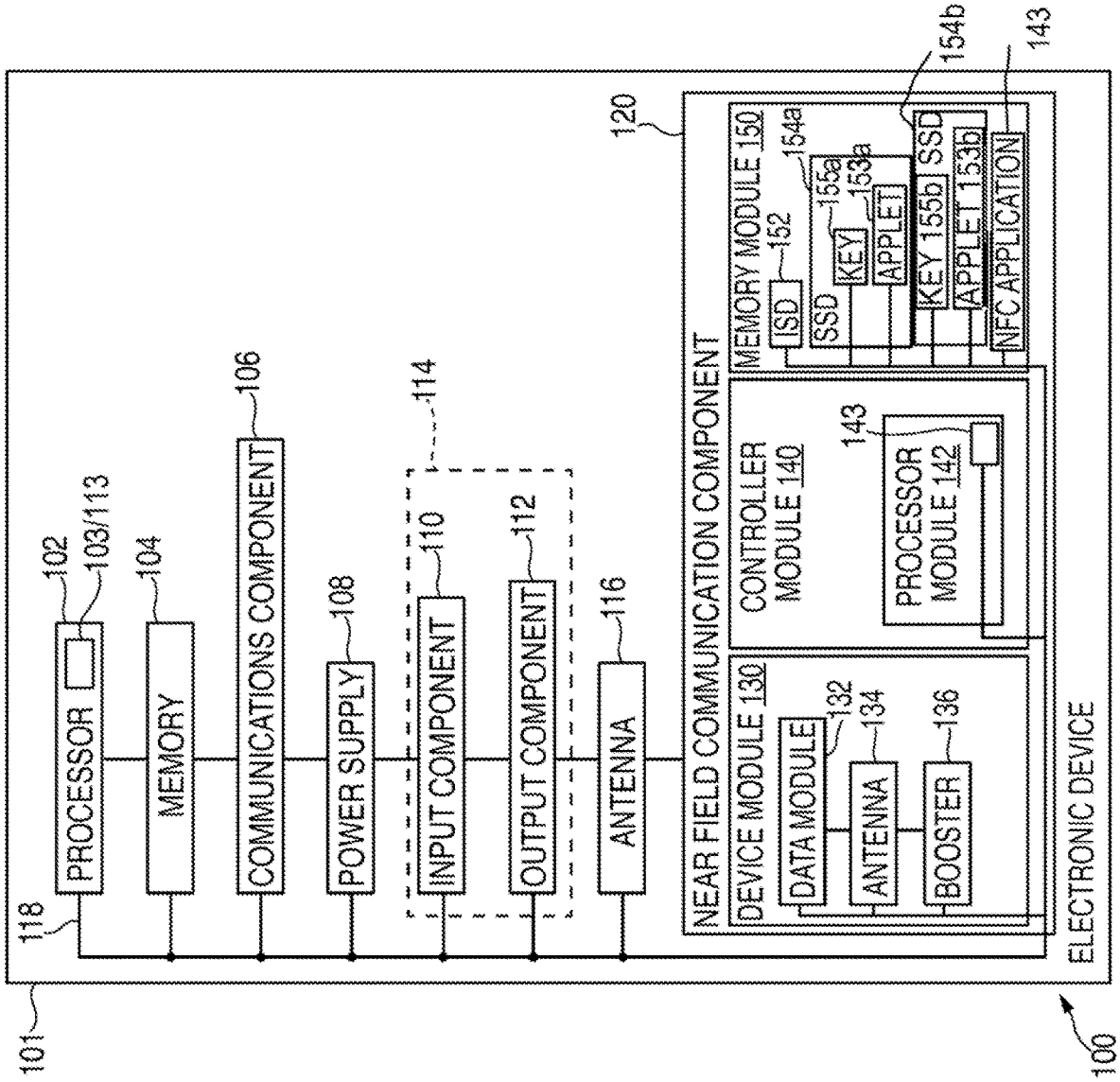

101
118
PROCESSOR
102
103/113
MEMORY
104
COMMUNICATIONS COMPONENT
106
POWER SUPPLY
108
INPUT COMPONENT
110
114
OUTPUT COMPONENT
112
ANTENNA
116
120
NEAR FIELD COMMUNICATION COMPONENT
DEVICE MODULE 130
DATA MODULE
132
ANTENNA
134
BOOSTER
136
CONTROLLER MODULE 140
143
PROCESSOR MODULE 142
MEMORY MODULE 150
ISD
152
SSD
KEY
155a
APPLET
153a
154a
KEY 155b
SSD
154b
APPLET 153b
NFC APPLICATION
143
ELECTRONIC DEVICE
100

FIG. 2

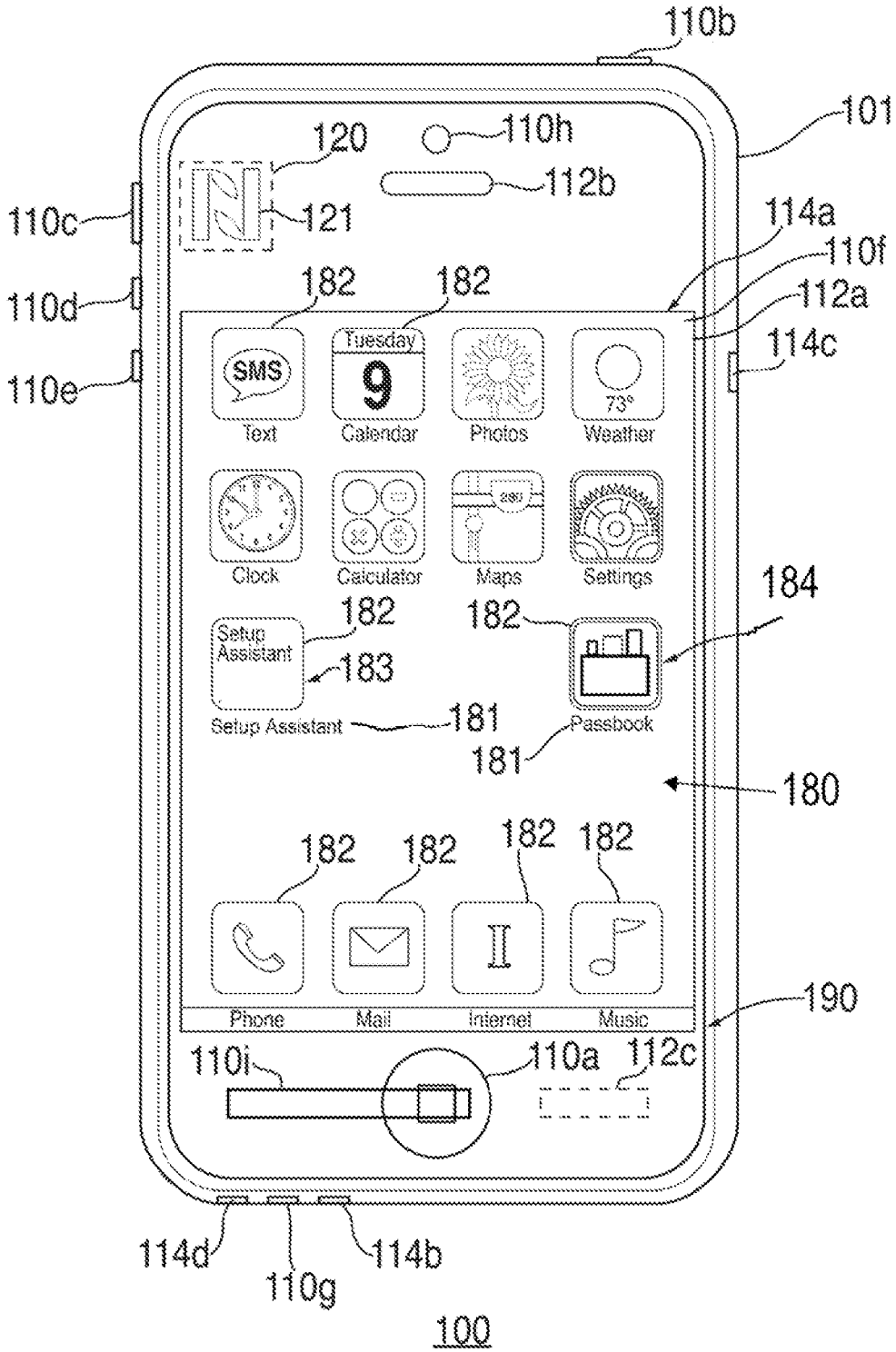

110b
101
120
110h
112b
121
110c
114a
110f
110d
182
182
112a
110e
114c
SMS
Tuesday
9
73°
Text
Calendar
Photos
Weather
Clock
Calculator
Maps
Settings
184
182
182
Setup Assistant
183
Setup Assistant
181
Passbook
181
180
182
182
182
182
Phone
Mail
Internet
Music
190
110i
110a
112c
114d
110g
114b
100

FIG. 3

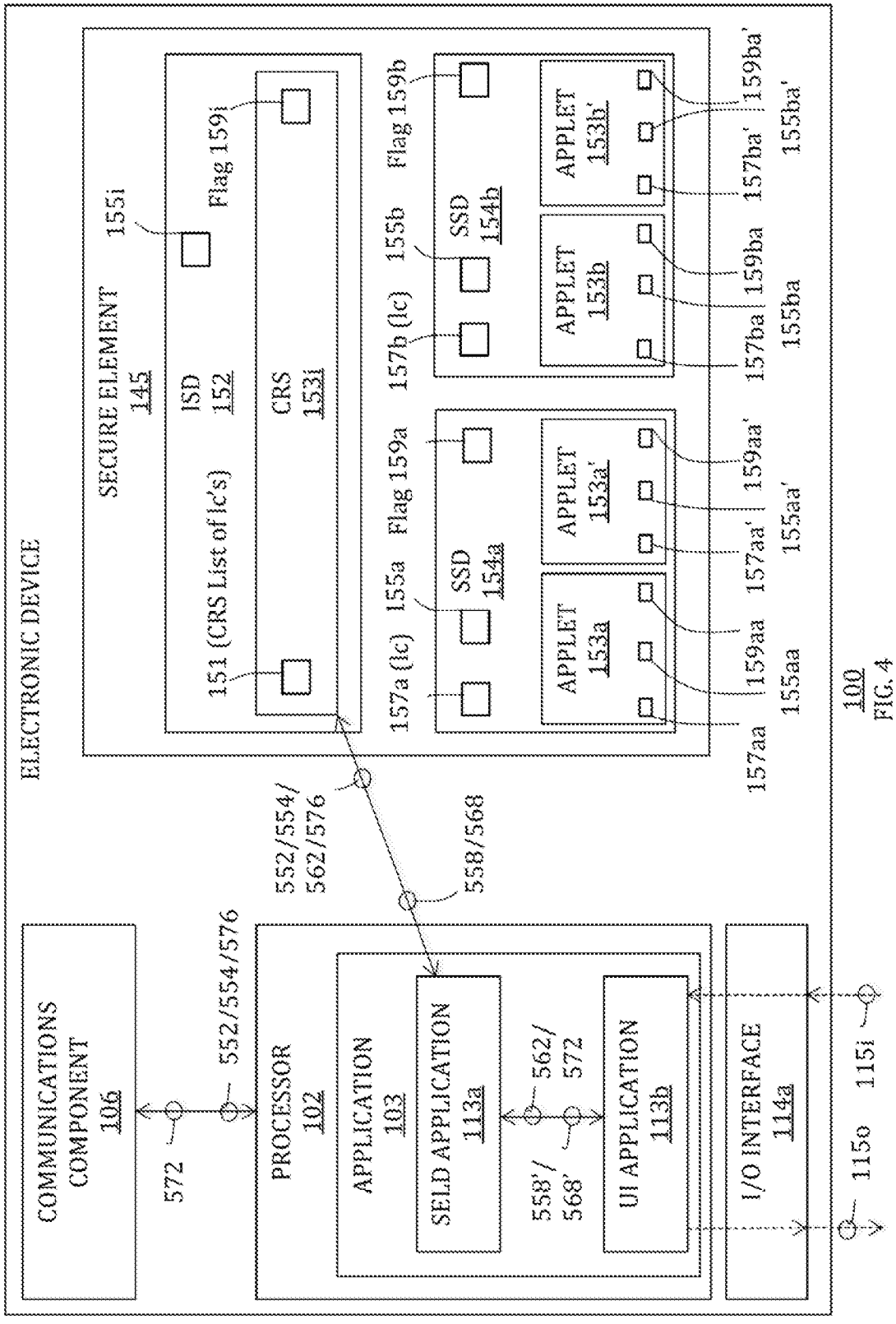
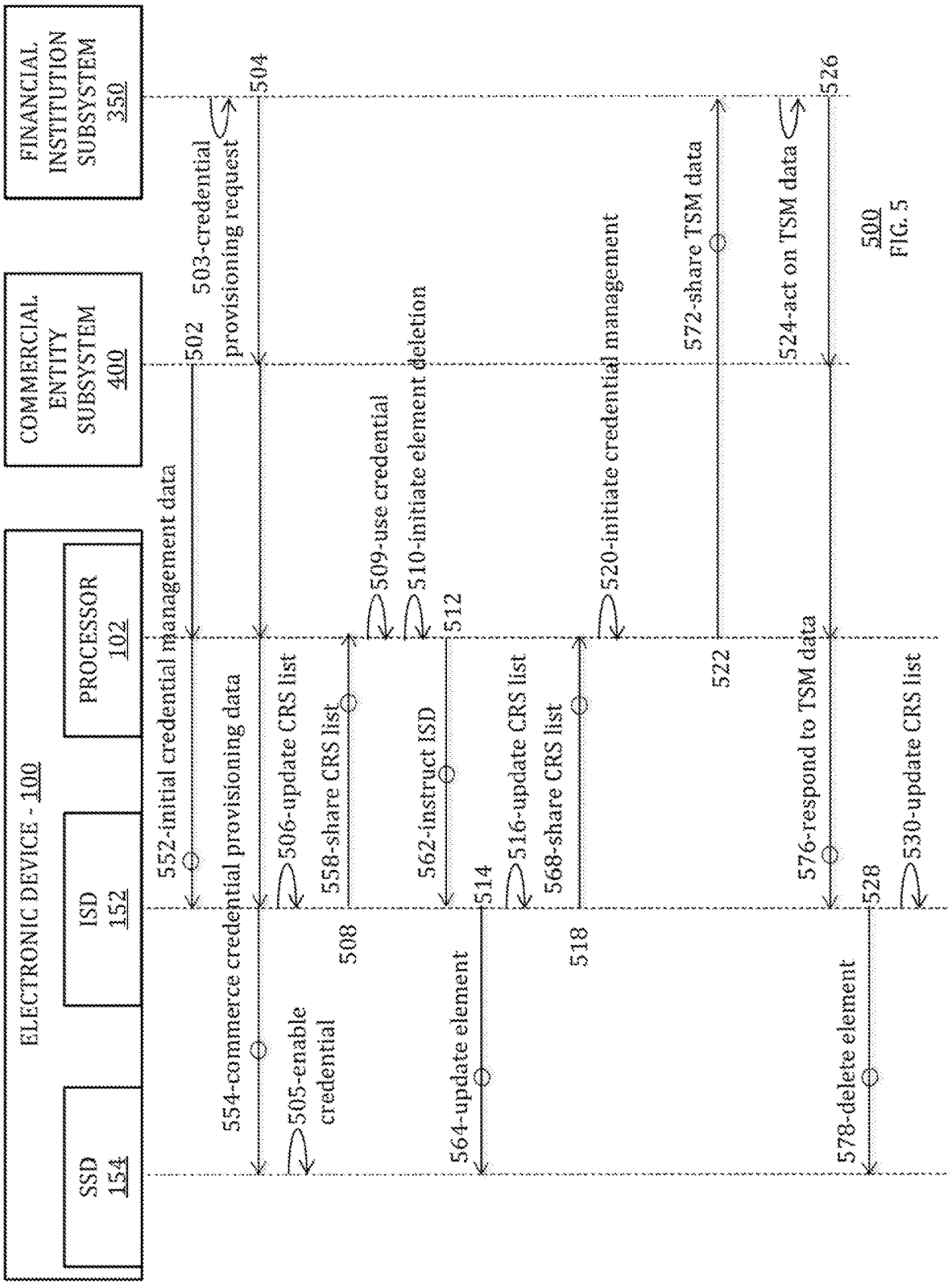
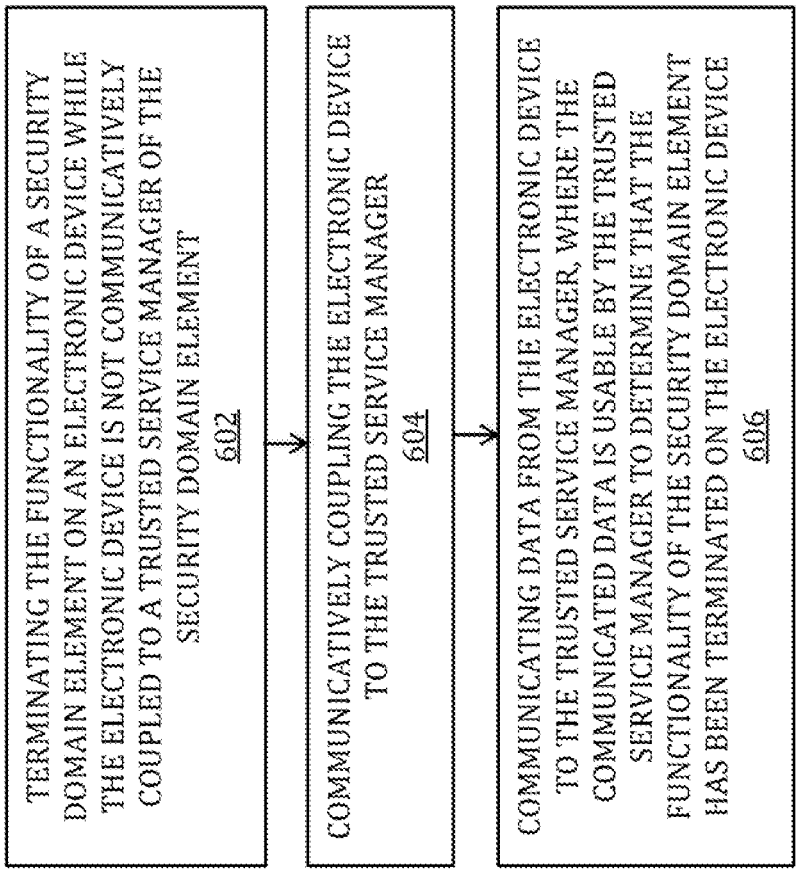

ELECTRONIC DEVICE
SECURE ELEMENT 145
ISD 152
151 (CRS List of Ic's)
155i
Flag 159i
CRS 153i
157a (Ic)
155a
SSD 154a
Flag 159a
APPLET 153a
APPLET 153a'
157aa
159aa
155aa
157aa'
159aa'
155aa'
157b (Ic)
155b
SSD 154b
Flag 159b
APPLET 153b
APPLET 153b'
157ba
159ba
155ba
157ba'
159ba'
155ba'
552/554/562/576
558/568
COMMUNICATIONS COMPONENT 106
572
552/554/576
PROCESSOR 102
APPLICATION 103
SELD APPLICATION 113a
562/572
558'/568'
UI APPLICATION 113b
I/O INTERFACE 114a
115o
115i
100

FIG. 4


ELECTRONIC DEVICE - 100
SSD 154
ISD 152
PROCESSOR 102
COMMERCIAL ENTITY SUBSYSTEM 400
FINANCIAL INSTITUTION SUBSYSTEM 350
502
503-credential provisioning request
504
552-initial credential management data
554-commerce credential provisioning data
505-enable credential
506-update CRS list
508
558-share CRS list
509-use credential
510-initiate element deletion
512
562-instruct ISD
514
516-update CRS list
518
520-initiate credential management
564-update element
568-share CRS list
522
572-share TSM data
524-act on TSM data
526
576-respond to TSM data
528
530-update CRS list
578-delete element

500
FIG. 5


TERMINATING THE FUNCTIONALITY OF A SECURITY DOMAIN ELEMENT ON AN ELECTRONIC DEVICE WHILE THE ELECTRONIC DEVICE IS NOT COMMUNICATIVELY COUPLED TO A TRUSTED SERVICE MANAGER OF THE SECURITY DOMAIN ELEMENT
602
COMMUNICATIVELY COUPLING THE ELECTRONIC DEVICE TO THE TRUSTED SERVICE MANAGER
604
COMMUNICATING DATA FROM THE ELECTRONIC DEVICE TO THE TRUSTED SERVICE MANAGER, WHERE THE COMMUNICATED DATA IS USABLE BY THE TRUSTED SERVICE MANAGER TO DETERMINE THAT THE FUNCTIONALITY OF THE SECURITY DOMAIN ELEMENT HAS BEEN TERMINATED ON THE ELECTRONIC DEVICE
606

600
FIG. 6

DELETION OF CREDENTIALS FROM AN ELECTRONIC DEVICE

CROSS-REFERENCE TO RELATED APPLICATION(S)

This application claims the benefit of prior filed U.S. Provisional Patent Application No. 61/920,029, filed Dec. 23, 2013, which is hereby incorporated by reference herein in its entirety.

TECHNICAL FIELD

This disclosure relates to the management of credentials on an electronic device and, more particularly, to the deletion of commerce credentials from an electronic device.

BACKGROUND OF THE DISCLOSURE

Portable electronic devices (e.g., cellular telephones) may be provided with near field communication ("NFC") components for enabling contactless proximity-based communications with another entity. Often times, these communications are associated with financial transactions or other secure data transactions that require the electronic device to access and share a commerce credential, such as a credit card credential or a public transportation ticket credential, previously provisioned on the device. However, the deletion of such commerce credentials from an electronic device is often inconvenient.

SUMMARY OF THE DISCLOSURE

This document describes systems, methods, and computer-readable media for deleting credentials from an electronic device capable of near field communications and/or other wireless communications.

For example, an electronic device may include a secure element that includes a security domain element stored on the secure element. The electronic device may also include a processor component configured to permanently terminate the functionality of the security domain element, after the functionality has been permanently terminated, communicatively couple the electronic device to a trusted service manager, and transmit data to the communicatively coupled trusted service manager that may be usable by the trusted service manager to determine that the functionality has been permanently terminated.

As another example, a financial institution system in communication with an electronic device may be provided that includes at least one processor component, at least one memory component, and at least one communications component. The financial institution system may be configured to provision a security domain element on the electronic device, after the security domain element is provisioned on the electronic device, receive shared data from the electronic device, and use the received shared data to determine that the functionality of the security domain element has been permanently terminated on the electronic device.

As yet another example, an electronic device may be provided that includes a secure element with a security domain element stored on the secure element, and a processor component configured to irreversibly end the ability of the electronic device to share information indicative of the security domain element with at least one of a user of the electronic device and a remote merchant subsystem, after the ability has been irreversibly ended, communicatively couple the electronic device to a trusted service manager, and transmit data to the communicatively coupled trusted service manager that is usable by the trusted service manager to determine that the ability has been irreversibly ended.

As yet another example, a method may include terminating the functionality of a security domain element on an electronic device while the electronic device is not communicatively coupled to a trusted service manager of the security domain element, after the terminating, communicatively coupling the electronic device to the trusted service manager, and communicating data from the electronic device to the communicatively coupled trusted service manager, where the communicated data may be usable by the trusted service manager to determine that the functionality of the security domain element has been terminated on the electronic device.

As yet another example, a non-transitory computer-readable medium may include computer-readable instructions recorded thereon for terminating the functionality of a security domain element on an electronic device, after the terminating, communicatively coupling the electronic device to a trusted service manager, and communicating data from the electronic device to the communicatively coupled trusted service manager, where the communicated data may be usable by the trusted service manager to determine that the functionality of the security domain element has been terminated.

As yet another example, an electronic device may include a secure element with a security domain element stored on the secure element, and a processor component configured to terminate the functionality of the security domain element without any communication between the electronic device and any remote entity.

As yet another example, an electronic device may include a secure element with a security domain element stored on the secure element, and a processor component configured to terminate the functionality of the security domain element independent of any communication between the electronic device and a trusted service manager.

This Summary is provided merely to summarize some example embodiments, so as to provide a basic understanding of some aspects of the subject matter described in this document. Accordingly, it will be appreciated that the features described in this Summary are merely examples and should not be construed to narrow the scope or spirit of the subject matter described herein in any way. Other features, aspects, and advantages of the subject matter described herein will become apparent from the following Detailed Description, Figures, and Claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The discussion below makes reference to the following drawings, in which like reference characters may refer to like parts throughout, and in which:

FIG. **1** is a schematic view of an illustrative system for managing credentials on an electronic device;

FIG. **2** is a more detailed schematic view of the electronic device of the system of FIG. **1**;

FIG. **3** is a front view of the electronic device of FIGS. **1** and **2**;

FIG. **4** is another more detailed schematic view of the electronic device of FIGS. **1-3**; and

FIGS. **5** and **6** are flowcharts of illustrative processes for managing credentials on an electronic device.

DETAILED DESCRIPTION OF THE DISCLOSURE

The secure deletion of a commerce credential from an electronic device may be initiated when the electronic device is not communicatively coupled to a remote subsystem responsible for the management of that commerce credential. For example, while the electronic device is not communicatively coupled to the responsible remote subsystem, a life cycle state of the commerce credential may be updated locally on the electronic device such that the commerce credential may no longer be used by the electronic device in any commercial transaction and/or such that the existence of the commerce credential on the electronic device may no longer be indicated by the device to a user, and that updated life cycle state may later be shared with the responsible remote subsystem once the electronic device eventually is communicatively coupled to the responsible remote subsystem such that the responsible remote subsystem may take appropriate action to complete the secure deletion of the commerce credential from the electronic device. As another example, while the electronic device is not communicatively coupled to the responsible remote subsystem, the commerce credential may be deleted from the electronic device, and particular data may later be shared with the responsible remote subsystem once the electronic device eventually is communicatively coupled to the responsible remote subsystem that may be utilized by the responsible remote subsystem to identify the deletion.

FIG. **1** shows a system **1** in which one or more credentials may be managed on an electronic device **100**, such as credentials provisioned on and removed from electronic device **100** by a financial institution subsystem **350** (e.g., in conjunction with a commercial entity subsystem **400**), and in which such credentials may be used by electronic device **100** for conducting a commercial transaction with a merchant subsystem **200** and an associated acquiring bank subsystem **300**. FIGS. **2-4** show further details with respect to particular embodiments of electronic device **100** of system **1**, while FIGS. **5** and **6** are flowcharts of illustrative processes for managing credentials on electronic device **100** in the context of system **1**.

Description of FIG. 1, FIG. 2, FIG. 3, and FIG. 4

FIG. **1** is a schematic view of an illustrative system **1** that may allow for the management of credentials on an electronic device. For example, as shown in FIG. **1**, system **1** may include an end-user electronic device **100** as well as a commercial entity subsystem **400** and a financial institution subsystem **350** for securely provisioning credentials on electronic device **100** and/or for securely deleting credentials from electronic device **100**. Moreover, as shown in FIG. **1**, system **1** may also include a merchant subsystem **200** for receiving contactless proximity-based communications **15** (e.g., near field communications) from electronic device **100** based on such provisioned credentials, as well as an acquiring bank subsystem **300** that may utilize such contactless proximity-based communications **15** for completing a transaction with financial institution subsystem **350**.

As shown in FIG. **2**, and as described in more detail below, electronic device **100** may include a processor **102**, memory **104**, communications component **106**, power supply **108**, input component **110**, output component **112**, antenna **116**, and near field communication ("NFC") component **120**, where input component **110** and output component **112** may sometimes be a single I/O component or I/O interface **114**, such as a touch screen, that may receive input information through a user's touch of a display screen and that may also provide visual information to a user via that same display screen. Electronic device **100** may also include a bus **118** that may provide one or more wired or wireless communication links or paths for transferring data and/or power to, from, or between various other components of device **100**. Electronic device **100** may also be provided with a housing **101** that may at least partially enclose one or more of the components of device **100** for protection from debris and other degrading forces external to device **100**. Processor **102** may be used to run one or more applications, such as an application **103** and/or an application **113**. Each one of applications **103** and **113** may include, but is not limited to, one or more operating system applications, firmware applications, media playback applications, media editing applications, communication applications, NFC applications, biometric feature-processing applications, or any other suitable applications. For example, processor **102** may load an application **103/113** as a user interface program to determine how instructions or data received via an input component **110** or other component of device **100** may manipulate the way in which information may be stored and/or provided to the user via an output component **112**. As one example, application **103** may be an operating system application while application **113** may be a third party application (e.g., an application associated with a merchant of merchant subsystem **200** and/or an application associated with a financial institution of financial institution subsystem **350** and/or an application generated and/or maintained by commercial entity subsystem **400**).

NFC component **120** may be any suitable proximity-based communication mechanism that may enable any suitable contactless proximity-based transactions or communications **15** between electronic device **100** and merchant subsystem **200** (e.g., a merchant payment terminal **220** of merchant subsystem **200**). NFC component **120** may include any suitable modules for enabling contactless proximity-based communication **15** between electronic device **100** and subsystem **200**. As shown in FIG. **2**, for example, NFC component **120** may include an NFC device module **130**, an NFC controller module **140**, and an NFC memory module **150**. NFC device module **130** may include an NFC data module **132**, an NFC antenna **134**, and an NFC booster **136**. NFC controller module **140** may include at least one NFC processor module **142** that may be used to run one or more applications, such as an NFC low power mode or wallet application **143** that may help dictate the function of NFC component **120**. NFC memory module **150** may operate in conjunction with NFC device module **130** and/or NFC controller module **140** to allow for NFC communication **15** between electronic device **100** and merchant subsystem **200**. NFC memory module **150** may be tamper resistant and may provide at least a portion of a secure element **145** (see, e.g., FIG. **4**). For example, such a secure element **145** may be configured to provide a tamper-resistant platform (e.g., as a single or multiple chip secure microcontroller) that may be capable of securely hosting applications and their confidential and cryptographic data (e.g., applets **153** and keys **155**) in accordance with rules and security requirements that may be set forth by a set of well-identified trusted authorities (e.g., an authority of financial institution subsystem and/or an industry standard, such as GlobalPlatform).

As shown in FIGS. **2** and **4**, NFC memory module **150** may include one or more of an issuer security domain ("ISD") **152** and a supplemental security domain ("SSD") **154** (e.g., a service provider security domain ("SPSD"), a

trusted service manager security domain ("TSMSD"), etc.), which may be defined and managed by an NFC specification standard (e.g., GlobalPlatform). For example, ISD **152** may be a portion of NFC memory module **150** in which a trusted service manager ("TSM") or issuing financial institution (e.g., commercial entity subsystem **400** and/or financial institution subsystem **350**) may store keys and/or other suitable information for creating or otherwise provisioning one or more credentials (e.g., commerce credentials associated with various credit cards, bank cards, gift cards, access cards, transit passes, etc.) on electronic device **100** (e.g., via communications component **106**), for credential content management, and/or for security domain management. A specific supplemental security domain ("SSD") **154** (e.g., one of SSDs **154***a* and **154***b*) may be associated with a particular TSM and at least one specific commerce credential (e.g., a specific credit card credential or a specific public transit card credential) that may provide specific privileges or payment rights to electronic device **100**. Each SSD **154** may have its own manager key **155** (e.g., a respective one of keys **155***a* and **155***b*) and at least one of its own credential applications or credential applets (e.g., a Java card applet instances) associated with a particular commerce credential (e.g., credential applets **153***a* and **153***a*' of SSD **154***a* and credential applets **153***b* and **153***b*' of SSD **154***b*), where a credential applet may have its own applet key (e.g., applet key **155***aa* for credential applet **153***a*, applet key **155***aa*' for credential applet **153***a*', applet key **155***ba* for credential applet **153***b*, and applet key **155***ba*' for credential applet **153***b*') and where a credential applet may need to be activated to enable its associated commerce credential for use by NFC device module **130** as an NFC communication **15** between electronic device **100** and merchant subsystem **200**.

As also shown in FIG. **4**, for example, ISD **152** may include a key **155***i* that may also be known to a trusted service manager associated with that security domain (e.g., commercial entity subsystem **400**, as shown in FIG. **1**). Moreover, as also shown in FIG. **4**, ISD **152** may also include or be in any way associated with a contactless registry services ("CRS") applet or application **153***i* that may be configured to provide local functionality to electronic device **100** for modifying the life cycle state **157** (e.g., activated, deactivated, locked, etc.) of certain security domain elements and sharing certain output information **115***o* about certain security domain elements in certain life cycle states with a user of device **100** (e.g., via a user I/O interface **114***a*). For example, as shown, CRS application **153***i* may include a CRS list **151** that may maintain a list of the current life cycle state of each security domain element on secure element **145** (e.g., life cycle state **157***a* of SSD **154***a*, life cycle state **157***aa* of credential applet **153***a*, life cycle state **157***aa*' of credential applet **153***a*', life cycle state **157***b* of SSD **154***b*, life cycle state **157***ba* of credential applet **153***b*, and life cycle state **157***ba*' of credential applet **153***b*'), where CRS application **153***i* may be configured to share the life cycle state of one or more security domain elements of secure element **145** with an application of device **100** (e.g., with a secure element daemon ("SELD") application **113***a* that may be running as a background process inside an operating system application **103** but that may not be under the control of an interactive user of device **100**), which in turn may provide certain life cycle state information with a user of device **100** as output information **115***o* via I/O interface **114***a* and a user interface ("UI") application (e.g., UI application **113***b*, such as a "wallet application", as described below), which may enable a user to change a life cycle state of a security domain element (e.g., to update CRS list **151** and a life cycle state **157** of a security domain element, such as for enabling a commerce credential of a specific credential applet for use in an NFC communication **15**).

As shown in FIG. **3**, and as described below in more detail, a specific example of electronic device **100** may be a handheld electronic device, such as an iPhone™, where housing **101** may allow access to various input components **110***a*-**110***i*, various output components **112***a*-**112***c*, and various I/O components **114***a*-**114***d* through which device **100** and a user and/or an ambient environment may interface with each other. For example, a touch screen I/O component **114***a* may include a display output component **112***a* and an associated touch input component **110***f*, where display output component **112***a* may be used to display a visual or graphic user interface ("GUI") **180** (e.g., with output information **115***o*), which may allow a user to interact with electronic device **100**. GUI **180** may include various layers, windows, screens, templates, elements, menus, and/or other components of a currently running application (e.g., application **103** and/or application **113** and/or application **143**) that may be displayed in all or some of the areas of display output component **112***a*. For example, as shown in FIG. **3**, GUI **180** may be configured to display a first screen **190** with one or more graphical elements or icons **182** of GUI **180**. When a specific icon **182** is selected, device **100** may be configured to open a new application associated with that icon **182** and display a corresponding screen of GUI **180** associated with that application. For example, when the specific icon **182** labeled with a "Setup Assistant" textual indicator **181** (i.e., specific icon **183**) is selected, device **100** may launch or otherwise access a specific setup application and may display screens of a specific user interface that may include one or more tools or features for interacting with device **100** in a specific manner according to that application. As another example, when the specific icon **182** labeled with a "Passbook" textual indicator **181** (i.e., specific icon **184**) is selected, device **100** may launch or otherwise access a specific "Passbook" or "wallet" application and may display screens of a specific user interface that may include one or more tools or features for interacting with device **100** in a specific manner according to that application.

Referring back to system **1** of FIG. **1**, merchant subsystem **200** may include a reader or terminal **220** for detecting, reading, or otherwise receiving NFC communication **15** from electronic device **100** (e.g., when electronic device **100** comes within a certain distance or proximity D of terminal **220**). Accordingly, it is noted that NFC communication **15** between merchant terminal **220** and electronic device **100** may occur wirelessly and, as such, may not require a clear "line of sight" between the respective devices. NFC device module **130** may be passive or active. When passive, NFC device module **130** may only be activated when within a response range D of a suitable terminal **220** of merchant subsystem **200**. For instance, terminal **220** of merchant subsystem **200** may emit a relatively low-power radio wave field that may be used to power an antenna utilized by NFC device module **130** (e.g., shared antenna **116** or NFC-specific antenna **134**) and, thereby, enable that antenna to transmit suitable NFC communication information (e.g., credit card credential information) from NFC data module **132**, via antenna **116** or antenna **134**, to terminal **220** of merchant subsystem **200** as NFC communication **15**. When active, NFC device module **130** may incorporate or otherwise have access to a power source local to electronic device **100** (e.g., power supply **108**) that may enable shared antenna **116** or NFC-specific antenna **134** to actively transmit NFC

communication information (e.g., credit card credential information) from NFC data module **132**, via antenna **116** or antenna **134**, to terminal **220** of merchant subsystem **200** as NFC communication **15**, rather than reflect radio frequency signals, as in the case of a passive NFC device module **130**. As also shown in FIG. **1**, and as described below in more detail, merchant subsystem **200** may also include a merchant processor component **202** that may be the same as or similar to a processor component **102** of electronic device **100**, a merchant application **203** that may be the same as or similar to an application **103**/**113** of electronic device **100**, a merchant communications component **206** that may be the same as or similar to a communications component **106** of electronic device **100**, a merchant I/O interface **214** that may be the same as or similar to an I/O interface **114** of electronic device **100**, a merchant bus **218** that may be the same as or similar to a bus **118** of electronic device **100**, a merchant memory component (not shown) that may be the same as or similar to a memory component **104** of electronic device **100**, and/or a merchant power supply component (not shown) that may be the same as or similar to a power supply component **108** of electronic device **100**.

When NFC component **120** is appropriately enabled and activated to communicate NFC communication **15** to merchant subsystem **200** with commerce credential data associated with an enabled credential of device **100** (e.g., commerce credential data associated with enabled and activated applet **153***a* of SSD **154***a* of NFC component **120**), acquiring bank subsystem **300** may utilize such commerce credential data of NFC communication **15** for completing a commercial or financial transaction with financial institution subsystem **350**. Financial institution subsystem **350** may include a payment network subsystem **360** (e.g., a payment card association or a credit card association) and/or an issuing bank subsystem **370**. For example, issuing bank subsystem **370** may be a financial institution that assumes primary liability for a consumer's capacity to pay off debts they incur with a specific credential. Each specific credential may be associated with a specific payment card that may be electronically linked to an account or accounts of a particular user. Various types of payment cards are suitable, including credit cards, debit cards, charge cards, stored-value cards, fleet cards, gift cards, and the like. The commerce credential of a specific payment card may be provisioned on electronic device **100** by issuing bank subsystem **370** for use in an NFC communication **15** with merchant subsystem **200**. Each credential may be a specific brand of payment card that may be branded by a payment network subsystem **360**. Payment network subsystem **360** may be a network of various issuing banks **370** and/or various acquiring banks that may process the use of payment cards (e.g., commerce credentials) of a specific brand. Alternatively or additionally, certain credentials that may be provisioned on device **100** for use in a commercial or financial transaction may be electronically linked to or otherwise associated with an account or accounts of a particular user, but not associated with any payment card. For example, a bank account or other financial account of a user may be associated with a credential provisioned on device **100** but may not be associated with any payment card.

Payment network subsystem **360** and issuing bank subsystem **370** may be a single entity or separate entities. For example, American Express may be both a payment network subsystem **360** and an issuing bank subsystem **370**. In contrast, Visa and MasterCard may be payment network subsystems **360**, and may work in cooperation with issuing bank subsystems **370**, such as Chase, Wells Fargo, Bank of America, and the like. Financial institution subsystem **350** may also include one or more acquiring banks, such as acquiring bank subsystem **300**. For example, acquiring bank subsystem **300** may be the same entity as issuing bank subsystem **370**. One, some, or all components of payment network subsystem **360** may be implemented using one or more processor components, which may be the same as or similar to processor component **102** of device **100**, one or more memory components, which may be the same as or similar to memory component **104** of device **100**, and/or one or more communications components, which may be the same as or similar to communications component **106** of device **100**. One, some, or all components of issuing bank subsystem **370** may be implemented using one or more processor components, which may be the same as or similar to processor component **102** of device **100**, one or more memory components, which may be the same as or similar to memory component **104** of device **100**, and/or one or more communications components, which may be the same as or similar to communications component **106** of device **100**.

To facilitate transactions within system **1**, one or more commerce credentials may be provisioned on electronic device **100**. As shown in FIG. **1**, commercial entity subsystem **400** may be provided within system **1**, where commercial entity subsystem **400** may be configured to provide a new layer of security and/or to provide a more seamless user experience when it is being determined whether or not to provision a credential from financial institution subsystem **350** on device **100** and/or whether or not to remove a credential from device **100**. Commercial entity subsystem **400** may be provided by a specific commercial entity that may offer various services to a user of device **100**. As just one example, commercial entity subsystem **400** may be provided by Apple Inc. of Cupertino, Calif., which may also be a provider of various services to users of device **100** (e.g., the iTunes™ Store for selling/renting media to be played by device **100**, the Apple App Store™ for selling/renting applications for use on device **100**, the Apple iCloud™ Service for storing data from device **100**, the Apple Online Store for buying various Apple products online, etc.), and which may also be a provider, manufacturer, and/or developer of device **100** itself (e.g., when device **100** is an iPod™, iPad™, iPhone™, or the like). Additionally or alternatively, commercial entity subsystem **400** may be provided by a network operator (e.g., a mobile network operator, such as Verizon or AT&T, which may have a relationship with a user of device **100** (e.g., a data plan for enabling the communication of data over a certain communication path and/or using a certain communication protocol with device **100**)).

The commercial entity that may provide, manage, or at least partially control commercial entity subsystem **400** may also provide different users with their own personalized accounts for using the services offered by that commercial entity. Each user account with the commercial entity may be associated with a specific personalized user ID and password that a user may use to log-in to their account with the commercial entity. Each user account with the commercial entity may also be associated with or have access to at least one commerce credential that can then be used by the user for purchasing services or products offered by the commercial entity. For example, each Apple ID user account may be associated with at least one credit card of a user associated with that Apple ID, such that the credit card may then be used by the user of that Apple ID account for procuring services from Apple's iTunes™ Store, the Apple App Store™, the Apple iCloud™ Service, and the like. The

commercial entity that may provide, manage, or at least partially control commercial entity subsystem **400** (e.g., Apple Inc.) may be distinct and independent from any financial entity of financial institution subsystem **350**. For example, the commercial entity that may provide, manage, or at least partially control commercial entity subsystem **400** may be distinct and independent from any payment network subsystem **360** or issuing bank subsystem **370** that may furnish and manage any credit card or other commerce credential associated with a user account of the commercial entity. Similarly, the commercial entity that may provide, manage, or at least partially control commercial entity subsystem **400** may be distinct and independent from any payment network subsystem **360** or issuing bank subsystem **370** that may furnish and manage any commerce credential to be provisioned on user device **100**. Such a commercial entity may leverage the known commerce credential information associated with each of its user accounts and/or any suitable information that commercial entity subsystem **400** may determine about device **100** in order to more securely determine with commercial entity subsystem **400** whether a specific credential offered by financial institution subsystem **350** ought to be provisioned on a user device **100** or removed therefrom. Additionally or alternatively, such a commercial entity may leverage its ability to configure or control various components of device **100** (e.g., software and/or hardware components of device **100** when that commercial entity at least partially produces or manages device **100**) in order to provide a more seamless user experience for a user of device **100** when he or she wants to provision a credential offered by financial institution subsystem **350** on device **100** or remove a credential therefrom.

Commercial entity subsystem **400** may be a secure platform system and, although not shown in FIG. **1**, may include a secure mobile platform ("SMP") broker component, an SMP trusted services manager ("TSM") component, an SMP crypto services component, an identity management system ("IDMS") component, a fraud system component, a hardware security module ("HSM") component, and/or a store component, as described in more detail below. One, some, or all components of commercial entity subsystem **400** may be implemented using one or more processor components, which may be the same as or similar to processor component **102** of device **100**, one or more memory components, which may be the same as or similar to memory component **104** of device **100**, and/or one or more communications components, which may be the same as or similar to communications component **106** of device **100**. One, some, or all components of commercial entity subsystem **400** may be managed by, owned by, at least partially controlled by, and/or otherwise provided by a single commercial entity (e.g., Apple Inc.) that may be distinct and independent from financial institution subsystem **350**. The components of commercial entity subsystem **400** may interact with each other and collectively with both financial institution subsystem **350** and electronic device **100** for providing a new layer of security and/or for providing a more seamless user experience when managing credentials on device **100**.

Description of FIG. **5**

FIG. **5** is a flowchart of an illustrative process **500** for managing commerce credentials on an electronic device (e.g., for provisioning a credential on an electronic device and/or for deleting a credential from an electronic device). Process **500** is shown being implemented by the various elements of system **1** of FIGS. **1-4** (e.g., electronic device **100**, financial institution subsystem **350**, and commercial entity subsystem **400**). However, it is to be understood that process **500** may be implemented using any other suitable components or subsystems. Process **500** may provide a seamless user experience for securely deleting or otherwise permanently disabling a credential previously provisioned on device **100** without requiring network connectivity between device **100** and a TSM (e.g., financial institution subsystem **350** and/or commercial entity subsystem **400**). This may enable a user to remove a credential's functionality from device **100** permanently without first establishing a network connection between device **100** and a remote subsystem. This may be beneficial when a first user would like to remove certain credentials from device **100** before selling or otherwise transferring control of device **100** to a second user despite no network connectivity between device **100** and a trusted service manager of the credentials.

Process **500** may begin at step **502**, where initial credential management data **552** may be provided on an electronic device. For example, ISD **152**, which may include or otherwise be associated with ISD key **155***i* and CRS application **153***i*, may be provided on secure element **145** of NFC component **120** of electronic device **100** (e.g., by commercial entity subsystem **400**) as at least a portion of initial credential management data **552**, where such initial credential management data **552** may be utilized by NFC component **120** for initially configuring secure element **145** to manage the provisioning and/or deletion of one or more commerce credentials on secure element **145** by a remote subsystem. ISD key **155***i* may also remain accessible to commercial entity subsystem **400** (e.g., a copy of ISD key **155***i* may be stored on or otherwise used by commercial entity subsystem **400**, as shown in FIG. **1**). In such embodiments, commercial entity subsystem **400** may be considered a secure element issuer trusted service manager ("SE-TSM"), and such initial credential management data **552** may be provided by commercial entity subsystem **400** to electronic device **100** via communications path **65** of FIG. **1**. For example, communications component **106** of electronic device **100** may be configured to communicate such initial credential management data **552** with commercial entity subsystem **400** using any suitable communications protocol over any suitable communications path **65**. Additionally or alternatively, SELD application **113***a*, UI application **113***b*, operating system application **103**, and/or any other suitable applications may be made accessible to device **100** by commercial entity subsystem **400** (e.g., from a store component of commercial entity subsystem **400**) as at least a portion of initial credential management data **552**, where such initial credential management data **552** may be utilized by device **100** for enabling a user of device **100** to actively manage the life cycle states of various elements on secure element **145** (e.g., via I/O interface **114***a*).

Next, at step **503**, process **500** may include system **1** receiving a request to provision a commerce credential on electronic device **100**. For example, step **503** may include financial entity subsystem **350** receiving any suitable request for a particular commerce credential to be provisioned on device **100** (e.g., a request initiated by a user of device **100** via interaction with an application of device **100** (e.g., through user interaction with GUI **180** on I/O interface **114***a* of device **100**, such as during use of a setup assistant application associated with "Setup Assistant" icon **183** and/or during use of a "Passbook" or "Wallet" application associated with "Passbook" icon **184** of FIG. **3**), a request initiated by commercial entity subsystem **400**, and/or a request generated by financial institution subsystem **350**

itself). Such a request of credential provisioning may include any suitable identification information associated with the selected credential that may be used by financial institution subsystem **350** for provisioning that credential onto device **100** (e.g., the card verification value ("CVV") for the selected credential, the expiration date for the selected credential, the billing address for the selected credential, etc.). Moreover, such a request may include any other suitable information that may be useful for enabling the provisioning of the selected credential on device **100** (e.g., information associated with the target device **100**, such as an SSD identifier, which may be indicative of an available SSD **154** of NFC component **120** of device **100** that may be able to receive such a provisioned credential).

Next, at step **504**, process **500** may include provisioning the commerce credential identified at step **503** on an electronic device. For example, commerce credential provisioning data **554** may be communicated to electronic device **100** by financial institution subsystem **350** (e.g., via commercial entity subsystem **400**) at step **504** for provisioning at least a first commerce credential applet **153***a* of a first SSD **154***a* on secure element **145** of electronic device **100**. In such embodiments, financial institution subsystem **350** may be considered a service provider trusted service manager ("SP-TSM"). In response to receiving a request at step **503**, various routines may occur at step **504** for provisioning a requested commerce credential on electronic device **100**. For example, step **504** may include financial institution subsystem **350** (e.g., payment network subsystem **360**) generating a descriptor of the selected credential to be provisioned, as well as visual artwork and/or other metadata that may be provided on device **100** for aiding user interaction with the credential once provisioned. Particularly, at step **504** of process **500** of FIG. **5**, financial institution subsystem **350** may pull specific data from the credential provisioning request (e.g., the credential identification information for the credential requested at step **503**), access one or more databases of information available to financial institution subsystem **350** that may be useful for generating one or more descriptors and/or various types of metadata that may aid any eventual user interaction with the credential once provisioned on device **100**, and then generate and transmit at least a portion of commerce credential provisioning data **554** to device **100** (e.g., at least partially via commercial entity subsystem **400**). For example, such commerce credential provisioning data **554** may include some or all suitable data that may enable device **100** to make the credential visually appear as available to device **100**, such as visual logos/icons and other user discernible data associated with the credential that may be provided to the user (e.g., when the specific icon **182** labeled with a "Passbook" textual indicator **181** (i.e., specific icon **184**) of FIG. **3** is selected, device **100** may launch or otherwise access a specific passbook or wallet application and may display screens of a specific user interface that may include one or more visual descriptors of the credential if the credential is in a life cycle state that is to be accessible to a user). Such commerce credential provisioning data **554** generated by financial institution subsystem **350** may be transmitted by financial institution subsystem **350** (e.g., by an appropriate payment network subsystem **360**) to commercial entity subsystem **400** (e.g., to an SMP broker component of commercial entity subsystem **400**) via communications path **55** of FIG. **1** using any suitable communications protocol over any suitable communications path type (e.g., via a TSM of communications path **55**) and then such commerce credential provisioning data **554** may be passed on by commercial entity subsystem **400** to device **100** via communications path **65** of FIG. **1** using any suitable communications protocol over any suitable communications path type (e.g., via a TSM of communications path **65**).

System **1** and/or process **500** may be configured to provision a virtual credential on device **100** rather than the actual credential that may be initially requested for provisioning at step **503**. For example, once it is determined that a credential is to be provisioned on device **100**, it may be requested (e.g., by financial institution subsystem **350**, by commercial entity subsystem **400** at step **503**, and/or by a user of device **100** at step **503**) that a virtual credential be generated, linked to the actual credential, and provisioned on device **100** instead of the actual credential identified at step **503**. That is, commercial entity subsystem **400** may generate and transmit credential provisioning instruction data to financial institution subsystem **350** at step **503** that may also include a specific instruction for financial institution subsystem **350** to create a new virtual credential (e.g., a device primary account number ("D-PAN")), link that virtual credential with the selected actual credential (i.e., a funding primary account number ("F-PAN") originally issued by the issuing bank), and then provision that virtual credential onto device **100**. Accordingly, in such embodiments, financial institution subsystem **350** may generate and transmit commerce credential provisioning data **554** at step **504** that may include a descriptor of the virtual credential (e.g., the D-PAN) to be provisioned and any suitable metadata that ought to be provided on device **100** for aiding user interaction with the virtual credential to be provisioned. Such linking or other suitable association of a virtual credential with an actual credential may be performed by any suitable component of financial institution subsystem **350**. For example, financial institution subsystem **350** (e.g., a particular payment network subsystem **360** that may be associated with the brand of the actual credential identified at step **503**) may define and store an entry in a virtual-linking table or data structure **352** (e.g., as shown in FIG. **1**) at step **504** of process **500**, where such an entry may create an association or link between the actual credential and a virtual credential. Thus, when a virtual credential is utilized by device **100** for a financial transaction with merchant subsystem **200** (e.g., after the virtual credential has been provisioned on device **100**), financial institution subsystem **350** may receive an authorization request indicative of that virtual credential (e.g., as data **395** from acquiring bank subsystem **300**, described below) and may conduct an analysis of that authorization request in light of the actual credential associated or otherwise linked with the identified virtual credential as determined by virtual-linking table **352**. Additionally or alternatively, table **352** may include data associating a credential (e.g., a virtual credential and/or an actual credential) with a particular electronic device **100** or at least a particular secure element **145** of a device **100** on which that credential is provisioned. Thus, when a list of credentials provisioned on a device **100** is provided to financial institution subsystem **350** (e.g., as described below with respect to step **522**), financial institution subsystem **350** may confer with data entries of table **352** to determine if one or more credentials previously provisioned on device **100** by financial institution subsystem **350** has been deleted (e.g., as described below with respect to step **524**).

By provisioning a virtual credential on device **100** rather than an actual credential, financial institution subsystem **350** may be configured to limit the fraudulent activity that may result if the virtual credential is intercepted by an unauthorized user (e.g., by an NFC communication **15** signal stealer

positioned adjacent device **100** and/or merchant terminal **220**), as financial institution subsystem **350** (e.g., payment network subsystem **360**) may only be configured to utilize virtual-linking table **352** for linking the virtual credential to the actual credential during certain transactions (e.g., during NFC transactions received by merchant terminal **220** and not during online transactions or other transactions that may allow credential information to be manually entered by a user). Therefore, in such embodiments using a virtual credential, commerce credential provisioning data **554** generated by financial institution subsystem **350** may contain a new D-PAN (e.g., new virtual credential information) from an entry in table **352** that may define a link between an F-PAN (e.g., an actual credential banking number) of the selected credential identified at step **503** and this new D-PAN. Commerce credential provisioning data **554** may also include the last four digits or any other suitable data of the linked F-PAN for creating a hashed version of the F-PAN. Providing both the virtual D-PAN and a hashed version of the actual F-PAN on device **100** may prevent user confusion between the two and may enable easier user association of the two when utilizing a virtual credential for a financial transaction. Therefore, in some embodiments, a full version of an F-PAN (e.g., an actual credential banking number) may never be stored on device **100**, but rather only an associated D-PAN (e.g., a linked virtual credential) may be stored in non-hashed form on device **100**. Commerce credential provisioning data **554** may also include a unique D-PAN hash (e.g., the last four digits of the D-PAN and/or any other suitable data for creating a hashed version of the D-PAN that may be used in all subsequent calls to reference this D-PAN while maintaining security of the D-PAN). Commerce credential provisioning data **554** may also include an "AuthToken" or any other suitable token that may be a one-time use token for enabling provision of the credential. Commerce credential provisioning data **554** may also include put pending command data that may include the primary account number (e.g., D-PAN or F-PAN, hashed or not) of the credential being provisioned, an SSD identifier, and/or an SSD counter.

As mentioned, commercial entity subsystem **400** (e.g., an SMP broker component and/or an SMP-TSM component of commercial entity subsystem **400**) may pass commerce credential provisioning data **554** onto device **100** as part of step **504**, where such commerce credential provisioning data **554** may include any suitable description or identification of the credential to be provisioned (e.g., a hashed-version of the credential's PAN, virtual and/or actual (e.g., D-PAN and/or F-PAN)), as well as any associated metadata. Such commerce credential provisioning data **554** may also include one or more persoScripts or GlobalPlatform application protocol data unit ("APDU") scripts (e.g., any scripts, any rotate keys (e.g., if necessary), and any other suitable administrative elements that may be used to provision a usable PAN on device **100**). Such commerce credential provisioning data **554** may also include information associated with the particular SSD **154** of device **100** that may have the credential provisioned thereon (e.g., an SSD identifier of a particular SSD **154**, as may be provided by step **503**). Such commerce credential provisioning data **554** may be transmitted by commercial entity subsystem **400** to electronic device **100** via communications path **65** of FIG. **1**. For example, communications component **106** of electronic device **100** may be configured to receive commerce credential provisioning data **554** using any suitable communications protocol over any suitable communications path **65**. In some embodiments, commerce credential provisioning data **554** may be transmitted by commercial entity subsystem **400** to device **100** as encrypted with ISD key **155***i* as may be accessible to both commercial entity subsystem **400** and ISD **152** of device **100**. Alternatively or additionally, at least some of commerce credential provisioning data **554** may be provided to electronic device **100** directly from financial institution subsystem **350** at step **504** (e.g., via communications path **75** of FIG. **1**, where communications component **106** of electronic device **100** may be configured to receive commerce credential provisioning data **554** using any suitable communications protocol over any suitable communications path **75**). Commerce credential provisioning data **554** may be generated and transmitted by financial institution subsystem **350** as encrypted with an SSD key **155***a* of the target SSD **154***a* and/or with a credential applet key **155***aa* of the new commerce credential applet **153***a* being provisioned at step **504**, where SSD key **155***a* and/or credential applet key **155***aa* may be accessible to financial institution subsystem **350** (e.g., as shown in FIG. **1**). By encrypting at least some of commerce credential provisioning data **554** using an SSD key **155***a* and/or a credential applet key **155***aa* that may be known to financial institution subsystem **350** but not to commercial entity subsystem **400**, at least some of the information of commerce credential provisioning data **554** may be inaccessible to commercial entity subsystem **400** even if that commerce credential provisioning data **554** may be passed through commercial entity subsystem **400** from financial institution subsystem **350** to device **100** at step **504**.

After step **504**, once commerce credential provisioning data **554** has been received by electronic device **100**, device **100** may be configured to complete any of the received scripts from commerce credential provisioning data **554** of step **504** and/or take any other suitable action for enabling the credential (e.g., for toggling the credential from a disabled state to an enabled state) at step **505** of process **500**, such that the actual credential identified at step **503** may have an associated commerce credential applet **153** (e.g., commerce credential applet **153***a* of SSD **154***a*) enabled on secure element **145** for eventual use in an NFC communication **15** for a financial transaction. SSD **154***a* may also be provisioned on secure element **145** along with commerce credential applet **153***a* based on commerce credential provisioning data **554** of step **504**. Alternatively, SSD **154***a* may have been previously created on secure element **145**, such that only commerce credential applet **153***a* and not SSD **154***a* may be provisioned on secure element **145** based on commerce credential provisioning data **554** of step **504**. Once a new commerce credential applet **153***a* has been provisioned on SSD **154***a* of secure element **145** of device **100** at step **504**, SSD **154***a* may include SSD key **155***a* and SSD life cycle state **157***a*, while commerce credential applet **153***a* may include applet key **155***aa* and applet life cycle state **157***aa*. At step **506** of process **500**, CRS list **151** of CRS application **153***i* may be updated (e.g., by ISD **152**) to reflect the new life cycle states of secure element **145** (e.g., at least the new life cycle state **157***aa* of new commerce credential applet **153***a* as just provisioned on device **100** at step **504**/**505**). For example, in some embodiments, the initial life cycle state **157***aa* of a commerce credential applet **153***a* provisioned on a secure element may be configured to be enabled but "DEACTIVATED" at step **505** and reflected as such in CRS list **151** at step **506**, whereby a user of device **100** may later activate the commerce credential applet **153***a* for use in an NFC communication **15** (e.g., update life cycle state **157***aa* of commerce credential applet **153***a* to "ACTIVATED"). After CRS list **151** has been updated at step **506** to reflect the life cycle state of the newly provisioned

commerce credential applet **153***a*, process **500** may proceed to step **508**, where at least certain data from CRS list **151** of secure element **145** may be shared with processor **102** of device **100** (e.g., with SELD application **113***a*) as shared CRS list data **558**, and where at least certain information of shared CRS list data **558** may be selectively shared by SELD application **113***a* with UI application **113***b* as shared user CRS list data **558'**, which may then be selectively provided by UI application **113***b* as output information **1150** to a user of device **100** (e.g., via I/O interface **114***a* or any other suitable output component of device **100**, as shown in FIG. **4**). Device **100** may then be used at step **509** (e.g., by a user interacting with UI application **113***b* through the use of user input information **115***i*) to change the life cycle state of a credential provisioned on secure element **145** (e.g., life cycle state **157***aa* of commerce credential applet **153***a*) to "ACTIVATED" for use in one or more ways (e.g., for use in an NFC communication **15** with merchant subsystem **200** in a financial transaction, as described below in more detail). For example, the visual artwork and/or other metadata of commerce credential provisioning data **554** that may be provided on device **100** at step **504** for aiding user interaction with a provisioned credential may be used at step **509** for identifying the credential to a user as output information **115***o*.

As mentioned, process **500** may be configured to allow an electronic device to mark a commerce credential or other security domain element for deletion without requiring authentication and/or secure channel setup and/or network connectivity with a trusted service manager (e.g., with SEI-TSM commercial entity subsystem **400** and/or with SP-TSM financial institution subsystem **350**). Device **100** may be configured to transition one or more certain security domain elements of NFC component **120** (e.g., SSDs **154***a* and **154***b* and/or credential applets **153***a*, **153***a'*, **153***b*, and **153***b'*) to a new life cycle state "ELEMENT_TERMINATED" that may make that element unusable. This ELEMENT_TERMINATED life cycle state may be similar to a "LOCKED" state that may already be covered by GlobalPlatform, however the transition to the ELEMENT_TERMINATED state may be irreversible and may act as a permanent local disable or mark-for-delete functionality that may thereafter make the security domain element unusable. Then, at any time after the life cycle state for a particular security domain element has been transitioned to ELEMENT_TERMINATED, the owner or trusted service manager of the security domain of that transitioned element, who may have content management privileges for that security domain, may later delete the transitioned element according to any suitable protocol (e.g., according to GlobalPlatform, for example, by setting up a secure channel path between device **100** and the TSM, and then issuing a DELETE command) or may in any other suitable way reconcile the permanent disablement of the credential. Therefore, a security domain element (e.g., a provisioned credential) may be permanently disabled on device **100** without requiring network connectivity between device **100** and a TSM (e.g., financial institution subsystem **350** and/or commercial entity subsystem **400** sharing a key with the security domain element) at the time of permanent disablement. This may enable a user to remove a credential's functionality from device **100** permanently without first establishing a network connection between device **100** and a remote subsystem. This may be beneficial when a first user would like to remove certain credentials from device **100** before selling device **100** to a second user despite no network connectivity between device **100** and a trusted service manager.

Before a life cycle state of a security domain element of device **100** may be transitioned to such an ELEMENT_TERMINATED state, that security domain element must first be configured to even allow such a transition. That is, some or all security domain elements of device **100** may each be configured to include a data field or any other suitable feature that can be set either to allow the security domain element to be transitioned to an ELEMENT_TERMINATED state or to prevent the security domain element from being transitioned to an ELEMENT_TERMINATED state. For example, some or all security domain elements of secure element **145** of device **100** may be configured to include a flag or bit register or any other suitable functionality data register **159** that may be set for either allowing or preventing such a transition. For example, as shown in FIG. **4**, security domain element ISD **152** or CRS application **153***i* may include a functionality data register **159***i*, security domain element SSD **154***a* may include a functionality data register **159***a*, security domain element credential applet **153***a* may include a functionality data register **159***aa*, security domain element credential applet **153***a'* may include a functionality data register **159***aa'*, security domain element SSD **154***b* may include a functionality data register **159***b*, security domain element credential applet **153***b* may include a functionality data register **159***ba*, and/or security domain element credential applet **153***b'* may include a functionality data register **159***ba'*, where the functionality data register **159** of each security domain element may be independently set to either allow or prevent a transition of the life cycle state **157** of that security domain element to the ELEMENT_TERMINATED state.

Whether the functionality data register **159** of a particular security domain element is set to allow or prevent such a life cycle state transition may be determined by the manager of that security domain element and may not be changed by a user of device **100**. In some embodiments, the functionality data register **159** of a security domain element may be set when that security domain element is installed or otherwise provisioned on device **100**. For example, functionality data register **159***i* of CRS application **153***i* of ISD **152** may be set by commercial entity subsystem **400** at step **502** of process **500** when initial credential management data **552** is provided to device **100**. Additionally or alternatively, as another example, functionality data register **159***aa* of credential applet **153***a* may be set by financial institution subsystem **350** or commercial entity subsystem **400** at step **504** of process **500** when commerce credential provisioning data **554** is provided to device **100**. In some embodiments, functionality data register **159***i* of CRS application **153***i* may be set (e.g., to a bit value "0") so as to prevent CRS application **153***i* from being transitioned to an ELEMENT_TERMINATED state, while functionality data register **159***aa* of credential applet **153***a* may be set (e.g., to a bit value "1") so as to allow life cycle state **157***aa* of credential applet **153***a* to be transitioned to an ELEMENT_TERMINATED state. Other components of secure element **145** may also be configured to be prevented from being transitioned to an ELEMENT_TERMINATED state, such as a controlling authority security domain ("CASD") (not shown). Moreover, in some particular embodiments, a life cycle state of a particular SSD may be prevented from transitioning to an ELEMENT_TERMINATED state while a life cycle state of a particular credential applet of that SSD may be allowed to transition to an ELEMENT_TERMINATED state. For example, functionality data register **159***a* of SSD **154***a* may be set (e.g., to a bit value "0") so as to prevent SSD **154***a* from being

transitioned to an ELEMENT_TERMINATED state, yet functionality data register **159***aa* of credential applet **153***a* of SSD **154***a* may be set (e.g., to a bit value "1") so as to allow life cycle state **157***aa* of credential applet **153***a* to be transitioned to an ELEMENT_TERMINATED state, while functionality data register **159***aa*' of credential applet **153***a*' of SSD **154***a* may be set either to allow or prevent the transition of life cycle state **157***aa*' of credential applet **153***a*' to an ELEMENT_TERMINATED state.

As one particular example, a functionality data register **159** of a security domain element of device **100** may be set in the "Extended Functionality Indicator," as may be stored in "Application Discretionary Data" of the contactless parameters in the "User Interaction Parameters", where GlobalPlatform may define such Application Discretionary Data to be used by a CRS application (see, e.g., GlobalPlatform Technical Specification 2.2.1, v1.1, which is hereby incorporated by reference herein in its entirety). Such Application Discretionary Data may be wrapped inside constructed basic encoding rules ("BER") tag 0xA6 (see, e GlobalPlatform Technical Specification 2.2.1, v1.1, Amendment C, Table 3-13, which is hereby incorporated by reference herein in its entirety). As a specific example, bit **2** of byte **1** (least significant bit ("LSB")) of the Extended Functionality Indicator of a specific security domain element may be set either to "0" (e.g., not set) for preventing the transition of the life cycle state of that security domain element to ELEMENT_TERMINATED or to "1" (e.g., set) for allowing the transition of the life cycle state of that security domain element to ELEMENT_TERMINATED. When the functionality data register of a security domain element is set by a trusted service manager at install of the security domain element, the content management privileges of such a trusted service manager (e.g., financial institutions subsystem **350** and/or commercial entity subsystem **400**) may require or otherwise utilize authentication and a secure channel for ensuring the authenticity and integrity of the functionality data register value. CRS application **153***i* and/or any other application of secure element **145** (e.g., NFC application **143**) may leverage the functionality data register of security domain elements while processing life cycle state update requests. For example, CRS list **151** may not only include state information for the life cycle state of some or all security domain elements of device **100**, but CRS list **151** may also include state information for the functionality data register of some or all of those security domain elements as well, such that shared CRS list data **558** or any other data indicative of CRS list **151** may indicate not only the life cycle state of a security domain element but also whether or not that security domain element is able to be transitioned to the ELEMENT_TERMINATED state.

At some point during the life of a security domain element on device **100**, CRS application **153***i* may be instructed (e.g., by processor **102**) to transition the life cycle state of the security domain element to ELEMENT_TERMINATED. For example, at step **510** of process **500**, a user of device **100** may interact with UI application **113***b* (e.g., with input information **115***i* via I/O interface **114***a*) to instruct device **100** to transition the life cycle state of a particular security domain element to ELEMENT_TERMINATED. As mentioned, this may be desirable by a user when he or she wishes to sell or otherwise transfer device **100** to a new person who should not have access to one or more commerce credentials on device **100**, especially when device **100** is not communicatively connected to a trusted service manager of that commerce credential at the time of the transfer. Such a user instruction may be provided by UI application **113***b* to SELD application **113***a* as state transition request data **562**, which may then be communicated to CRS application **153***i* at step **512** of process **500**. Alternatively or additionally, such a user instruction may not specifically identify a specific security domain element but instead the user instruction may be a more generic "clear all personal information" command that may have implications across multiple applications and not just for SELD application **113***a* and CRS application **153***i*. Alternatively or additionally, such an instruction may be generated automatically by an application of device **100** in response to a particular condition and not in response to a particular user interaction. Next, at step **514** of process **500**, ISD **152** (e.g., CRS application **153***i*) may process state transition request data **562** and potentially update the life cycle state of a particular security domain element to ELEMENT_TERMINATED by transmitting suitable life cycle state update data **564** to the particular security domain element. For example, CRS application **153***i* may process state transition request data **562** to determine whether the particular security domain element indicated by state transition request data **562** is able to be transitioned to the ELEMENT_TERMINATED state (e.g., by identifying the state information for the functionality data register of that particular security domain element) and, if so, then transmit suitable life cycle state update data **564** to that particular security domain element for updating the life cycle state of that security domain element to ELEMENT_TERMINATED. No access control (e.g., secure channel between device **100** and the TSM of the security domain element to be transitioned) may be required to issue the command of life cycle update data **564** of step **514**. That is, the communicative coupling between financial entity subsystem **350** and device **100** required at step **504** for the provisioning of the security domain element on device **100** may be terminated or otherwise non-existent during step **510**, **512**, and/or step **514**. The state of a security domain element may be transitioned to the ELEMENT_TERMINATED state locally on device **100** without requiring any communication between device **100** and a trusted service manager. UI application **113***b* may leverage previously shared CRS list data **558** (e.g., from step **508**) to determine which security domain elements of device **100** are able to be transitioned to the ELEMENT_TERMINATED state (e.g., based on state information for the functionality data register of some or all of the security domain elements) and may only enable a user to select from those particular security domain elements for instructing device **100** to transition the state of a security domain element to ELEMENT_TERMINATED at step **510**. Alternatively, UI application **113***b* may enable a user to select from all security domain elements for instructing device **100** to transition the state of a security domain element to ELEMENT_TERMINATED at step **510**, and only ISD **152** at step **514** may determine whether or not to allow state transition request data **562** to trigger a state transition to ELEMENT_TERMINATED through analysis of the state information for the functionality data register of the identified security domain element.

State transition request data **562** may be configured to identify any suitable security domain element for transitioning to the ELEMENT_TERMINATED state. For example, state transition request data **562** may request that life cycle state **157***aa* of credential applet **153***a* be transitioned to ELEMENT_TERMINATED state. If the state of functionality data register **159***aa* of credential applet **153***a* indicates the allowance of such a state change, ISD **152** may update life cycle state **157***aa* of credential applet **153***a* to ELEMENT_TERMINATED at step **514**. As another

example, state transition request data **562** may request that life cycle state **157***a* of SSD **154***a* be transitioned to ELEMENT_TERMINATED state. If the state of functionality data register **159***a* of SSD **154***a* indicates the allowance of such a state change, ISD **152** may update life cycle state **157***a* of SSD **154***a* to ELEMENT_TERMINATED at step **514**. Such a transition may be configured to consequently transition the life cycle state of each security domain element within SSD **154***a* to ELEMENT_TERMINATED as well (e.g., both life cycle state **157***aa* of credential applet **153***a* and life cycle state **157***aa*' of credential applet **153***a*' of SSD **154***a* may also be updated to ELEMENT_TERMINATED in response to such state transition request data **562** for SSD **154***a*). Therefore, the life cycle state of either a specific credential applet or an entire SSD may be transitioned to ELEMENT_TERMINATED at step **514**. In other embodiments, only particular applets of or associated with an SSD may be transitioned to a terminated state while the SSD itself may remain on the secure element and not be transitioned to a terminated state.

In particular embodiments, process **500** may be configured to utilize a proprietary or otherwise new life cycle state ELEMENT_TERMINATED through using a unique coding structure that may be accessible to applicable standards (e.g., to GlobalPlatform Technical Specification 2.2.1, v1.1). For example, life cycle state coding may be coded bitwise and, in order to avoid conflict with any existing valid life cycle states, the new ELEMENT_TERMINATED life cycle state may use a coding of "10000001" for bits **8-1**, where other existing valid life cycle states may include coding of "00000011" for an "INSTALLED" state, "00000111" for a "SELECTABLE" state, "0XXXX111" for application-specific states, and "1XXXXX11" for a "LOCKED" state. In some embodiments, device **100** may be configured to treat a security domain element in the ELEMENT_TERMINATED state as if it were in the LOCKED state except that any attempt to transition the state from ELEMENT_TERMINATED to a different state shall fail. Device **100** may be configured to transition the life cycle state of a security domain element to the ELEMENT_TERMINATED state through an application using GlobalPlatform Technical Specification 2.2.1's application programming interface ("API") "GPRegistryEntry method setState( )". For example, an application requesting this state transition (e.g., CRS application **153***i*) may be configured to have the "Global Registry and Contactless Activation" privilege. A limitation of such a "GPRegistryEntry method setState( )" may be extended to include this new ELEMENT_TERMINATED state, where a transition request to a state other than LOCKED, UNLOCKED, and ELEMENT_TERMINATED may only be accepted if the invoking application corresponds to this GPRegistryEntry. Device **100** may be configured to make possible a transition to the ELEMENT_TERMINATED state from most or all original life cycle states, including from the LOCKED state to the ELEMENT_TERMINATED state. In response to receiving a "SET STATUS" command (e.g., from SELD application **113***a*), CRS application **113***i* may not be configured to support transitioning a security domain element to the ELEMENT_TERMINATED state. Device **100** may be configured to apply one or more certain limitations to a requested transition of a particular security domain element's life cycle state to ELEMENT_TERMINATED. For example, if any application currently running on device **100** (e.g., at the initiation of step **514**) is referencing the security domain element (e.g., through an internal interface), then device **100** may be configured to prevent that security domain element from transitioning to the ELEMENT_TERMINATED state. It is also to be understood that, in some embodiments, it may be possible to transition globally all applications (e.g., applets) with a single command that may transition each application to the ELEMENT_TERMINATED state if that application is capable of doing so (e.g., is in a PERSONALIZED life cycle).

Next, at step **516** of process **500**, CRS list **151** of CRS application **153***i* may be updated (e.g., by ISD **152**) to reflect the new life cycle states of secure element **145** (e.g., at least the new ELEMENT_TERMINATED life cycle state of the particular security domain element identified by data **562** and **564**). After CRS list **151** has been updated at step **516** to reflect the life cycle state of the newly terminated security domain element, process **500** may proceed to step **518**, where at least certain data from CRS list **151** of secure element **145** may be shared with processor **102** of device **100** (e.g., with SELD application **113***a*) as shared CRS list data **568**, and where at least certain information of shared CRS list data **568** may be selectively shared by SELD application **113***a* with UI application **113***b* as shared user CRS list data **568**', which may then be selectively provided by UI application **113***b* as output information **115***o* to a user of device **100** (e.g., via I/O interface **114***a* or any other suitable output component of device **100**, as shown in FIG. **4**). Device **100** may then be used at step **520** (e.g., by a user interacting with UI application **113***b* through the use of user input information **115***i*) to manage commerce credentials of device **100** in one or more ways. For example, a user may interact with UI application **113***b* and output information **115***o* to provide new input information **115***i* for selecting a credential application for use in a financial transaction at step **520**.

As mentioned, device **100** may be configured to treat a security domain element in the ELEMENT_TERMINATED state as if it is in the LOCKED state except that any attempt to transition the state from ELEMENT_TERMINATED to a different state shall fail. However, in some embodiments, device **100** may be configured to prevent any indication of a security domain element that is in the ELEMENT_TERMINATED state to a user of device **100**. For example, if life cycle state **157***aa* of credential applet **153***a* is transitioned to the ELEMENT_TERMINATED state at step **564** and shared CRS list data **568** indicates this status to processor **102** at step **518**, UI application **113***b* may be configured to never present any information indicative of credential applet **153***a* to a user of device **100** from that point forward (e.g., as output information **115***o* at step **520**). That is, although output information **115***o* may have been indicative of credential applet **153***a* at step **509** where a user may have selected and activated that credential applet **153***a* for use in a financial transaction and/or at step **510** where a user may have selected that credential applet **153***a* for transitioning to the ELEMENT_TERMINATED state, once its state has been transitioned to ELEMENT_TERMINATED, all information indicative of the existence of credential applet **153***a* on device **100** may be permanently prevented from being shared with a user of device **100** (e.g., as output information **1150** by UI application **113***b* via I/O interface **114***a* at step **520**). Such indicative information may include all visual artwork and/or other metadata described above for a provisioned credential at step **504**. In some embodiments, SELD application **113***a* may be configured to detect which security domain elements are in the ELEMENT_TERMINATED state (e.g., through analysis of shared CRS list data **568**) and may only pass on shared user CRS list data **568**' information to UI application **113***b* (see, e.g., FIG. **4**) that is indicative of security domain elements that are not in the ELEMENT-

_TERMINATED state. That is, SELD application **113***a* may be configured to prevent UI application **113***b* from receiving any information from secure element **145** related to any security domain element that is in the ELEMENT_TERMINATED state. In other embodiments, UI application **113***b* may be configured to receive CRS list data **568'** that is the same as CRS list data **568** received by SELD application **113***a*, and UI application **113***b* may be configured to prevent the presentation of information to a user that is indicative of a security domain element that is in the ELEMENT_TERMINATED state. Moreover, if a security domain element in the ELEMENT_TERMINATED state offers an internal interface (e.g., through a shareable interface object ("SIO")), device **100** may be configured to make such an internal interface no longer functional once the security domain element transitions to the ELEMENT_TERMINATED state. It is also to be noted that the only supported SD command targeting a security domain element that is in the ELEMENT_TERMINATED state may be the DELETE command.

At some point after step **518**, process **500** may proceed to step **522** where electronic device **100** may be communicatively coupled to a trusted service manager of the security domain element whose state was transitioned to ELEMENT_TERMINATED at step **514**. For example, if credential applet **153***a* was transitioned to the ELEMENT_TERMINATED state at step **514**, step **522** may include electronic device **100** being communicatively coupled to financial institution subsystem **350** (e.g., directly via communications path **75** or indirectly through commercial entity subsystem **400** via communications paths **65** and **55**). Such a communicative coupling may occur for any suitable reason (e.g., at the request of financial institution subsystem **350**, commercial entity subsystem **400**, and/or device **100**). When such a communicative coupling is made, shared TSM data **572** may be communicated from device **100** to the communicatively coupled TSM at step **522** (e.g., directly via communications path **75** or indirectly through commercial entity subsystem **400** via communication paths **65** and **55**). Such shared TSM data **572** may include any suitable data that may be appropriate to share with the communicatively coupled TSM (e.g., financial institution subsystem **350**). For example, shared TSM data **572** may at least include information that identifies electronic device **100** (e.g., secure element **145**) and information indicative of data in the current CRS list **151** of device **100**. Particularly, processor **102** (e.g., SELD application **113***a*) may be configured to leverage most recently shared CRS list data **568** to generate and transmit shared TSM data **572** that may be indicative of at least the life cycle states of the security domain elements of device **100** that are managed by the communicatively coupled TSM. That is, TSM data **572** may include information indicative of the ELEMENT_TERMINATED state of applet credential **153***a* if such a state was transitioned to at step **514**. In response to receiving a "GET STATUS" command (e.g., from SELD application **113***a*), CRS application **113***i* may be configured to include the ELEMENT_TERMINATED status of the security domain elements currently in that life cycle state (e.g., in any shared CRS list data **558**/**568**). Device **100** may be configured to communicate shared TSM data **572** at step **522** automatically in response to being communicatively coupled to a TSM. Alternatively, device **100** may be configured to communicate shared TSM data **572** in response to a request for such data that may be made by the TSM in response to being communicatively coupled to device **100**.

In response to receiving shared TSM data **572** at step **522**, the communicatively coupled TSM may process the received TSM data at step **524** of process **500**. For example, financial institution subsystem **350** may analyze shared TSM data **572** in any suitable way at step **524** to determine whether any security domain element of device **100** managed by financial institution subsystem **350** has had its life cycle state transitioned to ELEMENT_TERMINATED. If such a determination is made, financial institution subsystem **350** may reconcile this transition by updating any suitable data maintained by financial institution subsystem **350**. For example, if a commerce credential applet defined by a virtual commerce credential (e.g., a D-PAN) has been transitioned to the ELEMENT_TERMINATED state on device **100**, financial institution subsystem **350** may be configured to update virtual-linking table **352** at step **524** to remove the link for that virtual commerce credential (e.g., such that the virtual credential may be linked to another actual credential and provisioned on another electronic device). Then, at step **526** of process **500**, financial institution subsystem **350** may be configured to share TSM response data **576** with device **100** based on the analysis of step **524** (e.g., directly via communications path **75** or indirectly through commercial entity subsystem **400** via communication paths **55** and **65**). For example, in response to financial entity subsystem **350** determining at step **524** that a particular security domain element of device **100** managed by financial institution subsystem **350** has had its life cycle state transitioned to ELEMENT_TERMINATED, financial institution subsystem **350** may generate and transmit TSM response data **576** that may be configured to delete or otherwise complete the termination of that particular security domain element from device **100** (e.g., TSM response data **576** may include a "DELETE" SD command that may be supported by GlobalPlatform). As shown in FIG. **4**, such TSM response data **576** may be received by device **100** (e.g., via communications component **106** from communications paths **65** or **75** of FIG. **1**) and processor **102** (e.g., SELD application **113***a*) may pass such TSM response data **576** on to ISD **152** (e.g., CRS application **153***i*).

Next, in response to receiving TSM response data **576** at step **526**, ISD **152** may process and act on that received TSM response data at step **528**. For example, at step **528**, ISD **152** (e.g., CRS application **153***i*) may process received TSM response data **576** and potentially delete or otherwise complete the termination of a particular security domain element currently in the ELEMENT_TERMINATED state by transmitting suitable delete element data **578** to the particular security domain element. For example, ISD **152** may process TSM response data **576** (e.g., to determine if the transmitting TSM (e.g., financial institution subsystem **350** has authority to delete the indicated security domain element) and, if appropriate, then transmit suitable delete element data **578** to that particular security domain element for deleting that security domain element from secure element **145**. Also, at step **530** of process **500**, CRS list **151** of CRS application **153***i* may be updated (e.g., by ISD **152**) to reflect the fact that a security domain element has been removed from secure element **145** such that CRS list **151** may remove any information regarding that security domain element.

Therefore, process **500** enables a security domain element (e.g., a commerce credential applet or an SSD) to be provisioned on device **100** (e.g., at step **504** during a first communication session between device **100** and a TSM), enables information indicative of that security domain element to be presented to a user of device **100** for aiding in the use or any other suitable management purpose of that security domain element (e.g., at steps **509** and **510**), enables

the life cycle state of that security domain element to be transitioned to an ELEMENT_TERMINATED state (e.g., at step **514**) without device **100** being communicatively coupled to a TSM of that security domain element (e.g., after the first communication session between device **100** and the TSM has been terminated), prevents that security domain element from being utilized by and/or presented to a user of device **100** from that point on (e.g., at step **520**), and then enables that security domain element to be frilly deleted from device **100** when device **100** is eventually communicatively coupled to the TSM of that security domain element (e.g., at steps **522-528** during a second communication session between device **100** and the TSM that is different than the first communication session). This may enable a user of device **100** to believe that a security domain element has been completely removed from device **100** as soon as that security domain element has been transitioned to the ELEMENT_TERMINATED state at step **514**, despite that security domain element not actually being completely removed from device **100** until the later step **528**. However, in other embodiments, rather than updating the life cycle state of a security domain element to ELEMENT_TERMINATED at step **514** in response to state transition request data **562** requesting the deletion of that security domain element, step **514** may alternatively include actually deleting the security domain element (i.e., rather than waiting to do so at a much later point in time at step **528** in response to TSM response data **576** received from a communicatively coupled TSM). Then, in such instances, step **516** may include updating CRS list **151** to be indicative of that deletion (e.g., by completely removing any information regarding that deleted security domain element or by generating a message indicative of the deletion). Then, device **100** may still be configured to prevent any indication of that deleted security domain element to a user of device **100** at step **520** and shared TSM data **572** shared with a communicatively coupled TSM at step **522** may at least include information that identifies electronic device **100** (e.g., secure element **145**) and information indicative of data in the current CRS list **151** of device **100**. Particularly, processor **102** (e.g., SELD application **113***a*) may be configured to leverage most recently shared CRS list data **568** updated at step **516** to generate and transmit shared TSM data **572** that may either have no information regarding the security domain element deleted at step **514** or that may include a message indicative of the deletion of the security domain element at step **514**. Then, in such a situation, financial institution subsystem **350** may analyze such shared TSM data **572** in any suitable way at step **524** to determine whether any security domain element of device **100** managed by financial institution subsystem **350** has been deleted from device **100** (e.g., by detecting such a message and/or by conferring with data entries of table **352** to determine if one or more credentials previously provisioned on device **100** by financial institution subsystem **350** is not identified in shared TSM data **572** (e.g., by determining that no life cycle state for the previously provisioned credential is indicated by shared TSM data **572**)). If such a determination is made, financial institution subsystem **350** may reconcile this deletion by updating any suitable data maintained by financial institution subsystem **350**. For example, if a commerce credential applet defined by a virtual commerce credential (e.g., a D-PAN) has been deleted from device **100** at step **514**, financial institution subsystem **350** may be configured to update virtual-linking table **352** at step **524** to remove the link for that virtual commerce credential (e.g., such that the virtual credential may be linked to another actual credential and provisioned on another electronic device). When such a determination is made at step **524** that one or more credentials previously provisioned on device **100** by financial institution subsystem **350** has been deleted from device **100** at step **514**, there may be no need for financial institution subsystem **350** to generate and transmit an TSM response data **576** to device **100** as described above with respect to step **526**. Co-pending, commonly-assigned U.S. provisional patent application No. 61/923,312, filed Jan. 3, 2014, is hereby incorporated by reference herein in its entirety, and is directed towards disabling mobile payments for lost electronic devices.

It is understood that the steps shown in process **500** of FIG. **5** are merely illustrative and that existing steps may be modified or omitted, additional steps may be added, and the order of certain steps may be altered.

Description of FIG. 6

FIG. **6** is a flowchart of an illustrative process **600**. At step **602**, process **600** may terminate (e.g., permanently) the functionality of a security domain element on an electronic device while the electronic device is not communicatively coupled to a trusted service manager of the security domain element. For example, as described above with respect to FIGS. **1-5**, device **100** may be configured to transition the state of a security domain element to the ELEMENT_TERMINATED state without device **100** being communicatively coupled to any remote entity, such as financial institution subsystem **350** or commercial entity subsystem **400**. As another example, as described above with respect to FIGS. **1-5**, device **100** may be configured to delete a security domain element from device **100** without device **100** being communicatively coupled to any remote entity, such as financial institution subsystem **350** or commercial entity subsystem **400**. Next, at step **604** of process **600**, after the termination of step **602**, the electronic device may be communicatively coupled to the trusted service manager and then, at step **606**, data may be communicated from the electronic device to the communicatively coupled trusted service manager, where the communicated data may be usable by the trusted service manager to determine that the functionality of the security domain element has been terminated on the electronic device. For example, as described above with respect to FIGS. **1-5**, once device **100** has disabled the functionality of a security domain element by transitioning it to the ELEMENT_TERMINATED state or by deleting it from device **100**, device **100** may communicate shared TSM data with the trusted service manager (e.g., financial institution subsystem **350**), where such shared TSM data may be used by the trusted service manager to detect that the functionality of the security domain element has been terminated (e.g., by indicating a transitioned state of the security domain element or by indicating nothing related to the security domain element).

It is understood that the steps shown in process **600** of FIG. **6** are merely illustrative and that existing steps may be modified or omitted, additional steps may be added, and the order of certain steps may be altered.

Further Description of FIG. 1

As mentioned, merchant terminal **220** may be provided by any suitable merchant of merchant subsystem **200** that may provide a product or service to a user of device **100** in response to device **100** providing payment credentials via communication **15** to terminal **220**. Based on such a received

NFC communication **15**, merchant subsystem **200** may be configured to generate and transmit data **295** to acquiring bank subsystem **300** (e.g., via a communication path **25** between merchant subsystem **200** and acquiring bank subsystem **300**), where data **295** may include payment information and an authorization request that may be indicative of the user's commerce credential and the merchant's purchase price for the product or service. Also known as a payment processor or acquirer, acquiring bank subsystem **300** may be a banking partner of the merchant associated with merchant subsystem **200**, and acquiring bank subsystem **300** may be configured to work with financial institution subsystem **350** to approve and settle credential transactions attempted by electronic device **100** via NFC communication **15** with merchant subsystem **200**. Acquiring bank subsystem **300** may then forward the authorization request from data **295** to financial institution subsystem **350** as data **395** (e.g., via a communication path **35** between acquiring bank subsystem **300** and financial institution subsystem **350**). One, some, or all components of acquiring bank subsystem **300** may be implemented using one or more processor components, which may be the same as or similar to processor component **102** of device **100**, one or more memory components, which may be the same as or similar to memory component **104** of device **100**, and/or one or more communications components, which may be the same as or similar to communications component **106** of device **100**.

As mentioned, payment network subsystem **360** and issuing bank subsystem **370** may be a single entity or separate entities. For example, American Express may be both a payment network subsystem **360** and an issuing bank subsystem **370**. In contrast, Visa and MasterCard may be payment network subsystems **360**, and may work in cooperation with issuing bank subsystems **370**, such as Chase, Wells Fargo, Bank of America, and the like. In the case of payment network subsystem **360** and issuing bank subsystem **370** being separate entities, payment network subsystem **360** may receive the authorization request of data **395** from acquiring bank subsystem **300** and may then forward the request to issuing bank subsystem **370** as data **495** (e.g., via a communication path **45** between payment network subsystem **360** and issuing bank subsystem **370**). In the case of payment network subsystem **360** and issuing bank subsystem **370** being the same entity, acquiring bank subsystem **300** may submit the authorization request of data **395** directly to issuing bank subsystem **370**. Furthermore, payment network subsystem **360** may respond to acquiring bank subsystem **300** on behalf of issuing bank subsystem **370** (e.g., according to conditions agreed upon between payment network subsystem **360** and issuing bank subsystem **370**). By interfacing between acquiring bank subsystem **300** and issuing bank subsystem **370**, payment network subsystem **360** may reduce the number of entities that each acquiring bank subsystem **300** and each issuing bank subsystem **370** may have to interact with directly. That is, to minimize direct integration points of financial institution subsystem **350**, payment network subsystem **360** may act as an aggregator for various issuing banks **370** and/or various acquiring banks **300**. Financial institution subsystem **350** may also include one or more acquiring banks, such as acquiring bank subsystem **300**. For example, acquiring bank subsystem **300** may be the same entity as issuing bank subsystem **370**. One, some, or all components of payment network subsystem **360** may be implemented using one or more processor components, which may be the same as or similar to processor component **102** of device **100**, one or more memory components, which may be the same as or similar to memory component **104** of device **100**, and/or one or more communications components, which may be the same as or similar to communications component **106** of device **100**. One, some, or all components of issuing bank subsystem **370** may be implemented using one or more processor components, which may be the same as or similar to processor component **102** of device **100**, one or more memory components, which may be the same as or similar to memory component **104** of device **100**, and/or one or more communications components, which may be the same as or similar to communications component **106** of device **100**.

When issuing bank subsystem **370** receives an authorization request (e.g., directly from acquiring bank subsystem **300** as data **395** or indirectly via payment network subsystem **360** as data **495**), the payment information (e.g., commerce credential information of device **100**) and the purchase amount included in the authorization request may be analyzed to determine if the account associated with the commerce credential has enough credit to cover the purchase amount. If sufficient funds are not present, issuing bank subsystem **370** may decline the requested transaction by transmitting a negative authorization response **499** to acquiring bank subsystem **300** (i.e., as response **399** via payment network subsystem **360**). However, if sufficient funds are present, issuing bank subsystem **370** may approve the requested transaction by transmitting a positive authorization response **499**/**399** to acquiring bank subsystem **300** and the financial transaction may be completed, while notification of the authorization response may be forwarded on to merchant subsystem **200** from acquiring bank subsystem **300** as data **299**. Either type of authorization response may be provided by user financial subsystem **350** to acquiring bank subsystem **300** as authorization response data **399** (e.g., authorization response data **399** may be provided directly from issuing bank subsystem **370** to acquiring bank subsystem **300** via communication path **35**, or authorization response data **399** may be provided from payment network subsystem **360** to acquiring bank subsystem **300** based on authorization response data **499** that may be provided to payment network subsystem **360** from issuing bank subsystem **370** via communication path **45**).

As mentioned, although not shown, commercial entity subsystem **400** of FIG. **1** may be a secure platform system and may include a secure mobile platform ("SMP") broker component, an SMP trusted services manager ("TSM") component, an SMP crypto services component, an identity management system ("IDMS") component, a fraud system component, a hardware security module ("HSM") component, and/or a store component. One, some, or all components of commercial entity subsystem **400** may be implemented using one or more processor components, which may be the same as or similar to processor component **102** of device **100**, one or more memory components, which may be the same as or similar to memory component **104** of device **100**, and/or one or more communications components, which may be the same as or similar to communications component **106** of device **100**. One, some, or all components of commercial entity subsystem **400** may be managed by, owned by, at least partially controlled by, and/or otherwise provided by a single commercial entity (e.g., Apple Inc.) that may be distinct and independent from financial institution subsystem **350**. The components of commercial entity subsystem **400** may interact with each other and collectively with both financial institution subsystem **350** and electronic device **100** for providing a new layer of security and/or for providing a more seamless user experience when it is being determined whether or not to

provision a credential from financial institution subsystem **350** on to device **100** and/or to remove a credential from device **100**.

An SMP broker component of commercial entity subsystem **400** may be configured to manage user authentication with a commercial entity user account. Such an SMP broker component may also be configured to manage the life cycle and provisioning of credentials on device **100**. An SMP broker component may be a primary end point that may control the user interface elements (e.g., elements of GUI **180**) on device **100**. An operating system or other application of device **100** (e.g., application **103**, application **113**, and/or application **143**) may be configured to call specific application programming interfaces ("APIs") and an SMP broker component may be configured to process requests of those APIs and respond with data that may derive the user interface of device **100** and/or respond with application protocol data units ("APDUs") that may communicate with secure element **145** of NFC component **120** (e.g., via a communication path **65** between commercial entity subsystem **400** and electronic device **100**). Such APDUs may be received by commercial entity subsystem **400** from financial institution subsystem **350** via a trusted services manager ("TSM") of system **1** (e.g., a TSM of a communication path **55** between commercial entity subsystem **400** and financial institution subsystem **350**). An SMP TSM component of commercial entity subsystem **400** may be configured to provide GlobalPlatform-based services that may be used to carry out credential provisioning operations on device **100** from financial institution subsystem **350**. GlobalPlatform, or any other suitable secure channel protocol, may enable such an SMP TSM component to properly communicate and/or provision sensitive account data between secure element **145** of device **100** and a TSM for secure data communication between commercial entity subsystem **400** and financial institution subsystem **350**.

An SMP TSM component of commercial entity subsystem **400** may be configured to use an HSM component of commercial entity subsystem **400** to protect its keys and generate new keys. An SMP crypto services component of commercial entity subsystem **400** may be configured to provide key management and cryptography operations that may be required for user authentication and/or confidential data transmission between various components of system **1**. Such an SMP crypto services component may utilize an HSM component of commercial entity subsystem **400** for secure key storage and/or opaque cryptographic operations. A payment crypto service of an SMP crypto services component of commercial entity subsystem **400** may be configured to interact with an IDMS component of commercial entity subsystem **400** to retrieve on-file credit cards or other types of commerce credentials associated with user accounts of the commercial entity. Such a payment crypto service may be configured to be the only component of commercial entity subsystem **400** that may have clear text (i.e., non-hashed) information describing commerce credentials (e.g., credit card numbers) of its user accounts in memory. A commercial entity fraud system component of commercial entity subsystem **400** may be configured to run a commercial entity fraud check on a commerce credential based on data known to the commercial entity about the commerce credential and/or the user (e.g., based on data (e.g., commerce credential information) associated with a user account with the commercial entity and/or any other suitable data that may be under the control of the commercial entity and/or any other suitable data that may not be under the control of financial institution subsystem **350**). Such a commercial entity fraud system component of commercial entity subsystem **400** may be configured to determine a commercial entity fraud score for the credential based on various factors or thresholds. Additionally or alternatively, commercial entity subsystem **400** may include a store component, which may be a provider of various services to users of device **100** (e.g., the iTunes™ Store for selling/renting media to be played by device **100**, the Apple App Store™ for selling/renting applications for use on device **100**, the Apple iCloud™ Service for storing data from device **100**, the Apple Online Store for buying various Apple products online, etc.). As just one example, such a store component of commercial entity subsystem **400** may be configured to manage and provide an application **113** to device **100** (e.g., via communications path **65**), where application **113** may be any suitable application, such as a banking application, an e-mail application, a text messaging application, an internet application, or any other suitable application. Any suitable communication protocol or combination of communication protocols may be used by commercial entity subsystem **400** to communicate data amongst the various components of commercial entity subsystem **400** and/or to communicate data between commercial entity subsystem **400** and other components of system **1** (e.g., financial institution subsystem **350** via communications path **55** of FIG. **1** and/or electronic device **100** via communications path **65** of FIG. **1**).

Further Description of FIG. **2**, FIG. **3**, and FIG. **4**

As mentioned, and as shown in FIG. **2**, electronic device **100** can include, but is not limited to, a music player (e.g., an iPod™ available by Apple Inc. of Cupertino, Calif.), video player, still image player, game player, other media player, music recorder, movie or video camera or recorder, still camera, other media recorder, radio, medical equipment, domestic appliance, transportation vehicle instrument, musical instrument, calculator, cellular telephone (e.g., an iPhone™ available by Apple Inc.), other wireless communication device, personal digital assistant, remote control, pager, computer (e.g., a desktop, laptop, tablet (e.g., an iPad™ available by Apple Inc.), server, etc.), monitor, television, stereo equipment, set up box, set-top box, boom box, modem, router, printer, or any combination thereof. In some embodiments, electronic device **100** may perform a single function (e.g., a device dedicated to conducting financial transactions) and, in other embodiments, electronic device **100** may perform multiple functions (e.g., a device that conducts financial transactions, plays music, and receives and transmits telephone calls). Electronic device **100** may be any portable, mobile, hand-held, or miniature electronic device that may be configured to conduct financial transactions wherever a user travels. Some miniature electronic devices may have a form factor that is smaller than that of hand-held electronic devices, such as an iPod™. Illustrative miniature electronic devices can be integrated into various objects that may include, but are not limited to, watches, rings, necklaces, belts, accessories for belts, headsets, accessories for shoes, virtual reality devices, glasses, other wearable electronics, accessories for sporting equipment, accessories for fitness equipment, key chains, or any combination thereof. Alternatively, electronic device **100** may not be portable at all, but may instead be generally stationary.

As shown in FIG. **2**, for example, electronic device **100** may include a processor **102**, memory **104**, communications component **106**, power supply **108**, input component **110**,

output component **112**, antenna **116**, and near field communication ("NFC") component **120**. Electronic device **100** may also include a bus **118** that may provide one or more wired or wireless communication links or paths for transferring data and/or power to, from, or between various other components of device **100**. In some embodiments, one or more components of electronic device **100** may be combined or omitted. Moreover, electronic device **100** may include other components not combined or included in FIG. **2**. For example, electronic device **100** may include any other suitable components or several instances of the components shown in FIG. **2**. For the sake of simplicity, only one of each of the components is shown in FIG. **2**.

Memory **104** may include one or more storage mediums, including for example, a hard-drive, flash memory, permanent memory such as read-only memory ("ROM"), semi-permanent memory such as random access memory ("RAM"), any other suitable type of storage component, or any combination thereof. Memory **104** may include cache memory, which may be one or more different types of memory used for temporarily storing data for electronic device applications. Memory **104** may be fixedly embedded within electronic device **100** or may be incorporated on one or more suitable types of cards that may be repeatedly inserted into and removed from electronic device **100** (e.g., a subscriber identity module ("SIM") card or secure digital ("SD") memory card). Memory **104** may store media data (e.g., music and image files), software (e.g., for implementing functions on device **100**), firmware, preference information (e.g., media playback preferences), lifestyle information (e.g., food preferences), exercise information (e.g., information obtained by exercise monitoring equipment), transaction information (e.g., information such as credit card information), wireless connection information (e.g., information that may enable device **100** to establish a wireless connection), subscription information (e.g., information that keeps track of podcasts or television shows or other media a user subscribes to), contact information (e.g., telephone numbers and e-mail addresses), calendar information, any other suitable data, or any combination thereof.

Communications component **106** may be provided to allow device **100** to communicate with one or more other electronic devices or servers or subsystems (e.g., one or more subsystems or other components of system **1**) using any suitable communications protocol. For example, communications component **106** may support Wi-Fi (e.g., an 802.11 protocol), ZigBee (e.g., an 802.15.4 protocol), WiDi™, Ethernet, Bluetooth™, Bluetooth™ Low Energy ("BLE"), high frequency systems (e.g., 900 MHz, 2.4 GHz, and 5.6 GHz communication systems), infrared, transmission control protocol/internet protocol ("TCP/IP") (e.g., any of the protocols used in each of the TCP/IP layers), Stream Control Transmission Protocol ("SCTP"), Dynamic Host Configuration Protocol ("DHCP"), hypertext transfer protocol ("HTTP"), BitTorrent™, file transfer protocol ("FTP"), real-time transport protocol ("RTP"), real-time streaming protocol ("RTSP"), real-time control protocol ("RTCP"), Remote Audio Output Protocol ("RAOP"), Real Data Transport Protocol™ ("RDTP"), User Datagram Protocol ("UDP"), secure shell protocol ("SSH"), wireless distribution system ("WDS") bridging, any communications protocol that may be used by wireless and cellular telephones and personal e-mail devices (e.g., Global System for Mobile Communications ("GSM"), GSM plus Enhanced Data rates for GSM Evolution ("EDGE"), Code Division Multiple Access ("CDMA"), Orthogonal Frequency-Division Multiple Access ("OFDMA"), high speed packet access ("HSPA"), multi-band, etc.), any communications protocol that may be used by a low power Wireless Personal Area Network ("6LoWPAN") module, any other communications protocol, or any combination thereof. Communications component **106** may also include or be electrically coupled to any suitable transceiver circuitry (e.g., transceiver circuitry or antenna **116** via bus **118**) that can enable device **100** to be communicatively coupled to another device (e.g., a host computer or an accessory device) and communicate with that other device wirelessly, or via a wired connection (e.g., using a connector port). Communications component **106** may be configured to determine a geographical position of electronic device **100**. For example, communications component **106** may utilize the global positioning system ("GPS") or a regional or site-wide positioning system that may use cell tower positioning technology or Wi-Fi technology.

Power supply **108** can include any suitable circuitry for receiving and/or generating power, and for providing such power to one or more of the other components of electronic device **100**. For example, power supply **108** can be coupled to a power grid (e.g., when device **100** is not acting as a portable device or when a battery of the device is being charged at an electrical outlet with power generated by an electrical power plant). As another example, power supply **108** can be configured to generate power from a natural source (e.g., solar power using solar cells). As another example, power supply **108** can include one or more batteries for providing power (e.g., when device **100** is acting as a portable device). For example, power supply **108** can include one or more of a battery (e.g., a gel, nickel metal hydride, nickel cadmium, nickel hydrogen, lead acid, or lithium-ion battery), an uninterruptible or continuous power supply ("UPS" or "CPS"), and circuitry for processing power received from a power generation source (e.g., power generated by an electrical power plant and delivered to the user via an electrical socket or otherwise). The power can be provided by power supply **108** as alternating current or direct current, and may be processed to transform power or limit received power to particular characteristics. For example, the power can be transformed to or from direct current, and constrained to one or more values of average power, effective power, peak power, energy per pulse, voltage, current (e.g., measured in amperes), or any other characteristic of received power. Power supply **108** can be operative to request or provide particular amounts of power at different times, for example, based on the needs or requirements of electronic device **100** or periphery devices that may be coupled to electronic device **100** (e.g., to request more power when charging a battery than when the battery is already charged).

One or more input components **110** may be provided to permit a user to interact or interface with device **100**. For example, input component **110** can take a variety of forms, including, but not limited to, a touch pad, dial, click wheel, scroll wheel, touch screen, one or more buttons (e.g., a keyboard), mouse, joy stick, track ball, microphone, camera, scanner (e.g., a bar code scanner or any other suitable scanner that may obtain product identifying information from a code, such as a bar code, a QR code, or the like), proximity sensor, light detector, motion sensor, biometric sensor (e.g., a fingerprint reader or other feature recognition sensor, which may operate in conjunction with a feature-processing application that may be accessible to electronic device **100** for authenticating a user), and combinations thereof. Each input component **110** can be configured to

provide one or more dedicated control functions for making selections or issuing commands associated with operating device **100**.

Electronic device **100** may also include one or more output components **112** that may present information (e.g., graphical, audible, and/or tactile information) to a user of device **100**. For example, output component **112** of electronic device **100** may take various forms, including, but not limited to, audio speakers, headphones, audio line-outs, visual displays, antennas, infrared ports, haptic output components (e.g., rumblers, vibrators, etc.), or combinations thereof.

As a specific example, electronic device **100** may include a display output component as output component **112**. Such a display output component may include any suitable type of display or interface for presenting visual data to a user. A display output component may include a display embedded in device **100** or coupled to device **100** (e.g., a removable display). A display output component may include, for example, a liquid crystal display ("LCD"), a light emitting diode ("LED") display, an organic light-emitting diode ("OLED") display, a surface-conduction electron-emitter display ("SED"), a carbon nanotube display, a nanocrystal display, any other suitable type of display, or combination thereof. Alternatively, a display output component can include a movable display or a projecting system for providing a display of content on a surface remote from electronic device **100**, such as, for example, a video projector, a head-up display, or a three-dimensional (e.g., holographic) display. As another example, a display output component may include a digital or mechanical viewfinder, such as a viewfinder of the type found in compact digital cameras, reflex cameras, or any other suitable still or video camera. A display output component may include display driver circuitry, circuitry for driving display drivers, or both, and such a display output component can be operative to display content (e.g., media playback information, application screens for applications implemented on electronic device **100**, information regarding ongoing communications operations, information regarding incoming communications requests, device operation screens, etc.) that may be under the direction of processor **102**.

It should be noted that one or more input components and one or more output components may sometimes be referred to collectively herein as an input/output ("I/O") component or I/O interface (e.g., input component **110** and output component **112** as I/O component or I/O interface **114**). For example, input component **110** and output component **112** may sometimes be a single I/O component **114**, such as a touch screen, that may receive input information through a user's touch of a display screen and that may also provide visual information to a user via that same display screen.

Processor **102** of electronic device **100** may include any processing circuitry that may be operative to control the operations and performance of one or more components of electronic device **100**. For example, processor **102** may receive input signals from input component **110** and/or drive output signals through output component **112**. As shown in FIG. **2**, processor **102** may be used to run one or more applications, such as an application **103**, an application **113**, and/or an application **113**. Each application **103/113/143** may include, but is not limited to, one or more operating system applications, firmware applications, media playback applications, media editing applications, NFC low power mode applications, biometric feature-processing applications, or any other suitable applications. For example, processor **102** may load application **103/113/143** as a user interface program to determine how instructions or data received via an input component **110** or other component of device **100** may manipulate the way in which information may be stored and/or provided to the user via an output component **112**. Application **103/113/143** may be accessed by processor **102** from any suitable source, such as from memory **104** (e.g., via bus **118**) or from another device or server (e.g., via communications component **106**). Processor **102** may include a single processor or multiple processors. For example, processor **102** may include at least one "general purpose" microprocessor, a combination of general and special purpose microprocessors, instruction set processors, graphics processors, video processors, and/or related chips sets, and/or special purpose microprocessors. Processor **102** also may include on board memory for caching purposes.

Electronic device **100** may also include near field communication ("NFC") component **120**. NFC component **120** may be any suitable proximity-based communication mechanism that may enable contactless proximity-based transactions or communications **15** between electronic device **100** and merchant subsystem **200** (e.g., a merchant payment terminal). NFC component **120** may allow for close range communication at relatively low data rates (e.g., 424 kbps), and may comply with any suitable standards, such as ISO/IEC 7816, ISO/IEC 18092, ECMA-340, ISO/IEC 21481, ECMA-352, ISO 14443, and/or ISO 15693. Alternatively or additionally, NFC component **120** may allow for close range communication at relatively high data rates (e.g., 370 Mbps), and may comply with any suitable standards, such as the TransferJet™ protocol. Communication between NFC component **120** and merchant subsystem **200** may occur within any suitable close range distance between device **100** and merchant subsystem **200** (see, e.g., distance D of FIG. **1**), such as a range of approximately 2 to 4 centimeters, and may operate at any suitable frequency (e.g., 13.56 MHz). For example, such close range communication of NFC component **120** may take place via magnetic field induction, which may allow NFC component **120** to communicate with other NFC devices and/or to retrieve information from tags having radio frequency identification ("RFID") circuitry. NFC component **120** may provide a manner of acquiring merchandise information, transferring payment information, and otherwise communicating with an external device (e.g., terminal **220** of merchant subsystem **200**).

NFC component **120** may include any suitable modules for enabling contactless proximity-based communication **15** between electronic device **100** and merchant subsystem **200**. As shown in FIG. **2**, for example, NFC component **120** may include an NFC device module **130**, an NFC controller module **140**, and an NFC memory module **150**.

NFC device module **130** may include an NFC data module **132**, an NFC antenna **134**, and an NFC booster **136**. NFC data module **132** may be configured to contain, route, or otherwise provide any suitable data that may be transmitted by NFC component **120** to merchant subsystem **200** as part of a contactless proximity-based or NFC communication **15**. Additionally or alternatively, NFC data module **132** may be configured to contain, route, or otherwise receive any suitable data that may be received by NFC component **120** from merchant subsystem **200** as part of a contactless proximity-based communication **15**.

NFC transceiver or NFC antenna **134** may be any suitable antenna or other suitable transceiver circuitry that may generally enable communication of communication **15** from NFC data module **132** to merchant subsystem **200** and/or to NFC data module **132** from subsystem **200**. Therefore, NFC

antenna **134** (e.g., a loop antenna) may be provided specifically for enabling the contactless proximity-based communication capabilities of NFC component **120**.

Alternatively or additionally, NFC component **120** may utilize the same transceiver circuitry or antenna (e.g., antenna **116**) that another communication component of electronic device **100** (e.g., communication component **106**) may utilize. For example, communication component **106** may leverage antenna **116** to enable Wi-Fi, Bluetooth™, cellular, or GPS communication between electronic device **100** and another remote entity, while NFC component **120** may leverage antenna **116** to enable contactless proximity-based or NFC communication **15** between NFC data module **132** of NFC device module **130** and another entity (e.g., merchant subsystem **200**). In such embodiments, NFC device module **130** may include NFC booster **136**, which may be configured to provide appropriate signal amplification for data of NFC component **120** (e.g., data within NFC data module **132**) so that such data may be appropriately transmitted by shared antenna **116** as communication **15** to subsystem **200**. For example, shared antenna **116** may require amplification from booster **136** before antenna **116** (e.g., a non-loop antenna) may be properly enabled for communicating contactless proximity-based or NFC communication **15** between electronic device **100** and merchant subsystem **200** (e.g., more power may be needed to transmit NFC data using antenna **116** than may be needed to transmit other types of data using antenna **116**).

NFC controller module **140** may include at least one NFC processor module **142**. NFC processor module **142** may operate in conjunction with NFC device module **130** to enable, activate, allow, and/or otherwise control NFC component **120** for communicating NFC communication **15** between electronic device **100** and merchant subsystem **200**. NFC processor module **142** may exist as a separate component, may be integrated into another chipset, or may be integrated with processor **102**, for example, as part of a system on a chip ("SoC"). As shown in FIG. **2**, NFC processor module **142** of NFC controller module **140** may be used to run one or more applications, such as an NFC low power mode or wallet application **143** that may help dictate the function of NFC component **120**. Application **143** may include, but is not limited to, one or more operating system applications, firmware applications, NFC low power applications, or any other suitable applications that may be accessible to NFC component **120** (e.g., application **103**/**113**). NFC controller module **140** may include one or more protocols, such as the Near Field Communication Interface and Protocols ("NFCIP-1"), for communicating with another NFC device (e.g., merchant subsystem **200**). The protocols may be used to adapt the communication speed and to designate one of the connected devices as the initiator device that controls the near field communication.

NFC controller module **140** may control the near field communication mode of NFC component **120**. For example, NFC processor module **142** may be configured to switch NFC device module **130** between a reader/writer mode for reading information (e.g., communication **15**) from NFC tags (e.g., from merchant subsystem **200**) to NFC data module **132**, a peer-to-peer mode for exchanging data (e.g., communication **15**) with another NFC enabled device (e.g., merchant subsystem **200**), and a card emulation mode for allowing another NFC enabled device (e.g., merchant subsystem **200**) to read information (e.g., communication **15**) from NFC data module **132**. NFC controller module **140** also may be configured to switch NFC component **120** between active and passive modes. For example, NFC processor module **142** may be configured to switch NFC device module **130** (e.g., in conjunction with NFC antenna **134** or shared antenna **116**) between an active mode where NFC device module **130** may generate its own RF field and a passive mode where NFC device module **130** may use load modulation to transfer data to another device generating an RF field (e.g., merchant subsystem **200**). Operation in such a passive mode may prolong the battery life of electronic device **100** compared to operation in such an active mode. The modes of NFC device module **130** may be controlled based on preferences of a user and/or based on preferences of a manufacturer of device **100**, which may be defined or otherwise dictated by an application running on device **100** (e.g., application **103** and/or application **143**).

NFC memory module **150** may operate in conjunction with NFC device module **130** and/or NFC controller module **140** to allow for NFC communication **15** between electronic device **100** and merchant subsystem **200**. NFC memory module **150** may be embedded within NFC device hardware or within an NFC integrated circuit ("IC"). NFC memory module **150** may be tamper resistant and may provide at least a portion of secure element **145**. For example, NFC memory module **150** may store one or more applications relating to NFC communications (e.g., application **143**) that may be accessed by NFC controller module **140**. For example, such applications may include financial payment applications, secure access system applications, loyalty card applications, and other applications, which may be encrypted. In some embodiments, NFC controller module **140** and NFC memory module **150** may independently or in combination provide a dedicated microprocessor system that may contain an operating system, memory, application environment, and security protocols intended to be used to store and execute sensitive applications on electronic device **100**. NFC controller module **140** and NFC memory module **150** may independently or in combination provide at least a portion of secure element **145**, which may be tamper resistant. For example, such a secure element may be configured to provide a tamper-resistant platform (e.g., as a single or multiple chip secure microcontroller) that may be capable of securely hosting applications and their confidential and cryptographic data (e.g., applet **153** and key **155**) in accordance with rules and security requirements that may be set forth by a set of well-identified trusted authorities (e.g., an authority of financial institution subsystem and/or an industry standard, such as GlobalPlatform). NFC memory module **150** may be a portion of memory **104** or at least one dedicated chip specific to NFC component **120**. NFC memory module **150** may reside on a SIM, a dedicated chip on a motherboard of electronic device **100**, or as an external plug in memory card. NFC memory module **150** may be completely independent from NFC controller module **140** and may be provided by different components of device **100** and/or provided to electronic device **100** by different removable subsystems.

As shown in FIGS. **2** and **4**, NFC memory module **150** may include one or more of an issuer security domain ("ISD") **152** and a supplemental security domain ("SSD") **154** (e.g., a service provider security domain ("SPSD"), a trusted service manager security domain ("TSMSD"), etc.), which may be defined and managed by an NFC specification standard (e.g., GlobalPlatform). For example, ISD **152** may be a portion of NFC memory module **150** in which a trusted service manager ("TSM") or issuing financial institution (e.g., commercial entity subsystem **400** and/or financial institution subsystem **350**) may store keys and/or other suitable information for creating or otherwise provisioning

one or more credentials (e.g., commerce credentials associated with various credit cards, bank cards, gift cards, access cards, transit passes, digital currency (e.g., bitcoin and associated payment networks), etc.) on electronic device **100** (e.g., via communications component **106**), for credential content management, and/or for security domain management. A specific supplemental security domain ("SSD") **154** (e.g., one of SSDs **154***a* and **154***b*) may be associated with a particular TSM and at least one specific commerce credential (e.g., a specific credit card credential or a specific public transit card credential) that may provide specific privileges or payment rights to electronic device **100**. Each SSD **154** may have its own manager key **155** (e.g., a respective one of keys **155***a* and **155***b*) and at least one of its own credential applications or credential applets (e.g., a Java card applet instances) associated with a particular commerce credential (e.g., credential applets **153***a* and **153***a*' of SSD **154***a* and credential applets **153***b* and **153***b*' of SSD **154***b*), where a credential applet may have its own applet key (e.g., applet key **155***aa* for credential applet **153***a*, applet key **155***aa*' for credential applet **153***a*', applet key **155***ba* for credential applet **153***b*, and applet key **155***ba*' for credential applet **153***b*') and where a credential applet may need to be activated to enable its associated commerce credential for use by NFC device module **130** as an NFC communication **15** between electronic device **100** and merchant subsystem **200**. For example, a first payment network subsystem **360** (e.g., Visa) may be the TSM for first SSD **154***a* and the different applets **153***a* and **153***a*' of first SSD **154***a* may be associated with different commerce credentials managed by that first payment network subsystem **360**, while a second payment network subsystem **360** (e.g., MasterCard) may be the TSM for second SSD **154***b* and the different applets **153***b* and **153***b*' of second SSD **154***b* may be associated with different commerce credentials managed by that second payment network subsystem **360**, where one credential applet of an SSD can be deleted while another credential applet of that same SSD may be maintained. Alternatively, each credential applet **153** may be provided by its own SSD **154**.

Security features may be provided for enabling use of NFC component **120** (e.g., for enabling activation of commerce credentials provisioned on device **100**) that may be particularly useful when transmitting confidential payment information, such as credit card information or bank account information of a credential, from electronic device **100** to merchant subsystem **200** as NFC communication **15**. Such security features also may include a secure storage area that may have restricted access. For example, user authentication via personal identification number ("PIN") entry or via user interaction with a biometric sensor may need to be provided to access the secure storage area (e.g., for a user to alter a life cycle state of a security domain element of secure element **145**). In certain embodiments, some or all of the security features may be stored within NFC memory module **150**. Further, security information, such as an authentication key, for communicating with subsystem **200** may be stored within NFC memory module **150**. In certain embodiments, NFC memory module **150** may include a microcontroller embedded within electronic device **100**.

While NFC component **120** has been described with respect to near field communication, it is to be understood that component **120** may be configured to provide any suitable contactless proximity-based mobile payment or any other suitable type of contactless proximity-based communication **15** between electronic device **100** and merchant subsystem **200**. For example, NFC component **120** may be configured to provide any suitable short-range communication, such as those involving electromagnetic/electrostatic coupling technologies.

Electronic device **100** may also be provided with a housing **101** that may at least partially enclose one or more of the components of device **100** for protection from debris and other degrading forces external to device **100**. In some embodiments, one or more of the components may be provided within its own housing (e.g., input component **110** may be an independent keyboard or mouse within its own housing that may wirelessly or through a wire communicate with processor **102**, which may be provided within its own housing).

As mentioned, and as shown in FIG. **3**, one specific example of electronic device **100** may be a handheld electronic device, such as an iPhone™, where housing **101** may allow access to various input components **110***a*-**110***i*, various output components **112***a*-**112***c*, and various I/O components **114***a*-**114***d* through which device **100** and a user and/or an ambient environment may interface with each other. Input component **110***a* may include a button that, when pressed, may cause a "home" screen or menu of a currently running application to be displayed by device **100**. Input component **110***b* may be a button for toggling electronic device **100** between a sleep mode and a wake mode or between any other suitable modes. Input component **110***c* may include a two-position slider that may disable one or more output components **112** in certain modes of electronic device **100**. Input components **110***d* and **110***e* may include buttons for increasing and decreasing the volume output or any other characteristic output of an output component **112** of electronic device **100**. Each one of input components **110***a*-**110***e* may be a mechanical input component, such as a button supported by a dome switch, a sliding switch, a control pad, a key, a knob, a scroll wheel, or any other suitable form.

An output component **112***a* may be a display that can be used to display a visual or graphic user interface ("GUI") **180**, which may allow a user to interact with electronic device **100**. GUI **180** may include various layers, windows, screens, templates, elements, menus, and/or other components of a currently running application (e.g., application **103** and/or application **143**) that may be displayed in all or some of the areas of display output component **112***a*. For example, as shown in FIG. **3**, GUI **180** may be configured to display a first screen **190**. One or more of user input components **110***a*-**110***i* may be used to navigate through GUI **180**. For example, one user input component **110** may include a scroll wheel that may allow a user to select one or more graphical elements or icons **182** of GUI **180**. Icons **182** may also be selected via a touch screen I/O component **114***a* that may include display output component **112***a* and an associated touch input component **110***f*. Such a touch screen I/O component **114***a* may employ any suitable type of touch screen input technology, such as, but not limited to, resistive, capacitive, infrared, surface acoustic wave, electromagnetic, or near field imaging. Furthermore, touch screen I/O component **114***a* may employ single point or multi-point (e.g., multi-touch) input sensing.

Icons **182** may represent various layers, windows, screens, templates, elements, and/or other components that may be displayed in some or all of the areas of display component **112***a* upon selection by the user. Furthermore, selection of a specific icon **182** may lead to a hierarchical navigation process. For example, selection of a specific icon **182** may lead to a new screen of GUI **180** that may include one or more additional icons or other GUI elements of the same application or of a new application associated with that

icon **182**. Textual indicators **181** may be displayed on or near each icon **182** to facilitate user interpretation of each graphical element icon **182**. It is to be appreciated that GUI **180** may include various components arranged in hierarchical and/or non-hierarchical structures. When a specific icon **182** is selected, device **100** may be configured to open a new application associated with that icon **182** and display a corresponding screen of GUI **180** associated with that application. For example, when the specific icon **182** labeled with a "Setup Assistant" textual indicator **181** (i.e., specific icon **183**) is selected, device **100** may launch or otherwise access a specific setup application and may display screens of a specific user interface that may include one or more tools or features for interacting with device **100** in a specific manner. For each application, screens may be displayed on display output component **112***a* and may include various user interface elements. Additionally or alternatively, for each application, various other types of non-visual information may be provided to a user via various other output components **112** of device **100**. The operations described with respect to various GUIs **180** may be achieved with a wide variety of graphical elements and visual schemes. Therefore, the described embodiments are not intended to be limited to the precise user interface conventions adopted herein. Rather, embodiments may include a wide variety of user interface styles.

Electronic device **100** also may include various other I/O components **114** that may allow for communication between device **100** and other devices. I/O component **114***b* may be a connection port that may be configured for transmitting and receiving data files, such as media files or customer order files, from a remote data source and/or power from an external power source. For example, I/O component **114***b* may be a proprietary port, such as a Lightning™ connector or a 30-pin dock connector from Apple Inc. of Cupertino, Calif. I/O component **114***c* may be a connection slot for receiving a SIM card or any other type of removable component. I/O component **114***d* may be a headphone jack for connecting audio headphones that may or may not include a microphone component. Electronic device **100** may also include at least one audio input component **110***g*, such as a microphone, and at least one audio output component **112***b*, such as an audio speaker.

Electronic device **100** may also include at least one haptic or tactile output component **112***c* (e.g., a rumbler), a camera and/or scanner input component **110***h* (e.g., a video or still camera, and/or a bar code scanner or any other suitable scanner that may obtain product identifying information from a code, such as a bar code, a QR code, or the like), and a biometric input component **110***i* (e.g., a fingerprint reader or other feature recognition sensor, which may operate in conjunction with a feature-processing application that may be accessible to electronic device **100** for authenticating a user). As shown in FIG. **3**, at least a portion of biometric input component **110***i* may be incorporated into or otherwise combined with input component **110***a* or any other suitable input component **110** of device **100**. For example, biometric input component **110***i* may be a fingerprint reader that may be configured to scan the fingerprint of a user's finger as the user interacts with mechanical input component **110***a* by pressing input component **110***a* with that finger. As another example, biometric input component **110***i* may be a fingerprint reader that may be combined with touch input component **110***f* of touch screen I/O component **114***a*, such that biometric input component **110***i* may be configured to scan the fingerprint of a user's finger as the user interacts with touch screen input component **110***f* by pressing or sliding along touch screen input component **110***f* with that finger. Moreover, as mentioned, electronic device **100** may further include NFC component **120**, which may be communicatively accessible to subsystem **200** via antenna **116** and/or antenna **134** (not shown in FIG. **3**). NFC component **120** may be located at least partially within housing **101**, and a mark or symbol **121** can be provided on the exterior of housing **101** that may identify the general location of one or more of the antennas associated with NFC component **120** (e.g., the general location of antenna **116** and/or antenna **134**).

Moreover, one, some, or all of the processes described with respect to FIGS. **1-6** may each be implemented by software, but may also be implemented in hardware, firmware, or any combination of software, hardware, and firmware. Instructions for performing these processes may also be embodied as machine- or computer-readable code recorded on a machine- or computer-readable medium. In some embodiments, the computer-readable medium may be a non-transitory computer-readable medium. Examples of such a non-transitory computer-readable medium include but are not limited to a read-only memory, a random-access memory, a flash memory, a CD-ROM, a DVD, a magnetic tape, a removable memory card, and a data storage device (e.g., memory **104** and/or memory module **150** of FIG. **2**). In other embodiments, the computer-readable medium may be a transitory computer-readable medium. In such embodiments, the transitory computer-readable medium can be distributed over network-coupled computer systems so that the computer-readable code is stored and executed in a distributed fashion. For example, such a transitory computer-readable medium may be communicated from one electronic device to another electronic device using any suitable communications protocol (e.g., the computer-readable medium may be communicated to electronic device **100** via communications component **106** (e.g., as at least a portion of an application **103** and/or as at least a portion of an application **113** and/or as at least a portion of an application **143**)). Such a transitory computer-readable medium may embody computer-readable code, instructions, data structures, program modules, or other data in a modulated data signal, such as a carrier wave or other transport mechanism, and may include any information delivery media. A modulated data signal may be a signal that has one or more of its characteristics set or changed in such a manner as to encode information in the signal.

It is to be understood that any, each, or at least one module or component or subsystem of system **1** may be provided as a software construct, firmware construct, one or more hardware components, or a combination thereof. For example, any, each, or at least one module or component or subsystem of system **1** may be described in the general context of computer-executable instructions, such as program modules, that may be executed by one or more computers or other devices. Generally, a program module may include one or more routines, programs, objects, components, and/or data structures that may perform one or more particular tasks or that may implement one or more particular abstract data types. It is also to be understood that the number, configuration, functionality, and interconnection of the modules and components and subsystems of system **1** are merely illustrative, and that the number, configuration, functionality, and interconnection of existing modules, components, and/or subsystems may be modified or omitted, additional modules, components, and/or subsystems may be added, and the interconnection of certain modules, components, and/or subsystems may be altered.

At least a portion of one or more of the modules or components or subsystems of system **1** may be stored in or otherwise accessible to an entity of system **1** in any suitable manner (e.g., in memory **104** of device **100** (e.g., as at least a portion of an application **103** and/or as at least a portion of an application **113** and/or as at least a portion of an application **143**)). For example, any or each module of NFC component **120** may be implemented using any suitable technologies (e.g., as one or more integrated circuit devices), and different modules may or may not be identical in structure, capabilities, and operation. Any or all of the modules or other components of system **1** may be mounted on an expansion card, mounted directly on a system motherboard, or integrated into a system chipset component (e.g., into a "north bridge" chip).

Any or each module or component of system **1** (e.g., any or each module of NFC component **120**) may be a dedicated system implemented using one or more expansion cards adapted for various bus standards. For example, all of the modules may be mounted on different interconnected expansion cards or all of the modules may be mounted on one expansion card. With respect to NFC component **120**, by way of example only, the modules of NFC component **120** may interface with a motherboard or processor **102** of device **100** through an expansion slot (e.g., a peripheral component interconnect ("PCI") slot or a PCI express slot). Alternatively, NFC component **120** need not be removable but may include one or more dedicated modules that may include memory (e.g., RAM) dedicated to the utilization of the module. In other embodiments, NFC component **120** may be integrated into device **100**. For example, a module of NFC component **120** may utilize a portion of device memory **104** of device **100**. Any or each module or component of system **1** (e.g., any or each module of NFC component **120**) may include its own processing circuitry and/or memory. Alternatively, any or each module or component of system **1** (e.g., any or each module of NFC component **120**) may share processing circuitry and/or memory with any other module of NFC component **120** and/or processor **102** and/or memory **104** of device **100**.

As mentioned, an input component **110** of device **100** (e.g., input component **1100** may include a touch input component that can receive touch input for interacting with other components of device **100** via wired or wireless bus **118**. Such a touch input component **110** may be used to provide user input to device **100** in lieu of or in combination with other input components, such as a keyboard, mouse, and the like.

A touch input component **110** may include a touch sensitive panel, which may be wholly or partially transparent, semitransparent, non-transparent, opaque, or any combination thereof. A touch input component **110** may be embodied as a touch screen, touch pad, a touch screen functioning as a touch pad (e.g., a touch screen replacing the touchpad of a laptop), a touch screen or touch pad combined or incorporated with any other input device (e.g., a touch screen or touch pad disposed on a keyboard), or any multi-dimensional object having a touch sensitive surface for receiving touch input. In some embodiments, the terms touch screen and touch pad may be used interchangeably.

In some embodiments, a touch input component **110** embodied as a touch screen may include a transparent and/or semitransparent touch sensitive panel partially or wholly positioned over, under, and/or within at least a portion of a display (e.g., display output component **112***a*). In other embodiments, a touch input component **110** may be embodied as an integrated touch screen where touch sensitive components/devices are integral with display components/devices. In still other embodiments, a touch input component **110** may be used as a supplemental or additional display screen for displaying supplemental or the same graphical data as a primary display and to receive touch input.

A touch input component **110** may be configured to detect the location of one or more touches or near touches based on capacitive, resistive, optical, acoustic, inductive, mechanical, chemical measurements, or any phenomena that can be measured with respect to the occurrences of the one or more touches or near touches in proximity to input component **110**. Software, hardware, firmware, or any combination thereof may be used to process the measurements of the detected touches to identify and track one or more gestures. A gesture may correspond to stationary or non-stationary, single or multiple, touches or near touches on a touch input component **110**. A gesture may be performed by moving one or more fingers or other objects in a particular manner on touch input component **110**, such as by tapping, pressing, rocking, scrubbing, rotating, twisting, changing orientation, pressing with varying pressure, and the like at essentially the same time, contiguously, or consecutively. A gesture may be characterized by, but is not limited to, a pinching, pulling, sliding, swiping, rotating, flexing, dragging, or tapping motion between or with any other finger or fingers. A single gesture may be performed with one or more hands, by one or more users, or any combination thereof.

As mentioned, electronic device **100** may drive a display (e.g., display output component **112***a*) with graphical data to display a graphical user interface ("GUI") **180**. GUI **180** may be configured to receive touch input via a touch input component **110***f* Embodied as a touch screen (e.g., with display output component **112***a* as I/O component **114***a*), touch I/O component **110***f* may display GUI **180**. Alternatively, GUI **180** may be displayed on a display (e.g., display output component **112***a*) separate from touch input component **110***f* GUI **180** may include graphical elements displayed at particular locations within the interface. Graphical elements may include, but are not limited to, a variety of displayed virtual input devices, including virtual scroll wheels, a virtual keyboard, virtual knobs, virtual buttons, any virtual user interface ("UI"), and the like. A user may perform gestures at one or more particular locations on touch input component **110***f*, which may be associated with the graphical elements of GUI **180**. In other embodiments, the user may perform gestures at one or more locations that are independent of the locations of graphical elements of GUI **180**. Gestures performed on a touch input component **110** may directly or indirectly manipulate, control, modify, move, actuate, initiate, or generally affect graphical elements, such as cursors, icons, media files, lists, text, all or portions of images, or the like within the GUI. For instance, in the case of a touch screen, a user may directly interact with a graphical element by performing a gesture over the graphical element on the touch screen. Alternatively, a touch pad may generally provide indirect interaction. Gestures may also affect non-displayed GUI elements (e.g., causing user interfaces to appear) or may affect other actions of device **100** (e.g., affect a state or mode of a GUI, application, or operating system). Gestures may or may not be performed on a touch input component **110** in conjunction with a displayed cursor. For instance, in the case in which gestures are performed on a touchpad, a cursor or pointer may be displayed on a display screen or touch screen and the cursor or pointer may be controlled via touch input on the touchpad to interact with graphical objects on the display screen. In other embodiments, in which gestures are performed

directly on a touch screen, a user may interact directly with objects on the touch screen, with or without a cursor or pointer being displayed on the touch screen. Feedback may be provided to the user via bus **118** in response to or based on the touch or near touches on a touch input component **110**. Feedback may be transmitted optically, mechanically, electrically, olfactory, acoustically, or the like or any combination thereof and in a variable or non-variable manner.

Further Applications of Described Concepts

While there have been described systems, methods, and computer-readable media for managing credentials on an electronic device, it is to be understood that many changes may be made therein without departing from the spirit and scope of the subject matter described herein in any way. Insubstantial changes from the claimed subject matter as viewed by a person with ordinary skill in the art, now known or later devised, are expressly contemplated as being equivalently within the scope of the claims. Therefore, obvious substitutions now or later known to one with ordinary skill in the art are defined to be within the scope of the defined elements.

Therefore, those skilled in the art will appreciate that the invention can be practiced by other than the described embodiments, which are presented for purposes of illustration rather than of limitation.

What is claimed is:

1. An electronic device comprising:

a secure element comprising a plurality of security domain elements stored on the secure element; and

a processor component configured to:

while the electronic device is not communicatively coupled to any trusted service manager, receive an instruction to delete a first security domain element of the plurality of security domain elements but not a second security domain element of the plurality of security domain elements, wherein the first security domain element was stored on the secure element with a particular value of a register for the first security domain element;

based on the instruction, permanently terminate the functionality of the first security domain element but not the functionality of the second security domain element, while the electronic device is not communicatively coupled to any trusted service manager, by:

detecting the particular value of the register for the first security domain element; and

in response to the detecting, transitioning a life cycle state of the first security domain element from a first type of life cycle state to a second type of life cycle state, wherein the detected value of the register is configured to allow the transitioning;

after the functionality of the first security domain element has been permanently terminated, communicatively couple the electronic device to a trusted service manager; and

transmit data to the communicatively coupled trusted service manager that is usable by the trusted service manager to determine that the functionality of the first security domain element has been permanently terminated.

2. The electronic device of claim **1**, wherein the permanent termination irreversibly prevents the electronic device from sharing information indicative of the first security domain element with a user of the electronic device.

3. The electronic device of claim **1**, wherein the permanent termination irreversibly prevents the electronic device from sharing information indicative of the first security domain element with a merchant subsystem.

4. The electronic device of claim **1**, wherein the permanent termination irreversibly prevents the electronic device from sharing information indicative of the first security domain element with each one of a user of the electronic device and a merchant subsystem.

5. The electronic device of claim **1**, wherein the first security domain element is a commerce credential applet.

6. The electronic device of claim **1**, wherein the first security domain element is a supplemental security domain.

7. The electronic device of claim **1**, wherein the first security domain element comprises a first applet of a security domain on the secure element and the second security domain element comprises a second applet of the security domain.

8. The electronic device of claim **1**, wherein the processor component is configured to permanently terminate the functionality of the first security domain element by deleting the first security domain element from the secure element while the electronic device is not communicatively coupled to any trusted service manager.

9. A financial institution system in communication with an electronic device, the financial institution system comprising:

at least one processor component;

at least one memory component; and

at least one communications component, wherein the financial institution system is configured to:

provision a security domain element on the electronic device;

after the security domain element is provisioned on the electronic device but before any instruction is communicated from the financial institution system for permanently terminating the security domain element on the electronic device, receive shared data from the electronic device; and

use the received shared data to determine that the functionality of the security domain element has been permanently terminated on the electronic device, wherein the financial institution system is configured to determine that the functionality of the security domain element has been permanently terminated on the electronic device by detecting the absence of any life cycle state of the security domain element in the received shared data.

10. The financial institution system of claim **9**, wherein:

the financial institution system is further configured to provision another security domain element on the electronic device; and

the financial institution system is configured to determine whether the functionality of the other security domain element has been permanently terminated on the electronic device by detecting a life cycle state of the other security domain element in the received shared data.

11. The financial institution system of claim **10**, wherein the financial institution system is further configured to transmit response data to the electronic device after detecting the life cycle state of the other security domain element in the received shared data.

12. The financial institution system of claim **11**, wherein the response data comprises a command to delete the other security domain element from the electronic device.

13. The financial institution system of claim **9**, wherein the financial institution system is configured to determine

that the functionality of the security domain element has been deleted from the electronic device by detecting the absence of any life cycle state of the security domain element in the received shared data.

14. An electronic device comprising:

a secure element comprising a first security domain element and a second security domain element stored on the secure element, wherein the first security domain element comprises a register stored with a particular value; and

a processor component configured to:

while the electronic device is not communicatively coupled to a trusted service manager, irreversibly end an ability of the electronic device to share information indicative of the first security domain element, but not of the second security domain element, with at least one of a user of the electronic device or a remote merchant subsystem, wherein the processor component is configured to irreversibly end the ability by:

detecting the particular value of the register of the first security domain element; and

in response to the detecting, changing a life cycle state of the first security domain element from a first type of life cycle state to a second type of life cycle state, wherein the detected value of the register is configured to allow the changing;

after the ability has been irreversibly ended, communicatively couple the electronic device to the trusted service manager; and

transmit data to the communicatively coupled trusted service manager that is usable by the trusted service manager to determine that the ability has been irreversibly ended.

15. The electronic device of claim **14**, wherein the data is indicative of a life cycle state of the first security domain element.

16. The electronic device of claim **14**, wherein the data is not indicative of a life cycle state of the first security domain element.

17. The electronic device of claim **14**, wherein the processor component is configured to irreversibly end the ability by deleting the first security domain element from the electronic device while the electronic device is not communicatively coupled to any trusted service manager.

18. The electronic device of claim **14**, wherein:

the processor component is further configured to receive an instruction from the user of the electronic device that identifies the first security domain element but not the second security domain element; and

the processor component is configured to irreversibly end the ability in response to the received instruction.

19. The electronic device of claim **14**, wherein the processor component is configured to irreversibly end the ability of the electronic device to share information indicative of the first security domain element by:

detecting a value of a functionality data register for the first security domain element; and

in response to the detecting, transitioning a life cycle state of the first security domain element from a first type of life cycle state to a permanently terminated life cycle state, wherein the detected value of the functionality data register is configured to allow the transitioning.

20. A method comprising:

detecting a particular value of a functionality data register of a first applet of a security domain on a secure element on an electronic device while the electronic device is not communicatively coupled to any trusted service manager of the security domain;

in response to the detecting, permanently terminating the functionality of a first applet of a security domain on a secure element on the electronic device while the electronic device is not communicatively coupled to any trusted service manager of the security domain, wherein the detected particular value of the functionality data register is configured to allow the terminating;

after the terminating, communicatively coupling the electronic device to a trusted service manager of the security domain; and

communicating data from the electronic device to the communicatively coupled trusted service manager, wherein the communicated data is usable by the trusted service manager to determine that the functionality of the first applet of the security domain has been permanently terminated on the electronic device and that the functionality of a second applet of the security domain has not been permanently terminated on the electronic device.

21. The method of claim **20**, wherein the first applet comprises a commerce credential applet.

22. The method of claim **20**, further comprising:

before the permanently terminating, communicatively coupling the electronic device to the trusted service manager;

before the permanently terminating, receiving the first applet on the electronic device from the communicatively coupled trusted service manager; and

before the permanently terminating but after the receiving, communicatively de-coupling the electronic device from the trusted service manager.

23. The method of claim **22**, wherein the receiving further comprises receiving the functionality data register with the particular value that is configured to allow the transition of a life cycle state of the first applet from a first type of life cycle state to a permanently terminated life cycle state.

24. The method of claim **20**, wherein the communicated data is indicative of a life cycle state of the first applet.

25. The method of claim **24**, further comprising:

after the communicating, receiving shared data at the electronic device from the communicatively coupled trusted service manager; and

using the received shared data to delete the first applet from the electronic device.

26. The method of claim **20**, wherein the communicated data is not indicative of a life cycle state of the first applet.

27. The method of claim **20**, wherein the permanently terminating comprises deleting the first applet from the electronic device.

28. The method of claim **20**, wherein the permanently terminating comprises transitioning a life cycle state of the first applet from a first type of life cycle state to a second type of life cycle state.

29. The method of claim **20**, wherein the permanently terminating comprises:

detecting a value of a functionality data register for the first applet; and

in response to the detecting, transitioning a life cycle state of the first applet from a first type of life cycle state to a permanently terminated life cycle state, wherein the detected value of the functionality data register is configured to allow the transitioning.

30. A non-transitory computer-readable medium comprising computer-readable instructions recorded thereon for:

irreversibly terminating the functionality of a security domain element on an electronic device while the electronic device is not communicatively coupled to a trusted service manager of the security domain element;

after the irreversibly terminating, communicatively coupling the electronic device to the trusted service manager; and

communicating data from the electronic device to the communicatively coupled trusted service manager, wherein the communicated data is usable by the trusted service manager to determine that the functionality of the security domain element has been irreversibly terminated, and wherein the communicated data comprises no information regarding the security domain element.

31. The non-transitory computer-readable medium of claim **30**, wherein the irreversibly terminating comprises:

detecting a value of a functionality data register for the security domain element; and

in response to the detecting, transitioning a life cycle state of the security domain element from a first type of life cycle state to a permanently terminated life cycle state, wherein the detected value of the functionality data register is configured to allow the transitioning.

32. An electronic device comprising:

a secure element comprising a first applet and a second applet of a security domain stored on the secure element, wherein the first applet was provisioned on the secure element with a particular value of a functionality data register for the first applet; and

a processor component configured to permanently terminate the functionality of the first applet but not the second applet, without any communication between the electronic device and any remote entity of data operative to carry out the permanent termination, by:

detecting the particular value of the functionality data register for the first applet; and

in response to the detecting, transitioning a life cycle state of the first applet from a first type of life cycle state to a permanently terminated life cycle state, wherein the detected value of the functionality data register is configured to allow the transitioning.

33. An electronic device comprising:

a secure element comprising a first applet and a second applet of a security domain stored on the secure element, wherein the first applet was provisioned on the secure element by a trusted service manager with a particular value of a functionality data register of the first applet; and

a processor component configured to delete the first applet but not the second applet, independent of any communication between the electronic device and the trusted service manager of data operative to carry out the permanent termination, by:

detecting the particular value of the functionality data register for the first applet; and

in response to the detecting, transitioning a life cycle state of the first applet from a first type of life cycle state to a permanently terminated life cycle state, wherein the detected particular value of the functionality data register is configured to allow the transitioning.

* * * * *