

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT7003347

SUBMISSION TYPE:	NEW ASSIGNMENT		
NATURE OF CONVEYANCE:	SUBMISSION IS TO CORRECT AN ERROR MADE IN A PREVIOUSLY RECORDED DOCUMENT THAT ERRONEOUSLY AFFECTS THE IDENTIFIED PATENT		
CONVEYING PARTY DATA			
Name			Execution Date
IOENGINE, LLC			11/02/2021
RECEIVING PARTY DATA			
Name:	IOENGINE, LLC		
Street Address:	22 ENSIGN ROAD		
City:	NORWALK		
State/Country:	CONNECTICUT		
Postal Code:	06853		
PROPERTY NUMBERS Total: 1			
Property Type	Number		
Patent Number:	10972584		
CORRESPONDENCE DATA			
Fax Number:			
<i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i>			
Phone:	6465531590		
Email:	patent@koffskyschwalb.com		
Correspondent Name:	MARK I. KOFFSKY		
Address Line 1:	KOFFSKY SCHWALB LLC		
Address Line 2:	500 SEVENTH AVENUE, 8TH FLOOR		
Address Line 4:	NEW YORK, NEW YORK 10018		
ATTORNEY DOCKET NUMBER:	1372.0012 [1-US CON VII]		
NAME OF SUBMITTER:	MARK I. KOFFSKY		
SIGNATURE:	/Mark I. Koffsky/		
DATE SIGNED:	11/02/2021		
Total Attachments: 59			
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PATENT ASSIGNMENT COVER SHEET

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EPAS ID: PAT5732713

SUBMISSION TYPE:	NEW ASSIGNMENT	
NATURE OF CONVEYANCE:	ASSIGNMENT	
CONVEYING PARTY DATA		
	Name	Execution Date
	SCOTT MCNULTY	02/09/2018
RECEIVING PARTY DATA		
Name:	IOENGINE, LLC	
Street Address:	22 ENSIGN ROAD	
City:	NORWALK	
State/Country:	CONNECTICUT	
Postal Code:	06853	
PROPERTY NUMBERS Total: 1		
Property Type	Number	
Application Number:	16579169	
CORRESPONDENCE DATA		
Fax Number:	(646)553-1591	
<i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i>		
Phone:	646.553.1590	
Email:	patent@koffskyschwalb.com	
Correspondent Name:	KOFFSKY SCHWALB LLC	
Address Line 1:	349 FIFTH AVENUE	
Address Line 2:	SUITE 733	
Address Line 4:	NEW YORK, NEW YORK 10016	
ATTORNEY DOCKET NUMBER:	1372.0012 [1-US CON VII]	
NAME OF SUBMITTER:	MARK I. KOFFSKY	
SIGNATURE:	/Mark I. Koffsky/	
DATE SIGNED:	09/23/2019	
Total Attachments: 2		
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Number: 10,972,584
Issue Date: April 6, 2021
First Named Inventor: Scott McNulty
Assignee: IOENGINE, LLC
Title: Apparatus, Method and System for a Tunneling Client Access Point

Declaration of IOENGINE, LLC Pursuant to MPEP § 323.01(c)

I, Scott McNulty, do hereby declare:

1. I am President and CEO of IOENGINE, LLC ("IOENGINE").
2. I make this declaration on behalf of IOENGINE pursuant to MPEP § 323.01(c).

All statements made in this declaration of my own knowledge are true and all statements made on information and belief are believed to be true.

3. IOENGINE is the correct owner of U.S. Patent No. 10,972,584 ("the '584 patent"). A copy of the '584 patent is attached as Exhibit A.

4. On information and belief, on or before September 14, 2021, USPTO received an assignment purporting to assign the '584 patent (along with certain other patent properties) from Continental Automotive Systems, Inc. to Vitesco Technologies USA LLC effective as of August 10, 2021 ("Continental Assignment").

5. On September 14, 2021, USPTO recorded the Continental Assignment with respect to the '584 patent at Reel 057499, Frame 0827.

6. A copy of the recorded Continental Assignment is attached as Exhibit B. (The '584 patent is shown listed on the Continental Assignment on page 2.)
7. The true chain of title of the '584 patent is as follows:
 - a. The sole inventor of the '584 patent is me, Scott McNulty.
 - b. On October 7, 2014, I signed a "PATENT ASSIGNMENT" document assigning the entire right, title and interest to the '584 patent (and certain other patent properties) to IOENGINE ("McNulty Assignment").
 - c. On October 26, 2021, USPTO recorded the McNulty Assignment with respect to the '584 patent at Reel 057906, Frame 0345. A copy of the recorded McNulty Assignment is attached as Exhibit C.
 - d. On February 9, 2018, I signed a confirmatory "PATENT ASSIGNMENT" document confirming the prior assignment of all right, title, and interest in the '584 patent (and certain other patent properties) and, to the extent that any right, title or interest in the '584 patent was not previously assigned, assigning that right, title, and interest to IOENGINE ("Confirmatory McNulty Assignment").
 - e. On September 23, 2019, USPTO recorded the Confirmatory McNulty Assignment with respect to the '584 patent at Reel 050463, Frame 0340. A copy of the recorded Confirmatory McNulty Assignment is attached as Exhibit D.
8. The chain of title for the '584 patent should not be considered altered by the Continental Assignment.
9. IOENGINE has been, and continues to be, the owner of the '584 patent.

I have been warned that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. § 1001) and may jeopardize the validity of the application or any patent issuing thereon.

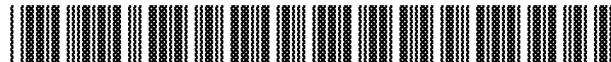
Dated: November 2, 2021

DocuSigned by:

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Scott McNulty

Exhibit A



US010972584B2

(12) **United States Patent**
McNulty

(10) **Patent No.:** **US 10,972,584 B2**

(45) **Date of Patent:** ***Apr. 6, 2021**

(54) **APPARATUS, METHOD AND SYSTEM FOR
A TUNNELING CLIENT ACCESS POINT**

(71) Applicant: **IOENGINE LLC**, Norwalk, CT (US)

(72) Inventor: **Scott McNulty**, Rowayton, CT (US)

(73) Assignee: **IOENGINE LLC**, Norwalk, CT (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 51 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **16/579,169**

(22) Filed: **Sep. 23, 2019**

(65) **Prior Publication Data**

US 2020/0028940 A1 Jan. 23, 2020

Related U.S. Application Data

(63) Continuation of application No. 15/712,780, filed on Sep. 22, 2017, now Pat. No. 10,447,819, which is a (Continued)

(51) **Int. Cl.**

H04L 29/06 (2006.01)

H04L 29/08 (2006.01)

H04L 9/32 (2006.01)

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

CPC **H04L 67/42** (2013.01); **H04L 9/3226** (2013.01); **H04L 9/3247** (2013.01); **H04L 63/0272** (2013.01); **H04L 63/0428** (2013.01); **H04L 65/4069** (2013.01); **H04L 67/04** (2013.01); **H04L 67/141** (2013.01); (Continued)

(58) **Field of Classification Search**

CPC **H04L 2209/76**; **H04L 2209/80**; **H04L 63/0272**; **H04L 63/0428**; **H04L 67/04**; **H04L 67/141**; **H04L 67/42**

See application file for complete search history.

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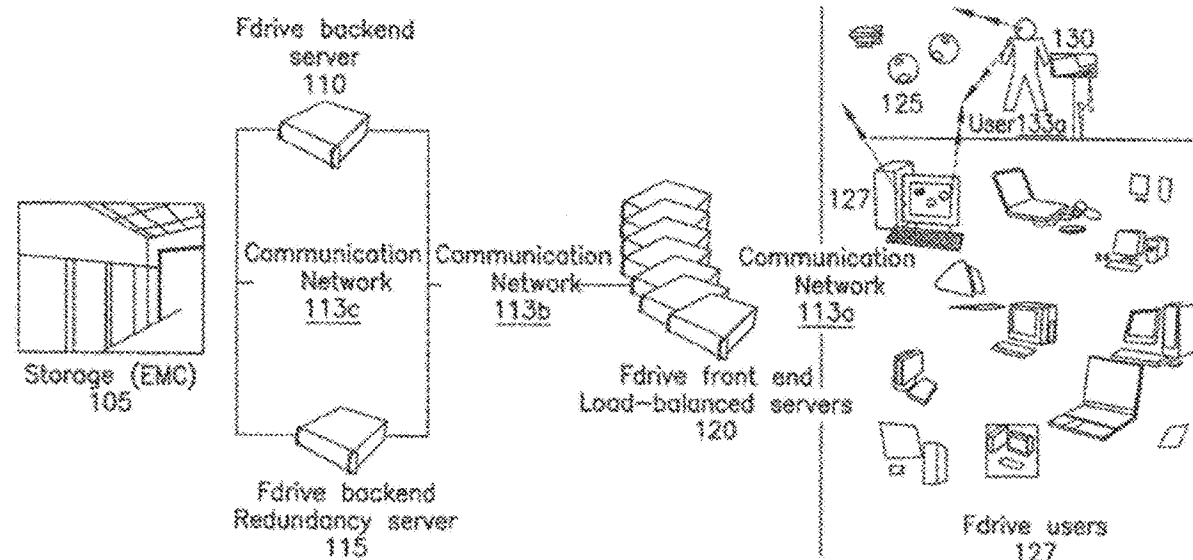
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Primary Examiner — Alina A Boutah

(57) **ABSTRACT**

The disclosure details the implementation of an apparatus, method, and system comprising a portable device configured to communicate with a terminal and a network server, and execute stored program code in response to user interaction with an interactive user interface. The portable device contains stored program code configured to render an interactive user interface on a terminal output component to enable the user the control processing activity on the portable device and access data and programs from the portable device and a network server.

99 Claims, 10 Drawing Sheets



PATENT

REEL: 058303 FRAME: 0763

Related U.S. Application Data

continuation of application No. 14/721,540, filed on May 26, 2015, now Pat. No. 9,774,703, which is a continuation of application No. 13/960,514, filed on Aug. 6, 2013, now Pat. No. 9,059,969, which is a continuation of application No. 12/950,321, filed on Nov. 19, 2010, now Pat. No. 8,539,047, which is a continuation of application No. 10/807,731, filed on Mar. 23, 2004, now Pat. No. 7,861,006.

(52) **U.S. CL**

CPC *H04L 2209/56* (2013.01); *H04L 2209/76* (2013.01); *H04L 2209/80* (2013.01)

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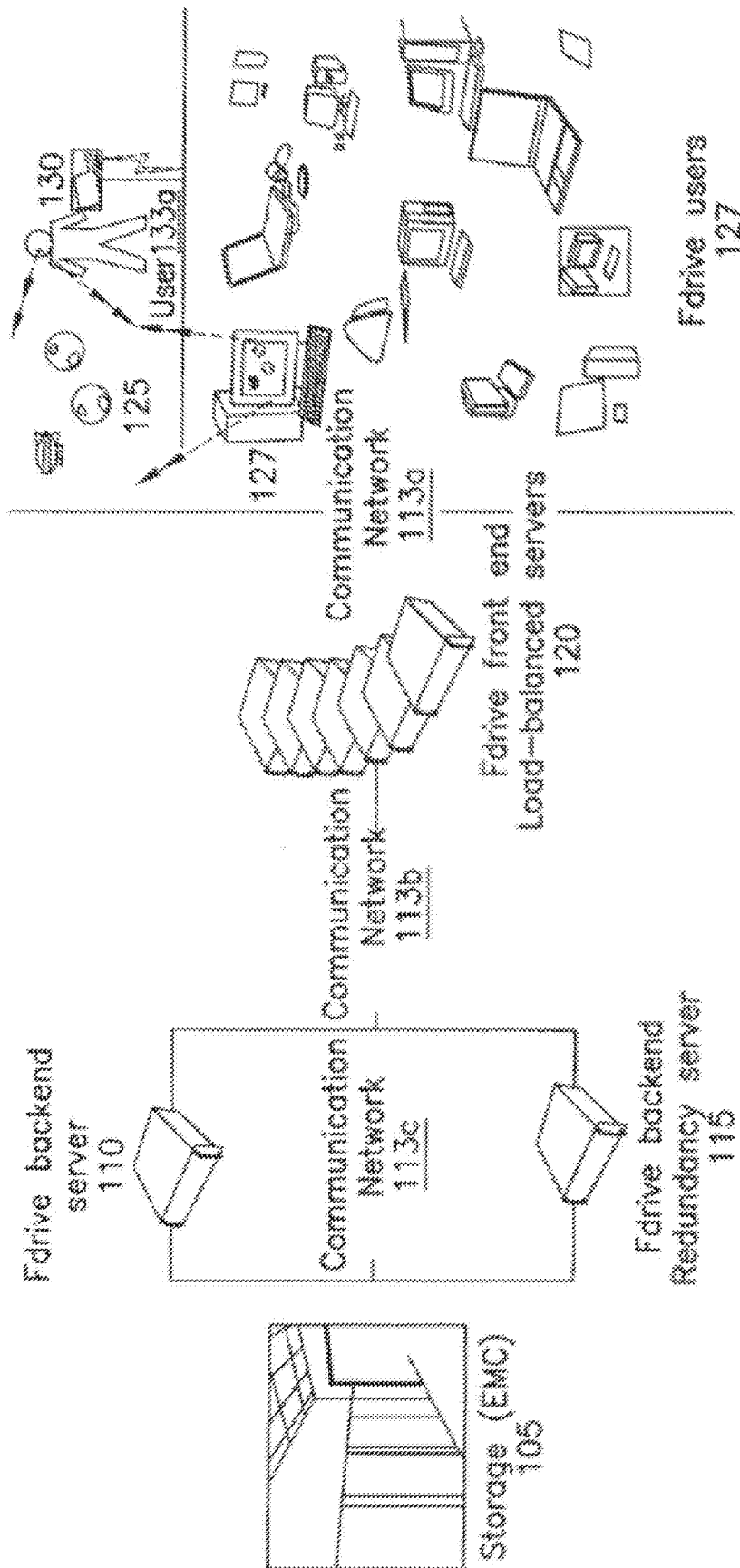


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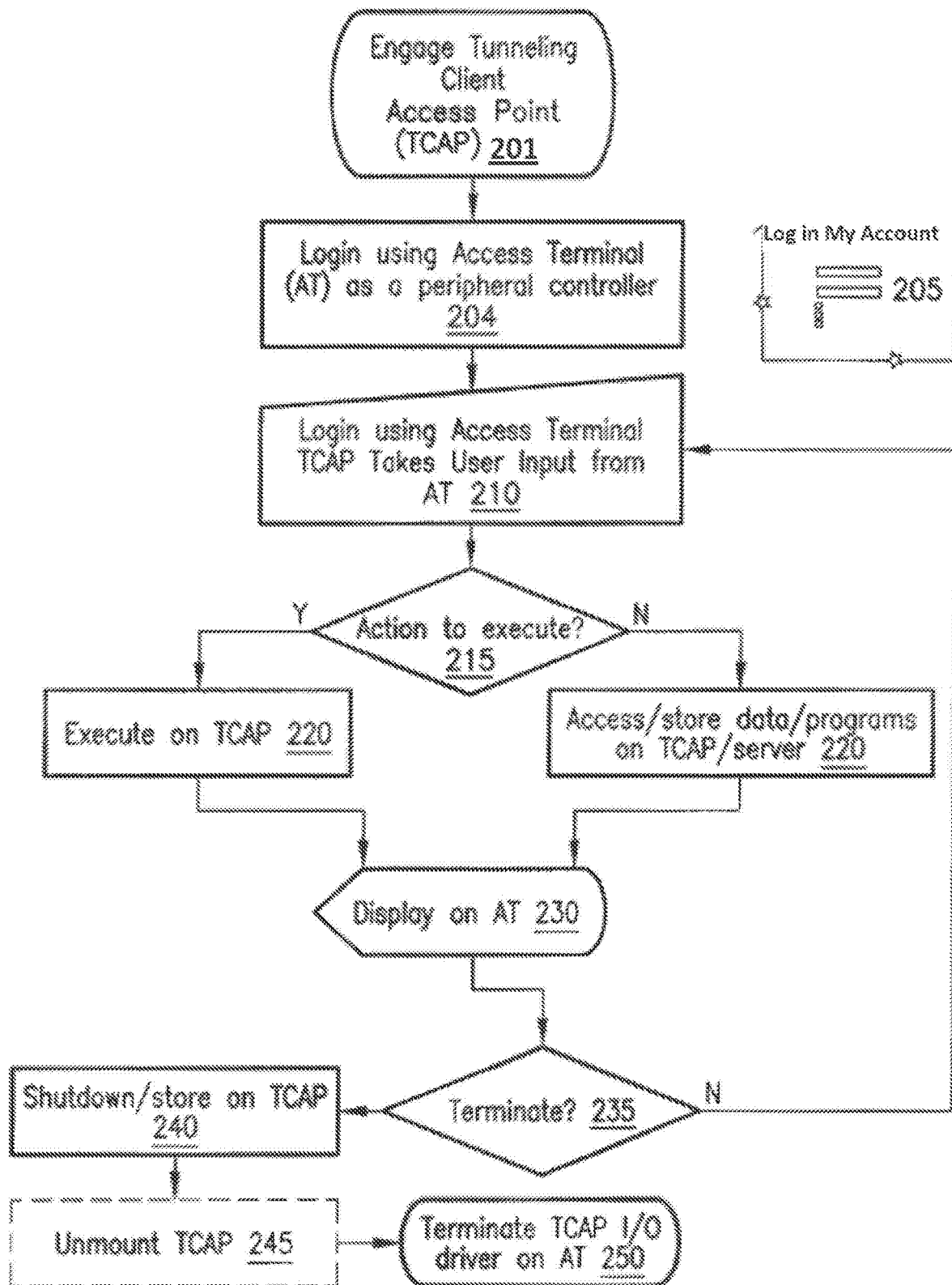
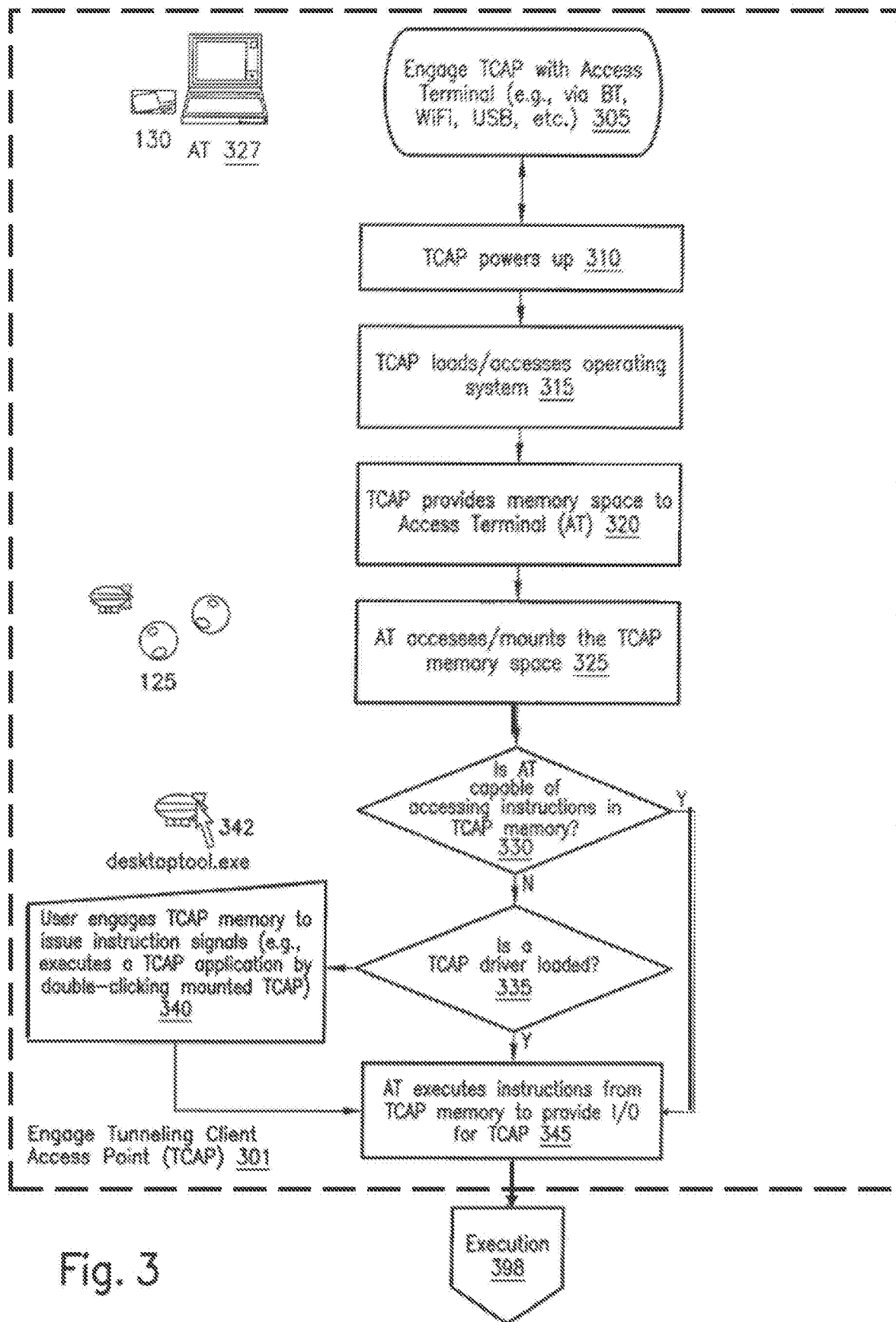


Fig. 2



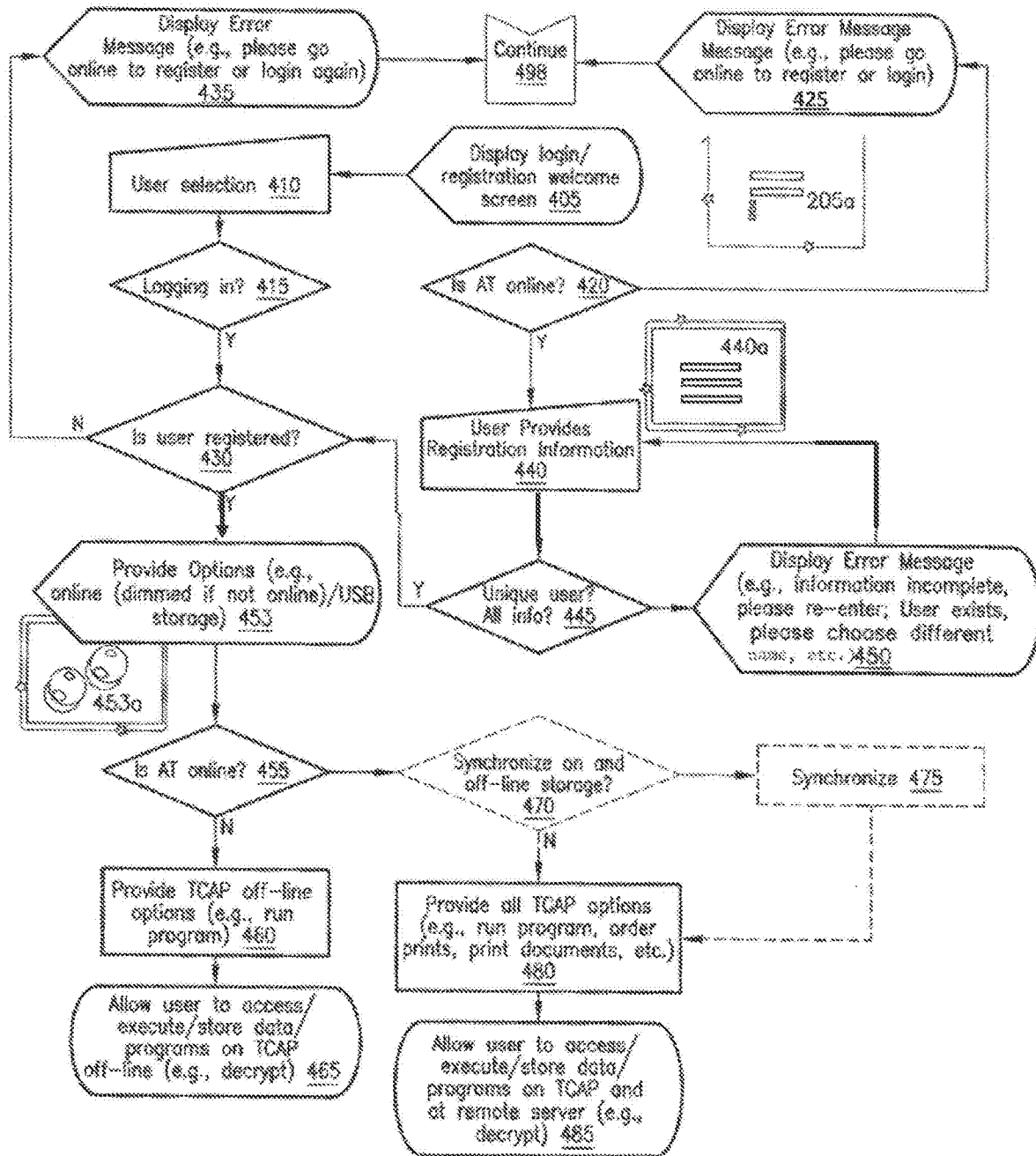


Fig. 4

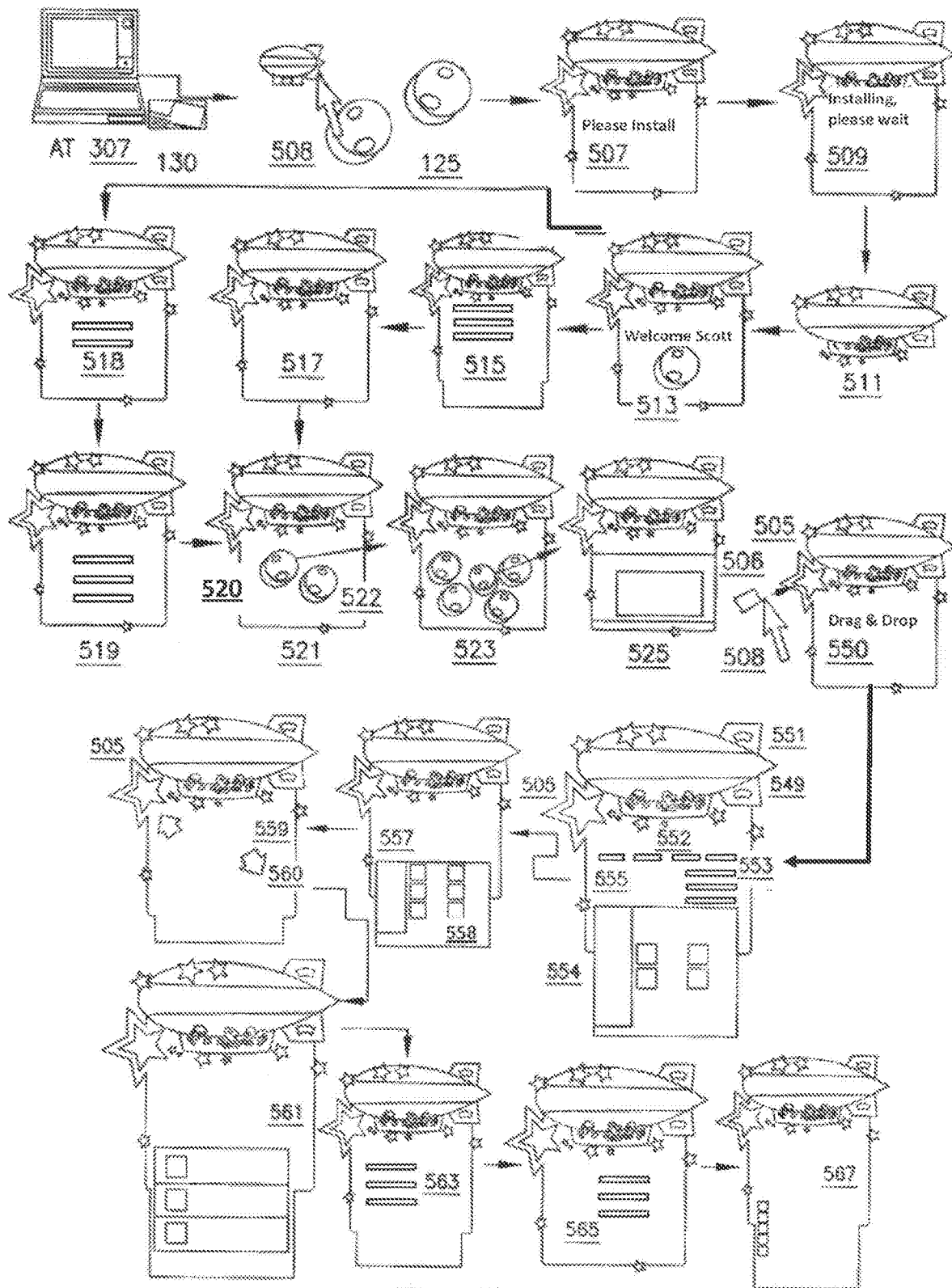


Fig. 5

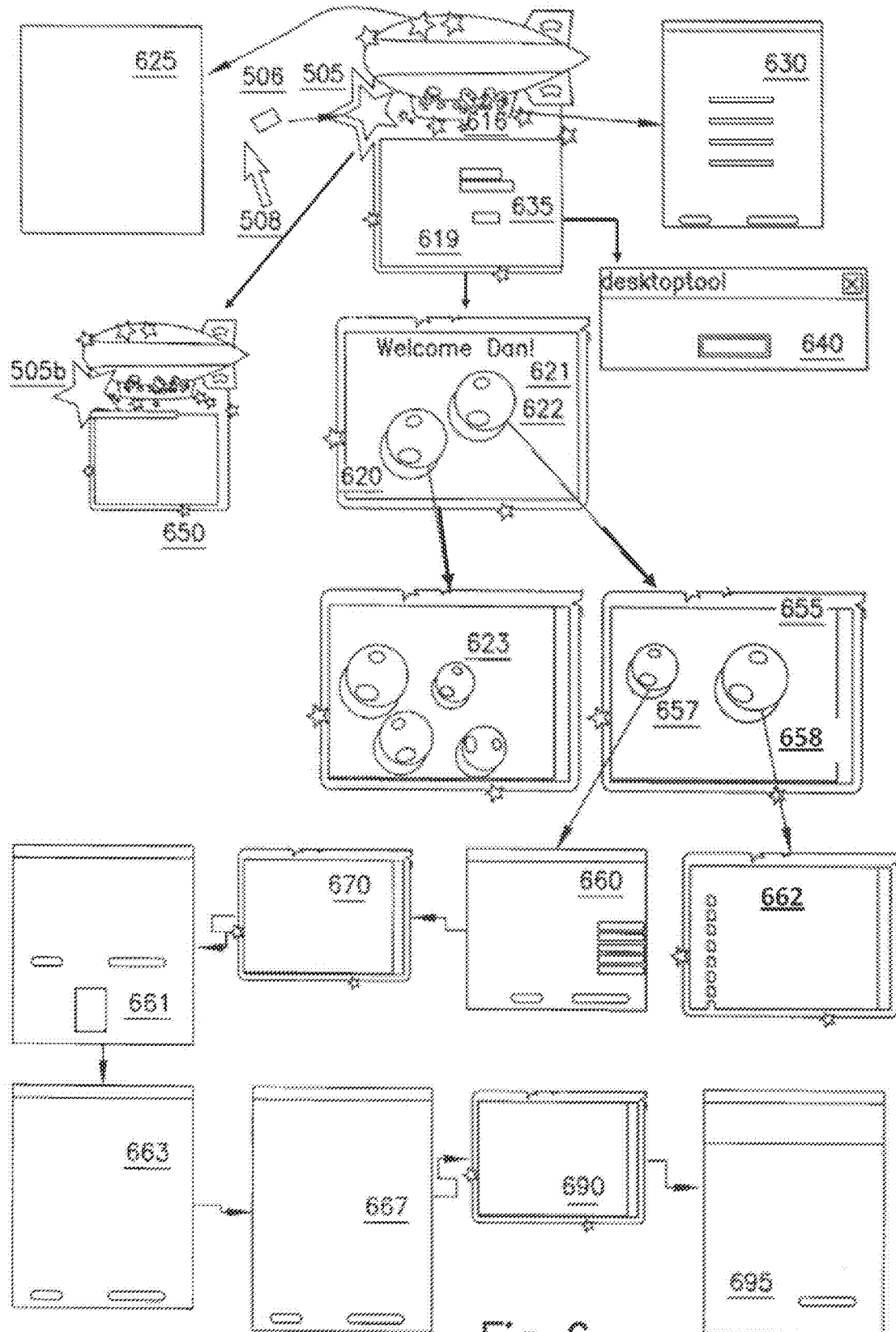
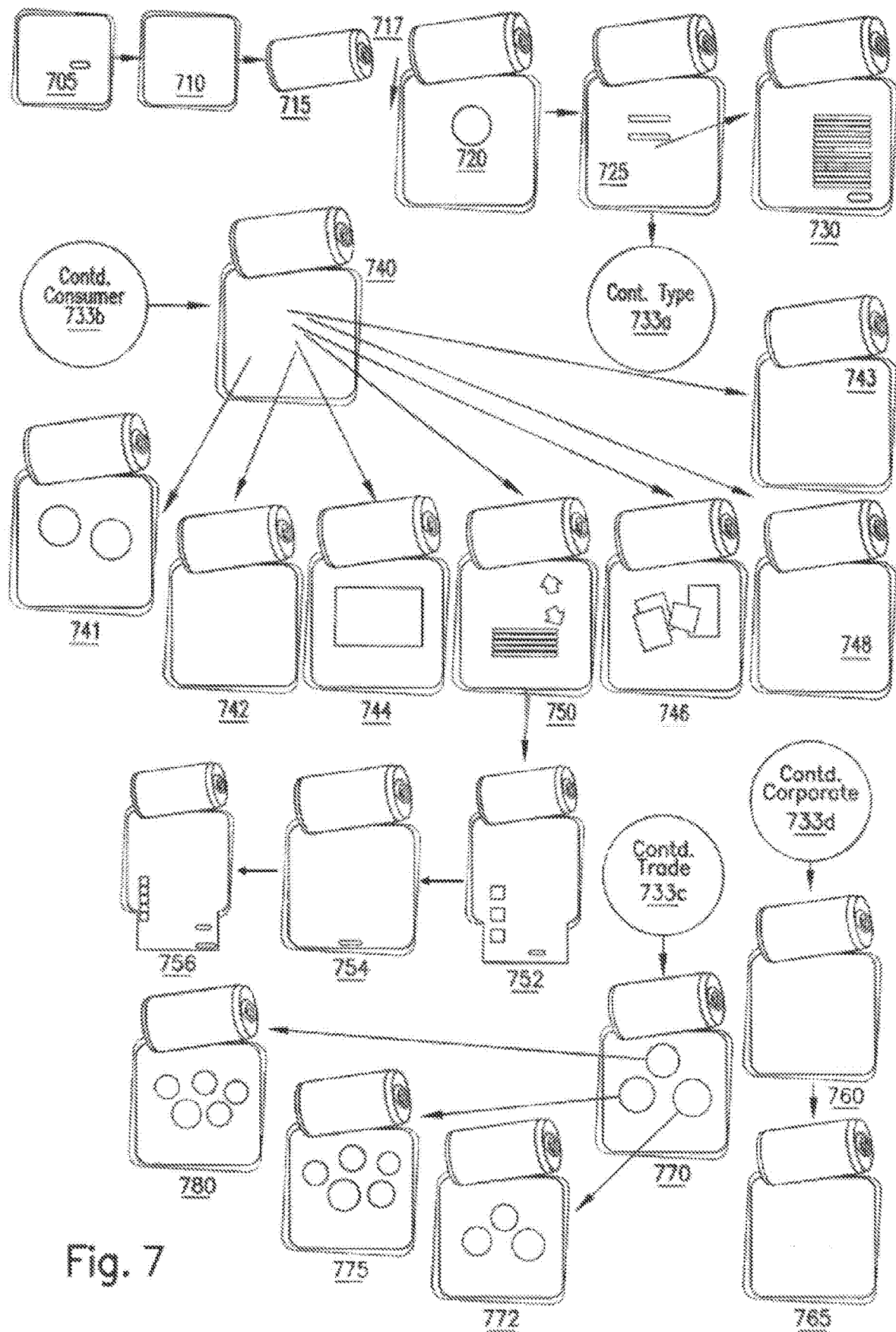


Fig. 6



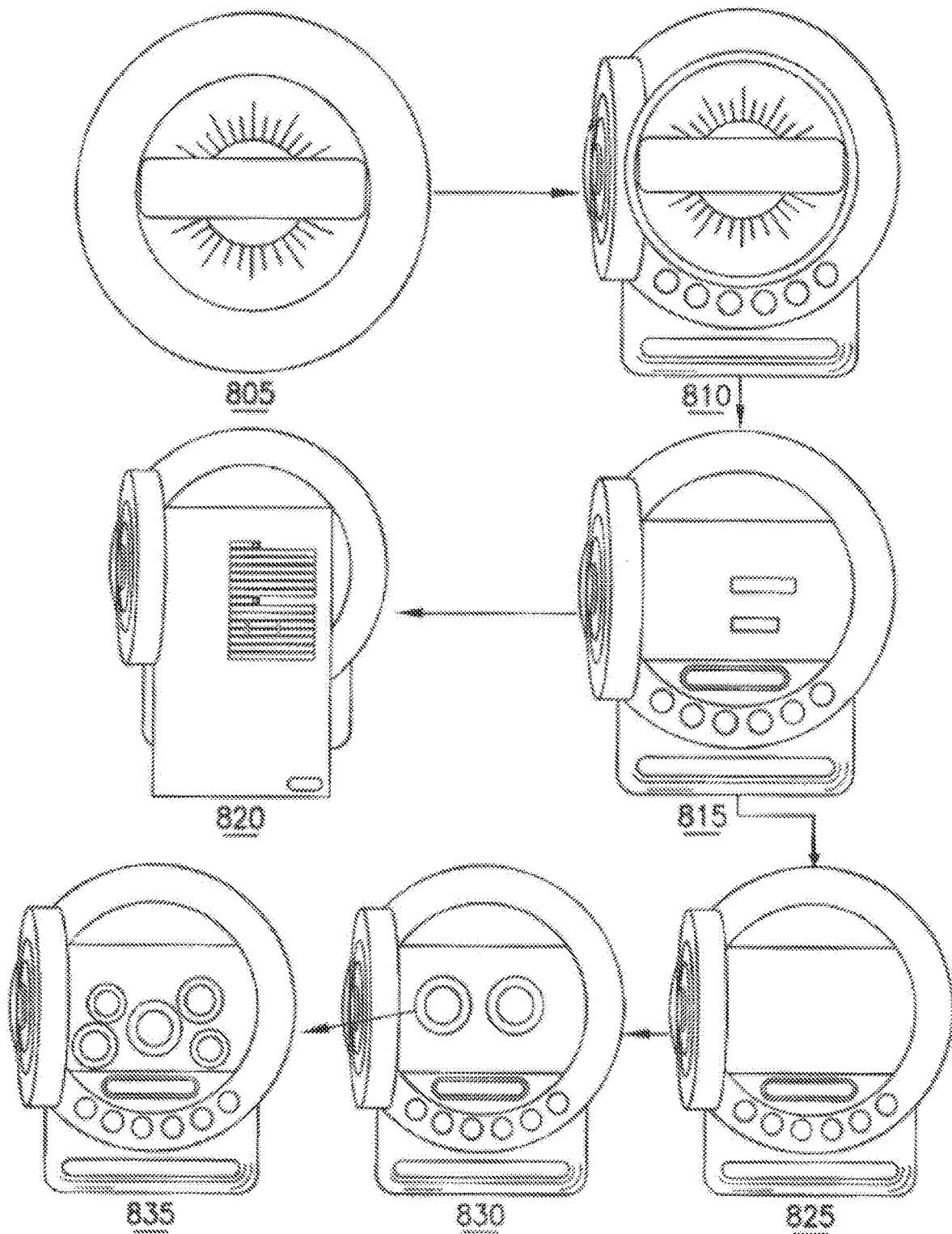


Fig. 8

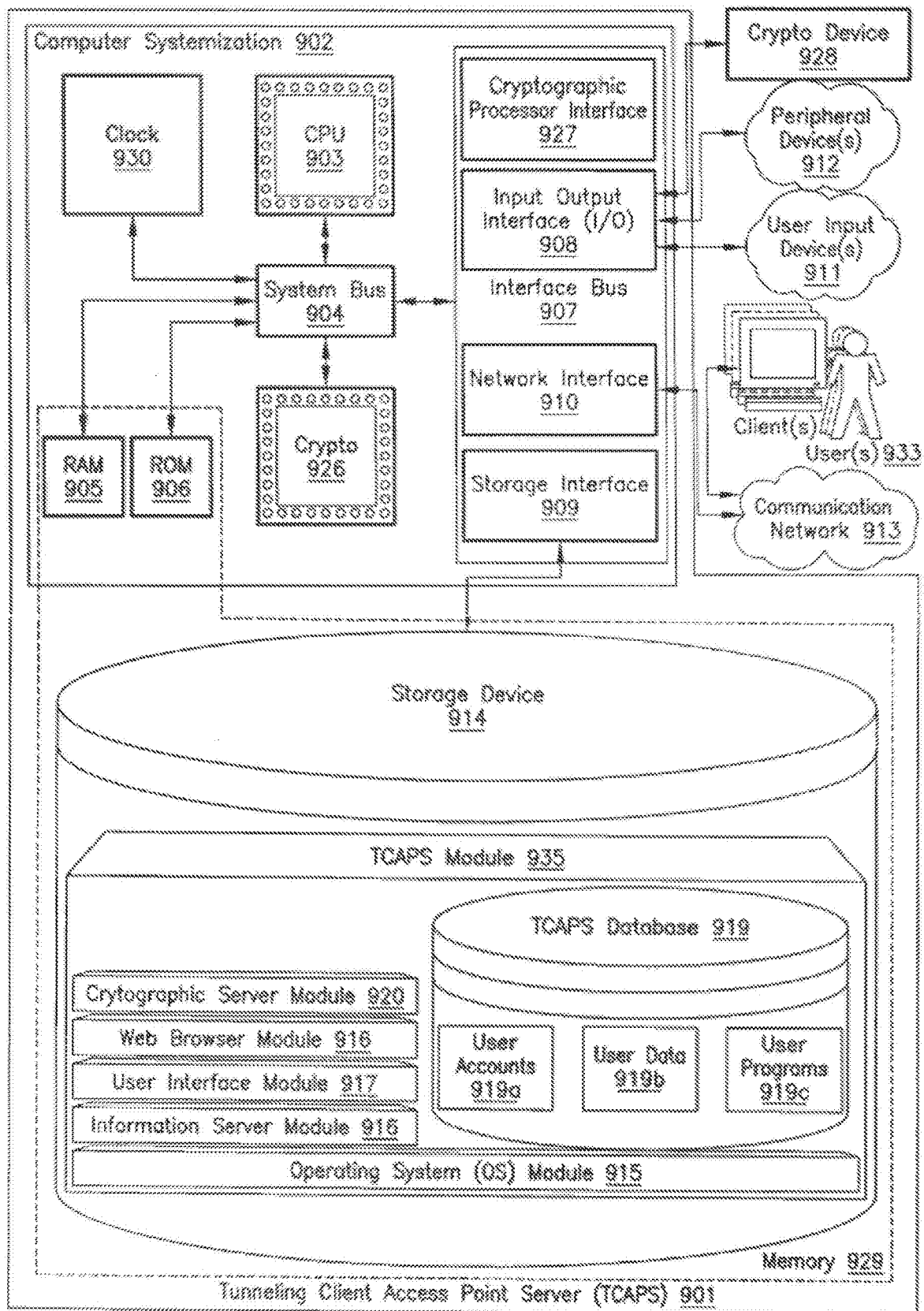


Fig. 9

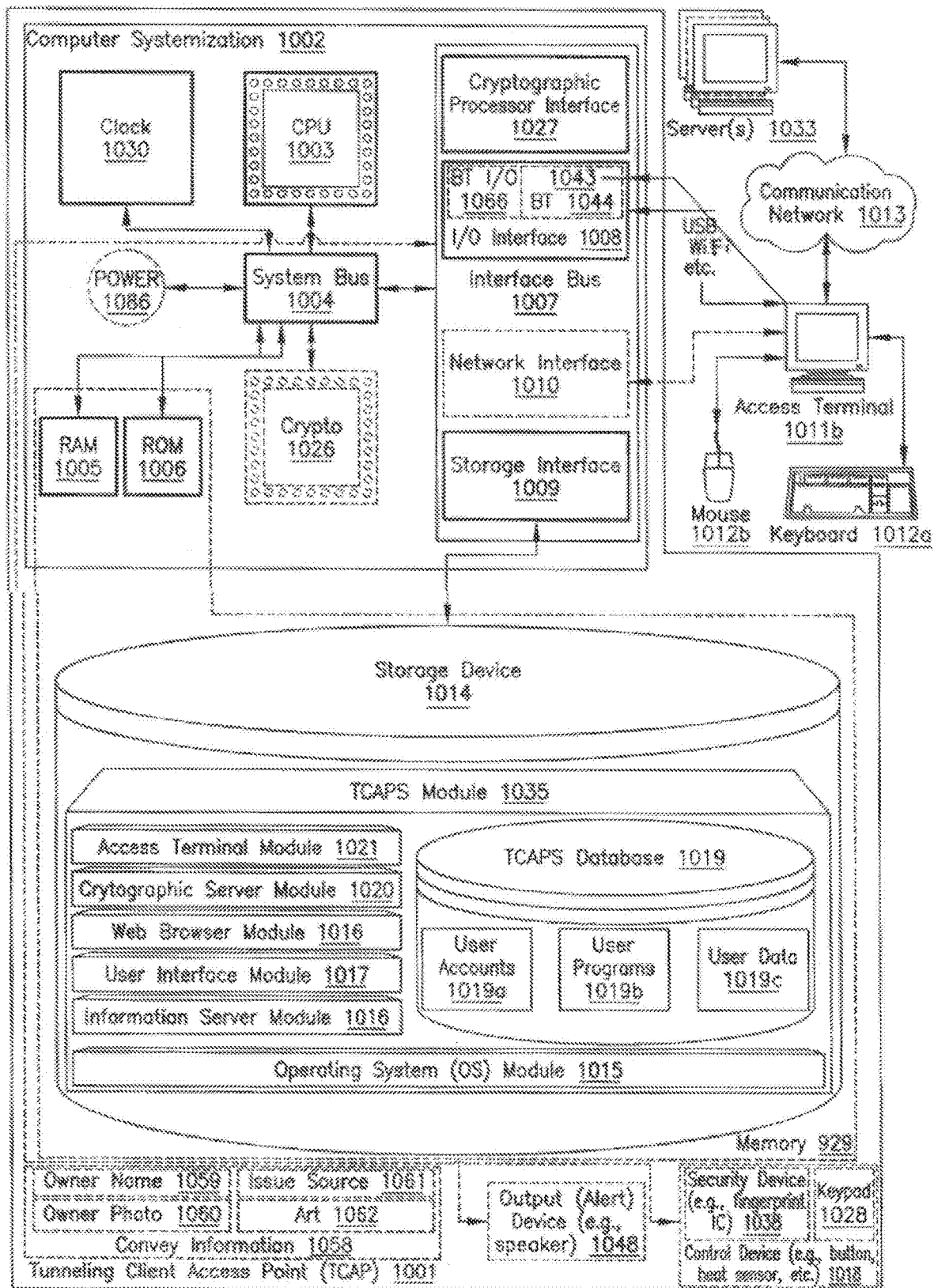


Fig.10

APPARATUS, METHOD AND SYSTEM FOR A TUNNELING CLIENT ACCESS POINT

This application is a continuation of U.S. application Ser. No. 14/721,540, filed May 26, 2015, which is a continuation of U.S. application Ser. No. 13/960,514, filed Aug. 6, 2013, now U.S. Pat. No. 9,059,969, which is a continuation of U.S. application Ser. No. 12/950,321, filed Nov. 19, 2010, now U.S. Pat. No. 8,539,047, which is a continuation of U.S. application Ser. No. 10/807,731, filed on Mar. 23, 2003, now U.S. Pat. No. 7,861,006.

FIELD

The present invention is directed generally to an apparatus, method, and system of accessing data, and more particularly, to an apparatus, method and system to transmit and process data comprising a portable device in communication with a terminal and a communications network comprising a plurality of communications network nodes.

BACKGROUND

Portable Computing and Storage

Computing devices have been becoming smaller over time. Currently, some of the smallest computing devices are in the form of personal digital assistants (PDAs). Such devices usually come with a touch screen, an input stylus and/or mini keyboard, and battery source. These devices, typically, have storage capacities around 64 MB. Examples of these devices include Palm's Palm Pilot.

Information Technology Systems

Typically, users, which may be people and/or other systems, engage information technology systems (e.g., commonly computers) to facilitate information processing. In turn, computers employ processors to process information; such processors are often referred to as central processing units (CPU). A common form of processor is referred to as a microprocessor. A computer operating system, which, typically, is software executed by CPU on a computer, enables and facilitates users to access and operate computer information technology and resources. Common resources employed in information technology systems include: input and output mechanisms through which data may pass into and out of a computer; memory storage into which data may be saved; and processors by which information may be processed. Often information technology systems are used to collect data for later retrieval, analysis, and manipulation, commonly, which is facilitated through database software. Information technology systems provide interfaces that allow users to access and operate various system components.

User Interface

The function of computer interfaces in some respects is similar to automobile operation interfaces. Automobile operation interface elements such as steering wheels, gearshifts, and speedometers facilitate the access, operation, and display of automobile resources, functionality, and status. Computer interaction interface elements such as check boxes, cursors, menus, scrollers, and windows (collectively and commonly referred to as widgets) similarly facilitate the access, operation, and display of data and computer hard-

ware and operating system resources, functionality, and status. Operation interfaces are commonly called user interfaces. Graphical user interfaces (GUIs) such as the Apple Macintosh Operating System's Aqua, Microsoft's Windows XP; or Unix's X-Windows provide a baseline and means of accessing and displaying information, graphically, to users.

Networks

Networks are commonly thought to comprise of the interconnection and interoperation of clients, servers, and intermediary nodes in a graph topology. It should be noted that the term "server" as used herein refers generally to a computer, other device, software, or combination thereof that processes and responds to the requests of remote users across a communications network. Servers serve their information to requesting "clients." The term "client" as used herein refers generally to a computer, other device, software, or combination thereof that is capable of processing and making requests and obtaining and processing, any responses from servers across a communications network. A computer, other device, software, or combination thereof that facilitates, processes information and requests, and/or furthers the passage of information from a source user to a destination user is commonly referred to as a "node." Networks are generally thought to facilitate the transfer of information from source points to destinations. A node specifically tasked with furthering the passage of information from a source to a destination is commonly called a "router." There are many forms of networks such as Local Area Networks (LANs), Pico networks, Wide Area Networks (WANs), Wireless Networks (WLANs), etc. For example, the Internet is generally accepted as being an interconnection of a multitude of networks whereby remote clients and servers may access and interoperate with one another.

SUMMARY

Although all of the aforementioned portable computing systems exist, no effective solution to securely access, execute, and process data is available in an extremely compact form. Currently, PDAs, which are considered among the smallest portable computing solution, are bulky, provide uncomfortably small user interfaces, and require too much power to maintain their data. Current PDA designs are complicated and cost a lot because they require great processing resources to provide custom user interfaces and operating systems. Further, current PDAs are generally limited in the amount of data they can store or access. No solution exists that allows users to employ traditional large user interfaces they are already comfortable with, provides greater portability, provides greater memory footprints, draws less power, and provides security for data on the device. As such, the disclosed tunneling client access point (TCAP) is very easy to use; at most it requires the user to simply plug the device into any existing and available desktop or laptop computer, through which, the TCAP can make use of a traditional user interface and input/output (I/O) peripherals, while the TCAP itself, otherwise, provides storage, execution, and/or processing resources. Thus, the TCAP requires no power source to maintain its data and allows for a highly portable "thumb" footprint. Also, by providing the equivalent of a plug-n-play virtual private network (VPN), the TCAP provides certain kinds of accessing of remote data in an easy and secure manner that was unavailable in the prior art.

In accordance with certain aspects of the disclosure, the above-identified problems of limited computing devices are overcome and a technical advance is achieved in the art of portable computing and data access. An exemplary tunneling client access point (TCAP) includes a method to dispose a portable storage device in communication with a terminal. The method includes providing the memory for access on the terminal, executing processing instructions from the memory on the terminal to access the terminal, communicating through a conduit, and processing the processing instructions.

In accordance with another embodiment, a portable tunneling storage processor is disclosed. The apparatus has a memory and a processor disposed in communication with the memory, and configured to issue a plurality of processing instructions stored in the memory. Also, the apparatus has a conduit for external communications disposed in communication with the processor, configured to issue a plurality of communication instructions as provided by the processor, configured to issue the communication instructions as signals to engage in communications with other devices having compatible conduits, and configured to receive signals issued from the compatible conduits.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings illustrate various non-limiting, example, inventive aspects in accordance with the present disclosure:

FIG. 1 is of a flow diagram illustrating embodiments of a tunneling client access point (TCAP);

FIG. 2 is of a flow diagram illustrating embodiments of a system of tunneling client access point and access terminal interaction;

FIG. 3 is of a flow diagram illustrating embodiments of engaging the tunneling, client access point to an access terminal interaction;

FIG. 4 is of a flow diagram illustrating embodiments of accessing the tunneling client access point and server through an access terminal;

FIGS. 5-8 is of a flow diagram illustrating embodiments of facilities, programs, and/or services that the tunneling client access point and server may provide to the user as accessed through an access terminal;

FIG. 9 is of a block diagram illustrating embodiments of a tunneling client access point server controller;

FIG. 10 is of a block diagram illustrating embodiments of a tunneling client access point controller;

The leading number of each reference number within the drawings indicates the first figure in which that reference number is introduced. As such, reference number 101 is first introduced in FIG. 1. Reference number 201 is first introduced in FIG. 2, etc.

DETAILED DESCRIPTION

Topology

FIG. 1 illustrates embodiments for a topology between a tunneling client access point (TCAP) (see FIG. 10 for more details on the TCAP) and TCAP server (TCAPS) (see FIG. 9 for more details on the TCAPS). In this embodiment, a user 133a may plug-in a TCAP into any number of access terminals 127 located anywhere. Access terminals (ATs) may be any number of computing devices such as servers, workstations, desktop computers, laptops, portable digital assistants (PDAs), and/or the like. The type of AT used is not

important other than the device should provide a compatible mechanism of engagement to the TCAP 130 and provide an operating environment for the user to engage the TCAP through the AT. In one embodiment, the TCAP provides a universal serial bus (USB) connector through which it may plug, into an AT. In other embodiment, the TCAP may employ Bluetooth, WiFi and/or other wireless connectivity protocols to connect with ATs that are also so equipped. In one embodiment, the AT provides Java and/or Windows runtime environments, which allows the TCAP to interact with the input/output mechanisms of the AT. See FIG. 9 for more details and embodiments on the types of connections that may be employed by the TCAP. Once the TCAP has engaged with an AT, it can provide the user with access to its storage and processing facilities.

If the AT is connected to a communication network 113, the TCAP may then communicate beyond the AT. In one embodiment, the TCAP can provide extended storage and/or processing resources by engaging servers 110, 115, 120, which have access to and can provide extended storage 105 to the TCAP through the AT. In one embodiment, a single server and storage device may provide such TCAP server support. In another embodiment, server support is provided over a communications network, e.g., the Internet, by an array of front-end load-balancing servers 120. These servers can provide access to storage facilities within the servers or to remote storage 105 across a communications network 113b, c (e.g., a local area network (LAN)). In such an embodiment, a backend server 110 may offload the front-end server with regard to data access to provide greater throughput. For purposes of load balancing and/or redundancy, a backup server 115 may be similarly situated to provide for access and backup in an efficient manner. In such an embodiment, the back-end servers may be connected to the front-end servers through a communications network 113b (e.g., wide area network (WAN)). The backend servers 110, 115 may be connected to the remote storage 105 through a communications network 113c as well (e.g., a high speed LAN, fiber-channel, and/or the like).

Thus, to the user 133a, the contents of the TCAP 130 appear on the AT as being contained on the TCAP 125 even though much of the contents may actually reside on the servers 115, 120 and/or the servers' storage facilities 105. In these ways, the TCAP "tunnels" data through an AT. The data may be provided through the AT's I/O for the user to observe without it actually residing on the AT. Also, the TCAP may tunnel data through an AT across a communications network, to access remote servers without requiring its own more complicated set of peripherals and I/O.

TCAP and AT Interaction

FIG. 2 illustrates embodiments for a system of tunneling client access point (TCAP) (see FIG. 10 for more details on the TCAP) and access terminal interaction. FIG. 2 provides an overview for TCAP and AT interaction and subsequent figures will provide greater detail on elements of the interaction. In this embodiment, a user engages the TCAP 201. For example, the user may plug the TCAP into an AT via the AT's USB port. Thereafter the user is presented with a login prompt 205 on the AT's display mechanism, e.g., on a video monitor. After a user successfully logs in (for example by providing a user name and password) 204, the TCAP can then accept user inputs from the AT and its peripherals (the TCAP can then also provide output to the user via the AT's peripherals).

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The user may employ the AT's input peripherals as user input devices that control actions on the TCAP. Depending on the user's actions **215**, the TCAP can be used by the AT as a storage device from which it can access and store data and programs **225**. For example, if the user takes the action of opening a file from the TCAP's memory, e.g., by double clicking on an icon when the TCAP is mounted as a USB drive on the AT, then the AT may treat the TCAP as a memory device and retrieve information from the TCAP **225**. If the user's action **215** is one that is directed at executing on the TCAP **215**, then the AT will not be involved in any execution. For example, if the user drops an icon representing a graphics file onto a drag-and-drop location visually representing the TCAP, then the file may be copied to the TCAP where it will process and spool the file for sending the graphics file to be printed at a remote location. In such a case, all of the requirements to process and spool the file are handled by the TCAP's processor and the AT would only be used as a mechanism for user input and output and as a conduit through which the TCAP may send files.

Regardless of if there is an action **215** to execute on the TCAP **220** or to access or store data on the TCAP **225**, the AT is used to display the status of any actions **230**. At any time the user may select to terminate TCAP related facilities executing either on the AT, a backend server, on the TCAP itself, and/or the like **235**. In one embodiment, the user may select a quit option that is displayed on the AT's screen. In another embodiment, the user may simply disengage the TCAP from the AT by severing the connection (e.g., turning power off, physically pulling the device off the AT, turning off wireless transmissions, and/or the like). It should be noted that such abrupt severing may result in the loss of data, file corruption, etc. if the TCAP has not saved data that is on the AT or on some remote server, however, if the TCAP is employing flash like memory, its contents should remain intact.

If there is no instruction signal to terminate the TCAP **235**, execution will continue and the TCAP will continue to take and look for input from the user. Of course if the TCAP has been set to perform certain actions, those actions will continue to execute, and the TCAP may respond to remote servers when it is communicating with them through the AT. When the user issues a terminate signal **235**, then the TCAP will shut down by saving any data to the TCAP that is in the AT's memory and then terminating any programs executing on both the AT and TCAP that were executed by and/or from the TCAP **240**. If no activities are taking place on the TCAP and all the data is written back to the TCAP **240**, then the TCAP may optionally unmount itself from the AT's file-system **245**. At this point, if there is a TCAP I/O driver executing on the AT, that driver may be terminated as triggered by the absence of the TCAP at a mount point **250**. After the TCAP is unmounted and/or the TCAP I/O driver is terminated, it is safe to disengage the TCAP from the AT.

TCAP and AT Interaction

FIG. 3 illustrates embodiments engaging the tunneling client access point to an access terminal interaction. Examples of engaging the TCAP **301** with an AT were discussed above in FIG. 1 **127**, **130**, **133a** and FIG. 2 **201**. In one embodiment, the TCAP **130** is engaged with an access terminal **327**, **305**. As mentioned in FIG. 1, the TCAP is capable of engaging with ATs using a number of mechanisms. In one embodiment, the TCAP has a USB connector for plugging into an AT, which acts as a conduit for power and data transfer. In another embodiment, the TCAP may

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use Bluetooth to establish a wireless connection with a number of ATs. In another embodiment, the TCAP may employ WiFi. In yet another embodiment, the TCAP may employ multiple communications mechanisms. It should be noted, with some wireless mechanisms like Bluetooth and WiFi, simply coming into proximity with an AT that is configured for such wireless communication may result in the TCAP engaging with and establish a communications link with the AT. In one embodiment, the TCAP has a "connect" button that will allow such otherwise automatically engaging interactions take place only if the "connect" button is engaged by a user. Such an implementation may provide greater security for users (see FIG. 10 for more details on the TCAP).

After being engaged **305**, the TCAP will then power on. In an embodiment requiring a direct connection, e.g., USB, simply plugging the TCAP into the AT provides power. In a wireless embodiment, the TCAP may be on in a lower powered state or otherwise turned on by engaging the connect button as discussed above. In such an embodiment, the TCAP can employ various on-board power sources (see FIG. 10 for more details on the TCAP). The TCAP then may load its own operating system **315**. The operating system can provide for interaction with the AT. In one embodiment, a Java runtime is executed on the TCAP, and Java applets communicate with the AT through Java APIs. In another embodiment, a driver is loaded onto the AT, and the on-TCAP Java operating system applets communicate to and through the AT via the driver running on the AT, wherein the driver provides an API through and to which messages may be sent.

After engaging with the AT, the TCAP can provide its memory space to the AT **320**. In one embodiment, the TCAP's memory is mapped and mounted as a virtual disk drive **125** storage **325**. In this manner, the TCAP may be accessed and manipulated as a standard storage device through the AT's operating system. Further, the TCAP and in some cases the AT can determine if the AT is capable of accessing program instructions stored in the TCAP's memory **330**. In one embodiment, the AT's operating system looks to auto-run a specified file from any drive as it mounts. In such an embodiment, the TCAP's primary interface may be specified in such a boot sequence. For example, under windows, an autorun.inf file can specify the opening of a program from the TCAP by the AT; e.g., OPEN=TCAP.EXE.

Many operating systems are capable of at least accessing the TCAP as a USB memory drive **330** and mounting its contents as a drive, which usually becomes accessible in file browsing window **125**. If the TCAP does not mount, the AT's operating system will usually generate an error informing the user of a mounting problem. If the AT is not capable of executing instruction from the TCAP, a determination is made if an appropriate driver is loaded on the AT to access the TCAP **335**. In one embodiment, the TCAP can check to see if an API is running on the AT. For example, the TCAP provide an executable to be launched, e.g., as specified through autorun.inf, and can establish communications through its connection to the AT, e.g., employing TCP/IP communications over the USB port. In such an embodiment, the TCAP can ping the AT for the program, and if an acknowledgement is received, the TCAP has determined that proper drivers and APIs exist. If no such API exists, the TCAP may launch a driver installation program for the AT as through an autorun.inf. In an alternative embodiment, if nothing happens, a user may double click onto an installer program that is stored on the mounted TCAP **342**, **340**. It

should be noted, that although the TCAP's memory space may be mounted, certain areas of the TCAP may be inaccessible until there is an authorization. For example, certain areas and content on the TCAP may be encrypted. It should be noted that any such access terminal modules that drive AT and TCAP interaction may be saved onto the TCAP by copying the module to a mounted TCAP. Nevertheless, if the AT is capable of accessing program instructions in TCAP memory 330, a TCAP driver is loaded on the AT 335, and/or the user engages a program in the TCAP memory 340, then the AT can execute program instructions from the TCAP's memory, which allows the TCAP to use the AT's I/O and allowing the user to interface with TCAP facilities 345. It should be noted that some ATs may not be able to mount the TCAP at all. In such an instance, the user may have to install the TCAP drivers by downloading them from a server on the Internet, loading them from a diskette or CD, and/or the like. Once the TCAP is engaged to the AT 301, execution may continue 398.

TCAP and AT Interaction

FIG. 4 illustrates embodiments accessing the tunneling client access point and server through an access terminal. Upon engaging the TCAP to the AT as described in FIG. 3 301, 398, the user may then go on to access the TCAP and its services 498. It should be noted that users may access certain unprotected areas of the TCAP once it has been mounted, as described in FIG. 3. However, to more fully access the TCAP's facilities, the user may be prompted to either login and/or registration window 205a to access the TCAP and its services, which may be displayed on the AT 405. It is important to note that in one embodiment, the execution of the login and/or registration routines are handled by the TCAP's processor. In such an embodiment, the TCAP may run a small Web server providing login facilities, and connect to other Web based services through the AT's connection to the Internet. Further, the TCAP may employ a basic Web browsing core engine by which it may connect to Web services through the AT's connection to a communications network like the Internet. For purposes of security, in one embodiment, the TCAP may connect to a remote server by employing a secure connection e.g., HTTPS, VPN, and/or the like.

Upon displaying a login window 405, e.g., 205a, the user may select to register to access the TCAP and its services, or they may simply log in by providing security verification. In one example, security authorization may be granted by simply providing a user and password as provided through a registration process. In another embodiment, authorization may be granted through biometric data. For example, the TCAP may integrate a fingerprint and/or heat sensor IC into its housing. Employing such a device, and simply by providing one's finger print by laying your finger to the TCAP's surface, would provide the login facility with authorization if the user's finger print matches one that was stored during the registration process.

If the user does not attempt to login 415, i.e., if the user wishes to register to use the TCAP and its services, then the TCAP can determine if the AT is online 420. This may be accomplished in a number of ways. In one embodiment, the TCAP itself may simply ping a given server and if acknowledgement of receipt is received, the TCAP is online. In another embodiment, the TCAP can query for online status by engaging the AT through the installed APIs. If the AT is not online, then the user may be presented with an error message 425. Thus, if a user does not have a login, and does

not have the ability to register, then restricted areas of the TCAP will remain unavailable. Thereafter, flow can continue 498 and the user may have another opportunity to login and/or register. In one embodiment as a login integrity check, the TCAP keeps track of the number of failed attempts to login and/or register and may lock-out all further access if a specified number of failed attempts occurs. In one embodiment, the lockdown may be permanent by erasing all data on the TCAP. In another embodiment, the TCAP will disallow further attempts for a specified period of time.

If the user is attempting to register 415, and the AT is online 420, then the user may provide registration information 440 into a screen form 440a. Registration information fields may require a user's name, address, email address, credit card information, biometric information (e.g., requiring the user to touch a biometric fingerprint IC on the TCAP), and/or the like. The TCAP may determine if all the information was provided as required for registration and may query backend servers to determine if the user information is unique 445. If the user did not properly fill out the registration information or if another user is already registered, the TCAP can provide an error message to such effect. Also, both the TCAP and its back-end servers may make log entries tracking such failed attempts for purposes of defending against fraud and/or security breaches. The user may then modify the registration information 440 and again attempt to register. Similarly to the login integrity checks, the TCAP can lockout registration attempts if the user fails to register more than some specified number of times.

Upon providing proper registration information 445 or proper login authentication 415, the TCAP can query back-end servers to see if the user is registered. In one embodiment, such verification may be achieved by sending a query to the servers to check its database for the authorization information and/or for duplicate registrations. The servers would then respond providing an acknowledgment of proper registration and authorization to access data on the backend servers. If the users are not registered on the backend servers 430, then the TCAP can provide an error message to the user for display on the AT to such effect 435. In an alternative embodiment, the registration information may be stored on the TCAP itself. In one embodiment, the registration would be maintained in encrypted form. Thus, the user's login information may be checked relative to the information the TCAP itself, and if there is, a match, access may be granted, otherwise an error message will be displayed 435. The TCAP may then continue 498 to operate as if it were just engaged to the AT.

If the user is confirmed to be registered 430, then the TCAP may provide options for display 453, 453a. Depending on the context and purpose of a particular TCAP, the options may vary. For example, the a screen 453a may provide the user with the options to access data either online or offline. The user might simply click on a button and gain secure access to such data that may be decrypted by the TCAP. In one embodiment, the TCAP will determine if the AT is online 455. If this was already determined 420, this check 455 may be skipped.

If the AT is online 455, optionally, the TCAP determines if the user wishes to synchronize the contents of the TCAP with storage facilities at the backend server 470. In one embodiment, the user may designate that such synchronization is to always take place. If synchronization is specified 470, then the TCAP will provide and receive updated data to and from the backend servers, overwriting older data with updated versions of the data 475. If the AT is online 455

and/or after any synchronization 475, the TCAP may provide the user with all of its service options as authorized by the account and programs available on the TCAP and at the backend server 480. Once again, these facilities, programs, and/or services may vary greatly depending on the context and deployment requirements of the user. The options to be presented to the user from the TCAP or the TCAP services from the backend server, as displayed through the TCAP onto the AT's display 480, are myriad and some example embodiments are provided in FIGS. 5-8. Upon presenting the user with the options, the user is then able to access, execute, store data and programs on the TCAP and on the remote server 485. All areas of the TCAP and services are then open, including any encrypted data areas.

If the AT is not online 455, the TCAP may provide options for the user not including online services 460. In one embodiment, the online options that may be presented on the AT display will be dimmed and/or omitted to reflect the lack of accessibility. However, the user will be able to access, execute, store data and programs on the TCAP, including any encrypted data areas 465.

TCAP Facilities and Services

FIGS. 5-8 illustrate embodiments of facilities, programs, and/or services that the tunneling client access point and server may provide to the user as accessed through an AT. Any particular set of facilities may have a myriad of options. The options and the general nature of the facilities provided on any particular TCAP are dependant upon the requirements of a given set of users. For example, certain groups and/or agencies may require TCAPs to be targeted towards consumer photographs, and may employ TCAPs to further that end. Other groups may require high security facilities, and tailor the TCAPs accordingly. In various environments, an organization may wish to provide a secure infrastructure to all of its agents for securely accessing the organization's data from anywhere and such an organization could tailor the TCAPs contents to reflect and respond to its needs. By providing a generalized infrastructure on the TCAP backend servers and within the TCAP by using a generalized processor, the TCAPs may be deployed in numerous environments.

In one particular embodiment as in FIG. 5, the TCAP provides facilities to access, process, and store email, files, music, photos and videos through the TCAP. Upon engaging 101 of FIG. 1 the TCAP 130 to an AT 307, the TCAP will mount and display through the AT's file browser window 125 of FIG. 1. As has already described, in the case where the AT has no TCAP driver software, the user may double click on the installer software stored on the TCAP 507. Doing so will launch the installer software from the TCAP's memory to execute on the AT, and the user may be presented with a window to confirm the desire to install the TCAP software onto the AT 507. Upon confirming the install 507, the software will install on the AT and the user will be asked to wait as they are apprised of the install progress 509.

Upon installation, the TCAP front-end software may execute and present the user with various options in various and fanciful interface formats 511, 460, 480 of FIG. 4. In one embodiment, these user interfaces and programs are Java applications that may execute on the AT and a present Java runtime. In an alternative embodiment, a small applet may run on the AT, but all other activities may execute on the TCAP's processor, which would use the AT display only as a display terminal. In the embodiment where the TCAP executes program instructions, the TCAP may be engaged to

receive commands and execute by receiving a signal from the access terminal driver instructing it to execute certain program files or, alternatively, looking to default location and executing program instructions. In yet another embodiment, the TCAP may obtain updated interfaces and programs from a backend server for execution either on the TCAP itself and/or the AT; this may be done by synchronization with the backend server and checking for updates of specified files at the backend server. By engaging the user interface, perhaps by clicking on a button to open the TCAP facilities and services 511, the interface may further unfurl to present options to access said facilities and services 513. Here, the interface may reflect ownership of the TCAP by providing a welcome screen and showing some resources available to the user; for example, a button entitled "My Stuff" may serve as a mechanism to advance the user to a screen where they may access their personal data store. At this point the user may attempt to login to access their data by engaging an appropriate button, which will take them to a screen that will accept login information 519. Alternatively, the user may also register if it is their first time using the TCAP by selecting an appropriate button, which will advance the user to a registration screen 515 wherein the user may enter their name, address, credit card information, etc. Upon successfully providing registration information, the user may be prompted for response to further solicitations on a follow-up screen 517. For example, depending on the services offered for a particular TCAP, the user may be provided certain perks like 5 MB of free online storage on a backend server, free photographic prints, free email access, and/or the like 517.

After the user is prompted to login 518 and successfully provides proper login information 519, or after successfully registering 515 and having responded to any solicitations 517, the user may be provided with general options 521 to access data stored on the TCAP itself 522 or in their online account 520 maintained on a backend server. For example, if the user selects the option to access their online storage 520, they may be presented with more options to interact with email, files, music, photos and videos that are available online 523. Perhaps if the user wished to check their email, the user might select to interact with their email, and a screen allowing them to navigate through their email account(s) would be presented 525. Such online access to data may be facilitated through http protocols whereby the TCAP applications send and receive data through http commands across a communications network interacting with the backend servers and/or other servers. Any received results may be parsed and imbedded in a GUI representation of a Java application. For example, the email facility may run as a Java applet 525 and may employ a POP mail protocol to pull data from a specified mail server to present to the user.

Similarly, many other facilities may be engaged by the user through the TCAP. In one embodiment, the user may drag 508 a file 506 onto a drag-and-drop zone 505 that is presented on the TCAP interface. Upon so doing, various drag-and-drop options may unfurl and present themselves to the user 550. It should be noted that, the file may come from anywhere, i.e., from the AT, the TCAP, and/or otherwise. For example, upon dragging and dropping a graphics file, a user may be prompted with options to order prints, upload the file to an online storage space, save the file to the TCAP's memory space, cancel the action, and/or the like 550. If the user sends the file for storage, or otherwise wishes to see and manage their data, an interface allowing for such management may be presented 555. The interface may organize and allow access to general data, picture, and music formats 554,

provide usage statistics (e.g., free space, capacity, used space, etc.) 553, provide actions to manipulate and organize the data 552, provide status on storage usage on the TCAP 551 and online 549, and/or the like.

Should the user engage a user interface element indicating the wish to manipulate their picture data 548, the TCAP interface will update to allow more specific interaction with the user's photos 557. In such a screen, the user may select various stored pictures and then indicate a desire to order photo prints by engaging the appropriate user interface element 558. Should the user indicate their desire for prints 558, they will be presented with an updated interface allowing the specification of what graphics files they wish to have printed 559. In one embodiment, the users may drag-and-drop files into a drop zone, or otherwise engage file browsing mechanisms 560 that allow for the selection of desired files. Upon having identified the files for prints 559, a user may be presented with an interface allowing for the selection of print sizes and quantities 561. After making such specifications, the user may be required to provide shipping information 563 and information for payments 565. After providing the billing information to a backend server for processing and approval, the user may be presented with a confirmation interface allowing for editing of the order, providing confirmation of costs, and allowing for submission of a final order for the selected prints 567. Upon submitting the order, the TCAP will process the files for spooling to a backend server that will accept the order and files, which will be developed as prints and the user's account will be charged accordingly. In one embodiment, all of the above order and image processing operations occur and execute on the TCAP CPU. For example, the TCAP may employ various rendering technologies, e.g., ghostscript, to allow it to read and save PDFs and other media formats.

FIG. 6 goes on to illustrate embodiments and facets of the facilities of FIG. 5. The TCAP interface allows the user to perform various actions at any given moment. As has already been discussed in FIG. 5, the user may drag 508 a file 506 onto a drag and drop zone 505 so as to provide the file to the TCAP for further manipulation. As in 550 of FIG. 5, the user may be presented with various options subsequent to a drag-and-drop operation. Also, the TCAP interface may provide visual feedback that files have been dropped in the drop zone by highlighting the drop zone 505b. Should the user wish, they may close the TCAP interface by engaging a close option 633. Also, the ability to change and/or update their personal information may be accessed through the TCAP interface 616, which would provide a form allowing the user to update their registration information 630. In one embodiment, should the user forget their login information, they may request login help 635 and the TCAP will send their authorization information to the last known email address and inform the user of same 640. Also, the TCAP interface may provide help facilities that may be accessed at any time by simply engaging a help facility user interface element 617. So doing will provide the user with help screen information as to how to interact with the TCAP's facilities 625.

Upon providing proper login information 619 and logging-in 619, the user may be presented with a welcome screen with various options to access their data 621 as has already been discussed in FIG. 5, 521. By engaging a user interface element to access online storage 620, the user may be presented with various options to interact with online storage 623, 523 of FIG. 5. Should the user wish to interact with data on the TCAP itself, the user may indicate so by engaging the appropriate user interface option 622. So doing

will provide the user with further options related to data stored on the TCAP 655. The user may engage an option to view the storage contents 658 and the TCAP interface will provide a listing of the contents 662, which may be manipulated through selection and drag-and-drop operations with the files.

In one embodiment, the user may order prints of photos 657 from files that are on the TCAP itself. As discussed in FIG. 5, the user may select files for which they desire prints 660. Here, the selected files will first be processed by the TCAP in preparation for sending to backend servers and file manipulations 670. The user may specify various attributes regarding the prints they desire, e.g., the size, number, cropping, red-eye correction, visual effects, and/or the like 661. In one embodiment, such processing occurs on the TCAP processor, while in other embodiments such processing can take place on the AT or backend server. Once again, the user may provide a shipping address 663, and make a final review to place the order 667. Upon committing to the order 667, the processed files are uploaded to the backend servers that will use the files to generate prints 690. A confirmation screen may then be provided to the user with an order number and other relevant information 695.

FIG. 7 goes on to illustrate embodiments and facets of the facilities of FIGS. 5-6 as may apply in different environments. As is demonstrated, the look and feel of the TCAP interface is highly malleable and can serve in many environments. FIG. 7 illustrates that even within a single organization, various environments might benefit from TCAPs and services tailored to serve such environments 733b-d. In this case TCAPs can serve in consumer 733b, industry trade 733c, corporate 733d, and/or the like environments.

As has already been discussed, initially in any of the environments, after engaging the TCAP to an AT, the user may be prompted to install the TCAP interface 705 and informed of the installation procedure 710. The user may then be presented with the installed TCAP interface 715, which may be activated by engaging an interface element to unfurl the interface, e.g., in this case by opening the top to a can of soda 717. Opening the interface will present the user with various options as 720, as has already been discussed in FIGS. 5-6. Similarly the user may login 725 or make a selection to register for various TCAP services and provide the requisite information in the provided form 730. Upon registering and/or logging-in 725, various options may be presented based upon the configuration of the TCAP. For example, if the TCAP was configured and tailored for consumers, then upon logging in 725 the consumer user might be presented 733a-b with various consumer related options 740. Similarly, if the TCAP were tailored for 733a, c the trade industry or 733a, d the corporate environment, options specific to the trade industry 770 and corporate environment 760 may be presented.

In one embodiment, an organization wishing to provide TCAPs to consumers might provide options 740 for free music downloads 743, free Internet radio streaming 748, free news (e.g., provided through an RSS feed from a server) 766, free photo printing 750, free email 740, free coupons 742, free online storage 741, and/or the like. Users could further engage such services (e.g., clicking free music file links for downloading to the TCAP, by ordering prints 750, etc. For example, the user may select files on the TCAP 750, select the types of photos they would like to receive 752, specify a delivery address 754, confirm the order 756 all of which will result in the TCAP processing the files and uploading them to the backend servers for generation of prints (as has already been discussed in FIGS. 5-6).

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In another embodiment, an organization wishing to provide TCAPs to a trade industry might provide options 770 for advertising 780, events 775, promotions 772, and/or the like. It is important to note that information regarding such options may be stored either on the TCAP or at a backend server. In one embodiment, such information may be constantly synchronized from the backend servers to the TCAPs. This would allow an organization to provide updates to the trade industry to all authorized TCAP "key holders." In such an embodiment, the user may be presented with various advertising related materials for the organization, e.g., print, television, outdoor, radio, web, and/or the like 780. With regard to events, the user may be presented with various related materials for the organization, e.g., trade shows, music regional, sponsorship, Web, and/or the like 775. With regard to promotions, the user may be presented with various related materials for the organization, e.g., rebates, coupons, premiums, and/or the like 772.

In another embodiment, an organization wishing to provide TCAPs to those in the corporate environment and might provide options relating to various corporate entities 760. Selecting any of the corporate entities 760 may provide the user with options to view various reports, presentations, and/or the like, e.g., annual reports, 10K reports, and/or the like 765. Similarly, the reports may reside on the TCAP and/or the corporate TCAP can act as a security key allowing the user to see the latest corporate related materials from a remote backend server.

FIG. 8 goes on to illustrate embodiments and facets of the facilities of FIGS. 5-7 as may apply in different environments. FIG. 8 illustrates that TCAPs may serve to provide heightened security to any environment. As has been discussed in previous figures, users may engage the TCAP interface 805 to access various options 810. The TCAP interface is highly adaptable and various services may be presented within it. For example, a stock ticker may be provided as part of the interface in a financial setting 810. Any number of live data feeds may dynamically update on the face of the interface. Upon logging-in 815 or registering a new account 820, the user may be informed that communications that are taking place are secured 825. In one embodiment, various encryption formats may be used by the TCAP to send information securely to the backend servers. It is important to note that in such an embodiment, even if data moving out of the TCAP and across the AT were captured at the AT, such data would not be readable because the data was encrypted by the TCAP's processor. As such, the TCAP acts as a "key" and provides a plug-and-play VPN to users. Such functionality, heretofore, has been very difficult to set up and/or maintain. In this way, all communications, options presented and views of user data are made available only to the TCAP with the proper decryption key. In heightened security environments, display of TCAP data is provided on the screen only in bitmapped format straight to the video memory of the AT and, therefore, is not stored anywhere else on the AT. This decreases the likelihood of capturing sensitive data. As such, the user may access their data on the TCAP and/or online 830 in a secure form whereby the user may navigate and interact with his/her data and various services 835 in a secure manner.

Tunneling Client Access Point Server Controller

FIG. 9 illustrates one embodiment incorporated into a tunneling client access point server (TCAPS) controller 901. In this embodiment, the TCAP controller 901 may serve to process, store, search, serve, identify, instruct, generate,

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match, and/or update data in conjunction with a TCAP (see FIG. 10 for more details on the TCAP). TCAPS act as backend servers to TCAPs, wherein TCAPS provide storage and/or processing resources to great and/or complex for the TCAP to service itself. In effect, the TCAPS transparently extend the capacity of a TCAP.

In one embodiment, the TCAPS controller 901 may be connected to and/or communicate with entities such as, but not limited to: one or more users from user input devices 911; peripheral devices 912; and/or a communications network 913. The TCAPS controller may even be connected to and/or communicate with a cryptographic processor device 928.

A TCAPS controller 901 may be based on common computer systems that may comprise, but are not limited to, components such as: a computer systemization 902 connected to memory 929.

Computer Systemization

A computer systemization 902 may comprise a clock 930, central processing unit (CPU) 903, a read only memory (ROM) 906, a random access memory (RAM) 905, and/or an interface bus 907, and most frequently, although not necessarily, are all interconnected and/or communicating through a system bus 904. Optionally, a cryptographic processor 926 may be connected to the system bus. The system clock typically has a crystal oscillator and provides a base signal. The clock is typically coupled to the system bus and various clock multipliers that will increase or decrease the base operating frequency for other components interconnected in the computer systemization. The clock and various components in a computer systemization drive signals embodying information throughout the system. Such transmission and reception of signals embodying information throughout a computer systemization may be commonly referred to as communications. These communicative signals may further be transmitted, received, and the cause of return and/or reply signal communications beyond the instant computer systemization to: communications networks, input devices, other computer systemizations, peripheral devices, and/or the like. Of course, any of the above components may be connected directly to one another, connected to the CPU, and/or organized in numerous variations employed as exemplified by various computer systems.

The CPU comprises at least one high-speed data processor adequate to execute program modules for executing user and/or system-generated requests. The CPU may be a micro-processor such as AMD's Athlon, Duron and/or Opteron; IBM and/or Motorola's PowerPC; Intel's Celeron, Itanium, Pentium and/or Xeon; and/or the like processor(s). The CPU interacts with memory through signal passing through conductive conduits to execute stored program code according to conventional data processing techniques. Such signal passing facilitates communication within the TCAPS controller and beyond through various interfaces. Should processing requirements dictate a greater amount speed, main-frame and super computer architectures may similarly be employed.

Interface Adapters

Interface bus(es) 907 may accept, connect, and/or communicate to a number of interface adapters, conventionally although not necessarily in the form of adapter cards, such as but not limited to: input output interfaces (I/O) 908,

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storage interfaces 909, network interfaces 910, and/or the like. Optionally, cryptographic processor interfaces 927 similarly may be connected to the interface bus. The interface bus provides for the communications of interface adapters with one another as well as with other components of the computer systemization. Interface adapters are adapted for a compatible interface bus. Interface adapters conventionally connect to the interface bus via a slot architecture. Conventional slot architectures may be employed, such as, but not limited to: Accelerated Graphics Port (AGP), Card Bus, (Extended) Industry Standard Architecture ((E)ISA), Micro Channel Architecture (MCA), NuBus, Peripheral Component Interconnect (Extended) (PCI(X)), Personal Computer Memory Card International Association (PCMCIA), and/or the like.

Storage interfaces 909 may accept, communicate, and/or connect to a number of storage devices such as, but not limited to: storage devices 914, removable disc devices, and/or the like. Storage interfaces may employ connection protocols such as, but not limited to: (Ultra) (Serial) Advanced Technology Attachment (Packet Interface) ((Ultra) (Serial) ATA(PI)), (Enhanced) Integrated Drive Electronics ((E)IDE), Institute of Electrical and Electronics Engineers (IEEE) 1394, fiber channel, Small Computer Systems Interface (SCSI), Universal Serial Bus (USB), and/or the like.

Network interfaces 910 may accept, communicate, and/or connect to a communications network 913. Network interfaces may employ connection protocols such as, but not limited to: direct connect, Ethernet (thick, thin, twisted pair 10/100/1000 Base T, and/or the like), Token Ring, wireless connection such as IEEE 802.11a-x, and/or the like. A communications network may be any one and/or the combination of the following: a direct interconnection; the Internet; a Local Area Network (LAN); a Metropolitan Area Network (MAN); an Operating Missions as Nodes on the Internet (OMNI); a secured custom connection; a Wide Area Network (WAN); a wireless network (e.g., employing protocols such as, but not limited to a Wireless Application Protocol (WAP), I-mode, and/or the like); and/or the like. A network interface may be regarded as a specialized form of an input output interface. Further, multiple network interfaces 910 may be used to engage with various communications network types 913. For example, multiple network interfaces may be employed to allow for the communication over broadcast, multicast, and/or unicast networks. Input Output interfaces (I/O) 908 may accept, communicate, and/or connect to user input devices 911, peripheral devices 912, cryptographic processor devices 928, and/or the like. I/O may employ connection protocols such as, but not limited to: Apple Desktop Bus (ADB); Apple Desktop Connector (ADC); audio: analog, digital, monaural, RCA, stereo, and/or the like; IEEE 1394a-b; infrared; joystick; keyboard; midi; optical; PC AT; PS/2; parallel; radio; serial; USB; video interface: BNC, composite, digital, Digital Visual Interface (DVI), RCA, S-Video, VGA, and/or the like; wireless; and/or the like. A common output device is a video display, which typically comprises a Cathode Ray Tube (CRT) or Liquid Crystal Display (LCD) based monitor with an interface (e.g., DVI circuitry and cable) that accepts signals from a video interface. The video interface composites information generated by a computer systemization and generates video signals based on the composited information in a video memory frame. Typically, the video interface provides the composited video information through a video connection interface that accepts a video display interface (e.g., a DVI connector accepting a DVI display cable).

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User input devices 911 may be card readers, dongles, finger print readers, gloves, graphics tablets, joysticks, keyboards, mouse (mice), trackballs, trackpads, retina readers, and/or the like.

Peripheral devices 912 may be connected and/or communicate to I/O and/or other facilities of the like such as network interfaces, storage interfaces, and/or the like. Peripheral devices may be audio devices, cameras, dongles (e.g., for copy protection, ensuring secure transactions with a digital signature, and/or the like), external processors (for added functionality), goggles, microphones, monitors, network interfaces, printers, scanners, storage devices, video devices, visors, and/or the like.

It should be noted that although user input devices and peripheral devices may be employed, the TCAPS controller may be embodied as an embedded, dedicated, and/or headless device, wherein access would be provided over a network interface connection.

Cryptographic units such as, but not limited to, microcontrollers, processors 926, interfaces 927, and/or devices 928 may be attached, and/or communicate with the TCAPS controller. A MC68HC16 microcontroller, commonly manufactured by Motorola Inc., may be used for and/or within cryptographic units. Equivalent microcontrollers and/or processors may also be used. The MC68HC16 microcontroller utilizes a 16-bit multiply-and-accumulate instruction in the 16 MHz configuration and requires less than one second to perform a 512-bit RSA private key operation. Cryptographic units support the authentication of communications from interacting agents, as well as allowing for anonymous transactions. Cryptographic units may also be configured as part of CPU. Other commercially available specialized cryptographic processors include VLSI Technology's 33 MHz 6868 or Semaphore Communications' 40 MHz Roadrunner 184.

Memory

Generally, any mechanization and/or embodiment allowing a processor to affect the storage and/or retrieval of information is regarded as memory 929. However, memory is a fungible technology and resource, thus, any number of memory embodiments may be employed in lieu of or in concert with one another. It is to be understood that a TCAPS controller and/or a computer systemization may employ various forms of memory 929. For example, a computer systemization may be configured wherein the functionality of on-chip CPU memory (e.g., registers), RAM, ROM, and any other storage devices are provided by a paper punch tape, or paper punch card mechanism; of course such an embodiment would result in an extremely slow rate of operation. In a typical configuration, memory 929 will include ROM 906, RAM 905, and a storage device 914. A storage device 914 may be any conventional computer system storage. Storage devices may include a drum; a (fixed and/or removable) magnetic disk drive; a magneto-optical drive; an optical drive (i.e., CD ROM/RAM/Recordable (R), ReWritable (RW), DVD R/RW, etc.); and/or other devices of the like. Thus, a computer systemization generally requires and makes use of memory.

Module Collection

The memory 929 may contain a collection of program and/or database modules and/or data such as, but not limited to: operating system module(s) 915 (operating system); information server module(s) 916 (information server); user

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REEL: 058303 FRAME: 0783

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interface module(s) **917** (user interface); Web browser module(s) **918** (Web browser); database(s) **919**; cryptographic server module(s) **920** (cryptographic server); TCAPS module(s) **935**; and/or the like (i.e., collectively a module collection). These modules may be stored and accessed from the storage devices and/or from storage devices accessible through an interface bus. Although non-conventional software modules such as those in the module collection, typically, are stored in a local storage device **914**, they may also be loaded and/or stored in memory such as: peripheral devices, RAM, remote storage facilities through a communications network, ROM, various forms of memory, and/or the like.

Operating System

The operating system module **915** is executable program code facilitating the operation of a TCAPS controller. Typically, the operating system facilitates access of I/O, network interfaces, peripheral devices, storage devices, and/or the like. The operating system may be a highly fault tolerant, scalable, and secure system such as Apple Macintosh OS X (Server), AT&T Plan 9, Be OS, Linux, Unix, and/or the like operating systems. However, more limited and/or less secure operating systems also may be employed such as Apple Macintosh OS, Microsoft DOS, Palm OS, Windows 2000/2003/3.1/95/98/CE/Millennium/NT/XP (Server), and/or the like. An operating system may communicate to and/or with other modules in a module collection, including itself, and/or the like. Most frequently, the operating system communicates with other program modules, user interfaces, and/or the like. For example, the operating system may contain, communicate, generate, obtain, and/or provide program module, system, user, and/or data communications, requests, and/or responses. The operating system, once executed by the CPU, may enable the interaction with communications networks, data, I/O, peripheral devices, program modules, memory, user input devices, and/or the like. The operating system may provide communications protocols that allow the TCAPS controller to communicate with other entities through a communications network **913**. Various communication protocols may be used by the TCAPS controller, as a subcarrier transport mechanism for interaction, such as, but not limited to: multicast, TCP/IP, UDP, unicast, and/or the like.

Information Server

An information server module **916** is stored program code that is executed by the CPU. The information server may be a conventional Internet information server such as, but not limited to Apache Software Foundation's Apache, Microsoft's Internet Information Server, and/or the like. The information server may allow for the execution of program modules through facilities such as Active Server Page (ASP), ActiveX, (ANSI) (Objective-) C (++), Common Gateway Interface (CGI) scripts, Java, JavaScript, Practical Extraction Report Language (PERL), Python, WebObjects, and/or the like. The information server may support secure communications protocols such as, but not limited to, File Transfer Protocol (FTP); HyperText Transfer Protocol (HTTP); Secure Hypertext Transfer Protocol (HTTPS); Secure Socket Layer (SSL), and/or the like. The information server provides results in the form of Web pages to Web browsers, and allows for the manipulated generation of the Web pages through interaction with other program modules. After a Domain Name System (DNS) resolution portion of

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an HTTP request is resolved to a particular information server, the information server resolves requests for information at specified locations on a TCAPS controller based on the remainder of the HTTP request. For example, a request such as `http://123.124.125.126/myInformation.html` might have the IP portion of the request "123.124.125.126" resolved by a DNS server to an information server at that IP address; that information server might in turn further parse the http request for the "/myInformation.html" portion of the request and resolve it to a location in memory containing the information "myInformation.html." Additionally, other information serving protocols may be employed across various ports, e.g., FTP communications across port **21**, and/or the like. An information server may communicate to and/or with other modules in a module collection, including itself, and/or facilities of the like. Most frequently, the information server communicates with the TCAPS database **919**, operating systems, other program modules, user interfaces, Web browsers, and/or the like.

Access to TCAPS database may be achieved through a number of database bridge mechanisms such as through scripting languages as enumerated below (e.g., CGI) and through inter-application communication channels as enumerated below (e.g., CORBA, WebObjects, etc.). Any data requests through a Web browser are parsed through the bridge mechanism into appropriate grammars as required by the TCAP. In one embodiment, the information server would provide a Web form accessible by a Web browser. Entries made into supplied fields in the Web form are tagged as having been entered into the particular fields, and parsed as such. The entered terms are then passed along with the field tags, which act to instruct the parser to generate queries directed to appropriate tables and/or fields. In one embodiment, the parser may generate queries in standard SQL by instantiating a search string with the proper join/select commands based on the tagged text entries, wherein the resulting command is provided over the bridge mechanism to the TCAPS as a query. Upon generating query, results from the query, the results are passed over the bridge mechanism, and may be parsed for formatting and generation of a new results Web page by the bridge mechanism. Such a new results Web page is then provided to the information server, which may supply it to the requesting Web browser.

Also, an information server may contain, communicate, generate, obtain, and/or provide program module, system, user, and/or data communications, requests, and/or responses.

User Interface

A user interface module **917** is stored program code that is executed by the CPU. The user interface may be a conventional graphic user interface as provided by, with, and/or atop operating systems and/or operating environments such as Apple Macintosh OS, e.g., Aqua, Microsoft Windows (NT/XP), Unix X Windows (KDE, Gnome, and/or the like), and/or the like. The user interface may allow for the display, execution, interaction, manipulation, and/or operation of program modules and/or system facilities through textual and/or graphical facilities. The user interface provides a facility through which users may affect, interact, and/or operate a computer system. A user interface may communicate to and/or with other modules in a module collection, including itself, and/or facilities of the like. Most frequently, the user interface communicates with operating systems, other program modules, and/or the like. The user

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interface may contain, communicate, generate, obtain, and/or provide program module, system, user, and/or data communications, requests, and/or responses.

Web Browser

A Web browser module **918** is stored program code that is executed by the CPU. The Web browser may be a conventional hypertext viewing application such as Microsoft Internet Explorer or Netscape Navigator. Secure Web browsing may be supplied with 128 bit (or greater) encryption by way of HTTPS, SSL, and/or the like. Some Web browsers allow for the execution of program modules through facilities such as Java, JavaScript, ActiveX, and/or the like. Web browsers and like information access tools may be integrated into PDAs, cellular telephones, and/or other mobile devices. A Web browser may communicate to and/or with other modules in a module collection, including itself, and/or facilities of the like. Most frequently, the Web browser communicates with information servers, operating systems, integrated program modules (e.g., plug-ins), and/or the like; e.g., it may contain, communicate, generate, obtain, and/or provide program module, system, user, and/or data communications, requests, and/or responses. Of course, in place of a Web browser and information server, a combined application may be developed to perform similar functions of both. The combined application would similarly affect the obtaining and the provision of information to users, user agents, and/or the like from TCAPS enabled nodes. The combined application may be nugatory on systems employing standard Web browsers.

TCAPS Database

A TCAPS database module **919** may be embodied in a database and its stored data. The database is stored program code, which is executed by the CPU; the stored program code portion configuring the CPU to process the stored data. The database may be a conventional, fault tolerant, relational, scalable, secure database such as Oracle or Sybase. Relational databases are an extension of a flat file. Relational databases consist of a series of related tables. The tables are interconnected via a key field. Use of the key field allows the combination of the tables by indexing against the key field; i.e., the key fields act as dimensional pivot points for combining information from various tables. Relationships generally identify links maintained between tables by matching primary keys. Primary keys represent fields that uniquely identify the rows of a table in a relational database. More precisely, they uniquely identify rows of a table on the "one" side of a one-to-many relationship.

Alternatively, the TCAPS database may be implemented using various standard data-structures, such as an array, hash, (linked) list, struct, structured text file (e.g., XML), table, and/or the like. Such data-structures may be stored in memory and/or in (structured) files. In another alternative, an object-oriented database may be used, such as Frontier, ObjectStore, Poet, Zope, and/or the like. Object databases can include a number of object collections that are grouped and/or linked together by common attributes; they may be related to other object collections by some common attributes. Object-oriented databases perform similarly to relational databases with the exception that objects are not just pieces of data but may have other types of functionality encapsulated within a given object. If the TCAPS database is implemented as a data-structure, the use of the TCAPS database may be integrated into another module such as the

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TCAPS module. Also, the database may be implemented as a mix of data structures, objects, and relational structures. Databases may be consolidated and/or distributed in countless variations through standard data processing techniques.

5 Portions of databases, e.g., tables, may be exported and/or imported and thus decentralized and/or integrated. In one embodiment, the database module **919** includes three tables **919a-c**. A user accounts table **919a** includes fields such as, but not limited to: a user name, user address, user authorization information (e.g., user name, password, biometric data, etc.), user credit card, organization, organization account, TCAP unique identifier, account creation data, account expiration date; and/or the like. In one embodiment, user accounts may be activated only for set amounts of time and will then expire once a specified date has been reached. 10 An user data table **919b** includes fields such as, but not limited to: a TCAP unique identifier, backup image, data store, organization account, and/or the like. A user programs table **919c** includes fields such as, but not limited to: system programs, organization programs, programs to be synchronized, and/or the like. In one embodiment, user programs may contain various user interface primitives, which may serve to update TCAPS. Also, various accounts may require custom database tables depending upon the environments and the types of TCAPS a TCAPS may need to serve. It should be noted that any unique fields may be designated as a key field throughout. In an alternative embodiment, these tables have been decentralized into their own databases and their respective database controllers (i.e., individual database controllers for each of the above tables). Employing standard data processing techniques, one may further distribute the databases over several computer systemizations and/or storage devices. Similarly, configurations of the decentralized database controllers may be varied by consolidating and/or distributing the various database modules **919a-c**. The TCAPS may be configured to keep track of various settings, inputs, and parameters via database controllers.

A TCAPS database may communicate to and/or with other modules in a module collection, including itself, and/or facilities of the like. Most frequently, the TCAPS database communicates with a TCAPS module, other program modules, and/or the like. The database may contain, retain, and provide information regarding other nodes and data.

Cryptographic Server

A cryptographic server module **920** is stored program code that is executed by the CPU **903**, Cryptographic processor **926**, cryptographic processor interface **927**, cryptographic processor device **928**, and/or the like. Cryptographic processor interfaces will allow for expedition of encryption and/or decryption requests by the cryptographic module; however, the cryptographic module, alternatively, may run on a conventional CPU. The cryptographic module allows for the encryption and/or decryption of provided data. The cryptographic module allows for both symmetric and asymmetric (e.g., Pretty Good Protection (PGP)) encryption and/or decryption. The cryptographic module may employ cryptographic techniques such as, but not limited to: digital certificates (e.g., X.509 authentication framework), digital signatures, dual signatures, enveloping, password access protection, public key management, and/or the like. The cryptographic module will facilitate numerous (encryption and/or decryption) security protocols such as, but not limited to: checksum, Data Encryption Standard

(DES), Elliptical Curve Encryption (ECC), International Data Encryption Algorithm (IDEA), Message Digest 5 (MD5, which is a one way hash function), passwords, Rivest Cipher (RC5), Rijndael, RSA (which is an Internet encryption and authentication system that uses an algorithm developed in 1977 by Ron Rivest, Adi Shamir, and Leonard Adleman), Secure Hash Algorithm (SHA), Secure Socket Layer (SSL), Secure Hypertext Transfer Protocol (HTTPS), and/or the like. Employing such encryption security protocols, the TCAPS may encrypt all incoming, and/or outgoing communications and may serve as node within a virtual private network (VPN) with a wider communications network. The cryptographic module facilitates the process of "security authorization" whereby access to a resource is inhibited by a security protocol wherein the cryptographic module effects authorized access to the secured resource. In addition, the cryptographic module may provide unique identifiers of content, e.g., employing and MD5 hash to obtain a unique signature for an digital audio file. A cryptographic module may communicate to and/or with other modules in a module collection, including itself, and/or facilities of the like. The cryptographic module supports encryption schemes allowing for the secure transmission of information across a communications network to enable a TCAPS module to engage in secure transactions if so desired. The cryptographic module facilitates the secure accessing of resources on TCAPS and facilitates the access of secured resources on remote systems; i.e., it may act as a client and/or server of secured resources. Most frequently, the cryptographic module communicates with information servers, operating systems, other program modules, and/or the like. The cryptographic module may contain, communicate, generate, obtain, and/or provide program module, system, user, and/or data communications, requests, and/or responses.

TCAPS

A TCAPS module **935** is stored program code that is executed by the CPU. The TCAPS affects accessing, obtaining and the provision of information, services, transactions, and/or the like across various communications networks. The TCAPS enables TCAP users to simply access data and/or services across a communications network in a secure manner. The TCAPS extends the storage and processing capacities and capabilities of TCAPs. The TCAPS coordinates with the TCAPS database to identify interassociated items in the generation of entries regarding any related information. A TCAPS module enabling access of information between nodes may be developed by employing standard development tools such as, but not limited to: (ANSI) (Objective-) C (++), Apache modules, binary executables, Java, Javascript, mapping tools, procedural and object oriented development tools, PERL, Python, shell scripts, SQL commands, web application server extensions, WebObjects, and/or the like. In one embodiment, the TCAPS server employs a cryptographic server to encrypt and decrypt communications. A TCAPS module may communicate to and/or with other modules in a module collection, including itself, and/or facilities of the like. Most frequently, the TCAPS module communicates with a TCAPS database, operating systems, other program modules, and/or the like. The TCAPS may contain, communicate, generate, obtain, and/or provide program module, system, user, and/or data communications, requests, and/or responses.

Distributed TCAP

The structure and/or operation of any of the TCAPS node controller components may be combined, consolidated, and/

or distributed in any number of ways to facilitate development and/or deployment. Similarly, the module collection may be combined in any number of ways to facilitate deployment and/or development. To accomplish this, one may integrate the components into a common code base or in a facility that can dynamically load the components on demand in an integrated fashion.

The module collection may be consolidated and/or distributed in countless variations through standard data processing and/or development techniques. Multiple instances of any one of the program modules in the program module collection may be instantiated on a single node, and/or across numerous nodes to improve performance through load-balancing and/or data-processing techniques. Furthermore, single instances may also be distributed across multiple controllers and/or storage devices; e.g., databases. All program module instances and controllers working in concert may do so through standard data processing communication techniques.

The configuration of the TCAPS controller will depend on the context of system deployment. Factors such as, but not limited to, the budget, capacity, location, and/or use of the underlying hardware resources may affect deployment requirements and configuration. Regardless of if the configuration results in more consolidated and/or integrated program modules, results in a more distributed series of program modules, and/or results in some combination between a consolidated and distributed configuration, data may be communicated, obtained, and/or provided. Instances of modules consolidated into a common code base from the program module collection may communicate, obtain, and/or provide data. This may be accomplished through intra-application data processing communication techniques such as, but not limited to: data referencing (e.g., pointers), internal messaging, object instance variable communication, shared memory space, variable passing, and/or the like.

If module collection components are discrete, separate, and/or external to one another, then communicating, obtaining, and/or providing data with and/or to other module components may be accomplished through inter-application data processing communication techniques such as, but not limited to: Application Program Interfaces (API) information passage; (distributed) Component Object Model ((D) COM), (Distributed) Object Linking and Embedding ((D) OLE), and/or the like), Common Object Request Broker Architecture (CORBA), process pipes, shared files, and/or the like. Messages sent between discrete module components for inter-application communication or within memory spaces of a singular module for intra-application communication may be facilitated through the creation and parsing of a grammar. A grammar may be developed by using standard development tools such as lex, yacc, and/or the like, which allow for grammar generation and parsing functionality, which in turn may form the basis of communication messages within and between modules. Again, the configuration will depend upon the context of system deployment.

Tunneling Client Access Point Controller

FIG. 10 illustrates one embodiment incorporated into a tunneling client access point (TCAP) controller **1001**. Much of the description of the TCAPS of FIG. 9 applies to the TCAP, and as such, the disclosure focuses more upon the variances exhibited in the TCAP. In this embodiment, the TCAP controller **1001** may serve to process, store, search, identify, instruct, generate, match, and/or update data within itself, at a TCAPS, and/or through an AT.

The first and foremost difference between the TCAP and the TCAPS is that the TCAP is very small as was shown **130** of FIG. 1. The TCAP may be packaged in plugin sticks, often, smaller than the size of a human thumb. In one embodiment, a TCAP may be hardened for military use. In such an embodiment, the shell **1001** may be composed of metal, and/or other durable composites. Also, components within may be shielded from radiation.

In one embodiment, the TCAP controller **1001** may be connected to and/or communicate with entities such as, but not limited to: one or more users from an access terminal **1011b**. The access terminal itself may be connected to peripherals such as user input devices (e.g., keyboard **1012a**, mouse **1012b**, etc.); and/or a communications network **1013** in manner similar to that described in FIG. 9.

A TCAP controller **1001** may be based on common computer systems components that may comprise, but are not limited to, components such as: a computer systemization **1002** connected to memory **1029**. Optionally, the TCAP controller **1001** may convey information **1058**, produce output through an output device **1048**, and obtain input from control device **1018**.

Control Device

The control device **1018** may be optionally provided to accept user input to control access to the TCAP controller. In one embodiment, the control device may provide a keypad **1028**. Such a keypad would allow the user to enter passwords, personal identification numbers (PIN), and/or the like.

In an alternative embodiment, the control device may include a security device **1038**. In one embodiment, the security device is a fingerprint integrated circuit (fingerprint IC) that provides biometric fingerprint information such as, but not limited to AuthenTec Inc.'s FingerLoc™ AF-S2™. Either a fingerprint IC and/or other biometric device will provide biometric validation information that may be used to confirm the identity of a TCAP user and ensure that transactions are legitimate. In alternative embodiments, a simple button, heat sensor, and/or other type of user input functionality may be provided solely and/or in concert with other types of control device types. The control device may be connected to the I/O interface, the system bus, or the CPU directly.

The output device **1048** is used to provide status information to the user. In one alternative embodiment, the output device is an LCD panel capable of providing alpha numeric and/or graphic displays. In an alternative embodiment, the output device may be a speaker providing audible signals indicating errors and/or actually streaming information that is audible to the user, such as voice alerts. The output device may be connected to the I/O interface, the system bus, or the CPU directly.

The conveyance, information **1058** component of the TCAP controller may include any number of indicia representing the TCAP's source on the cover **1001**. Source conveying indicia may include, but is not limited to: an owner name **1059** for readily verifying a TCAP user; a photo of the owner **1060** for readily verifying a TCAP controller owner; mark designating the source that issued the TCAP **1061**, **1001** such as a corporate logo, and/or the like; fanciful design information **1062** for enhancing the visual appearance of the TCAP; and/or the like. It should be noted that the conveyance information **11421** may be positioned anywhere on the cover **1189**.

Computer Systemization

A computer systemization **1002** may comprise a clock **1030**, central processing unit (CPU) **1003**, a read only

memory (ROM) **1006**, a random access, memory (RAM) **1005**, and/or an interface bus **1007**, and most frequently, although not necessarily, are all interconnected and/or communicating through a system bus **1004**. Optionally the computer systemization may be connected to an internal power source **1086**. Optionally, a cryptographic processor **1026** may be connected to the system bus. The system clock typically has a crystal oscillator and provides a base signal. Of course, any of the above components may be connected directly to one another, connected to the CPU, and/or organized in numerous variations employed as exemplified by various computer systems.

The CPU comprises at least one low-power data processor adequate to execute program modules for executing user and/or system-generated requests. The CPU may be a micro-processor such as ARM's Application Cores, Embedded Cores, Secure Cores; Motorola's DragonBall; and/or the like processor(s).

Power Source

The power source **1086** may be of any standard form for powering small electronic circuit board devices such as but not limited to: alkaline, lithium hydride, lithium ion, nickel cadmium, solar cells, and/or the like. In the case of solar cells, the case provides an aperture through which the solar cell protrudes are to receive photonic energy. The power cell **1086** is connected to at least one of the interconnected subsequent components of the TCAP thereby providing an electric current to all subsequent components. In one example, the power cell **1086** is connected to the system bus component **1004**. In an alternative embodiment, an outside power source **1086** is provided through a connection across the I/O **1008** interface. For example, a USB and/or IEEE 1394 connection carries both data and power across the connection and is therefore a suitable source of power.

Interface Adapters

Interface bus(es) **1007** may accept, connect, and/or communicate to a number of interface adapters, conventionally although not necessarily in the form of adapter cards, such as but not limited to: input output interfaces (I/O) **1008**, storage interfaces **1009**, network interfaces **1010**, and/or the like. Optionally, cryptographic processor interfaces **1027** similarly may be connected to the interface bus. The interface bus provides for the communications of interface adapters with one another as well as with other components of the computer systemization. Interface adapters are adapted for a compatible interface bus. In one embodiment, the interface bus provides I/O **1008** via a USB port. In an alternative embodiment, the interface bus provides I/O via an IEEE 1394 port. In an alternative embodiment, wireless transmitters are employed by interfacing wireless protocol integrated circuits (ICs) for I/O via the interface bus **1007**.

Storage interfaces, **1009** may accept, communicate, and/or connect to a number of storage devices such as, but not limited to: storage devices **1014**, removable disc devices, and/or the like. Storage interfaces may employ connection protocols such as, but not limited to a flash memory connector, and/or the like. In one embodiment, an optional network interface may be provide **1010**.

Input Output interfaces (I/O) **1008** may accept, communicate, and/or connect to an access terminal **1011b**. I/O may employ connection protocols such as, but not limited to: Apple Desktop Bus (ADB); Apple Desktop Connector

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(ADC); IEEE 1394a-b; infrared; PC AT; PS/2; parallel; radio; serial; USB, and/or the like; wireless component; and/or the like.

Wireless Component

In one embodiment a wireless component may comprise a Bluetooth chip disposed in communication with a transceiver 1043 and a memory 1029 through the interface bus 1007 and/or system bus 1004. The transceiver may be either external to the Bluetooth chip, or integrated within the Bluetooth chip itself. The transceiver is a radio frequency (RF) transceiver operating in the range as required for Bluetooth transmissions. Further, the Bluetooth chip 1044 may integrate an input/output interface (I/O) 1066. The Bluetooth chip and its I/O may be configured to interface with the TCAP controller through the interface bus, the system buss, and/or directly with the CPU. The I/O may be used to interface with other components such as an access terminal 1011b equipped with similar wireless capabilities. In one embodiment, the TCAP may optionally interconnect wirelessly with a peripheral device 912 and/or a control device 911 of FIG. 9. In one example embodiment, the I/O may be based on serial line technologies, a universal serial bus (USB) protocol, and/or the like. In an alternative embodiment, the I/O may be based on the ISO 7816-3 standard. It should be noted that the Bluetooth chip in an alternative embodiment may be replaced with an IEEE 802.11b wireless chip. In another embodiment, both a Bluetooth chip and an IEEE 802.11b wireless chip may be used to communicate and or bridge communications with respectively enabled devices. It should further be noted that the transceiver 1043 may be used to wirelessly communicate with other devices powered by Bluetooth chips and/or IEEE 802.11b chips and/or the like. The ROM can provide a basic instruction set enabling the Bluetooth chip to use its I/O to communicate with other components. A number of Bluetooth chips are commercially available, and may be used as a Bluetooth chip in the wireless component, such as, but not limited to, CSR's BlueCore line of chips. If IEEE 802.11b functionality is required, a number of chips are commercially available for the wireless component as well.

Cryptographic units such as, but not limited to, micro-controllers, processors 1026, and/or interfaces 1027 may be attached, and/or communicate with the TCAP controller. A Secure Core component commonly manufactured by ARM, Inc. and may be used for and/or within cryptographic units.

Memory

Generally, any mechanization and/or embodiment allowing a processor to affect the storage and/or retrieval of information is regarded as memory 1029. However, memory is a fungible technology and resource, thus, any number of memory embodiments may be employed in lieu of or in concert with one another. It is to be understood that a TCAP controller and/or a computer systemization may employ various forms of memory 1029. In a typical configuration, memory 1029 will include ROM 1006, RAM 1005, and a storage device 1014. A storage device 1014 may be any conventional computer system storage. Storage devices may include flash memory, micro hard drives, and/or the like.

Module Collection

The memory 1029 may contain a collection of program and/or database modules and/or data such as, but not limited

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to: operating system module(s) 1015 (operating system); information server module(s) 1016 (information server); user interface module(s) 1017 (user interface); Web browser module(s) 1018 (Web browser); database(s) 1019; cryptographic server module(s) 1020 (cryptographic server); access terminal module 1021; TCAP module(s) 1035; and/or the like (i.e., collectively a module collection). These modules may be stored and accessed from the storage devices and/or from storage devices accessible through an interface bus. Although non-conventional software modules such as those in the module collection, typically, are stored in a local storage device 1014, they may also be loaded and/or stored in memory such as: peripheral devices, RAM, remote storage facilities through an access terminal, communications network, ROM, various forms of memory, and/or the like. In one embodiment, all data stored in memory is encrypted by employing the cryptographic server 1020 as described in further detail below. In one embodiment, the ROM contains a unique TCAP identifier. For example, the TCAP may contain a unique digital certificate, number, and/or the like, which may be used for purposes of verification and encryption across a network and/or in conjunction with a TCAPS.

Operating System

The operating system module 1015 is executable program code facilitating the operation of a TCAP controller. Typically, the operating system facilitates access of I/O, network interfaces, peripheral devices, storage devices, and/or the like. The operating system may be a highly fault tolerant, scalable, and secure system such as Linux, and/or the like operating systems. However, more limited and/or less secure operating systems also may be employed such as Java runtime OS, and/or the like. An operating system may communicate to and/or with other modules in a module collection, including itself, and/or the like. Most frequently, the operating system communicates with other program modules, user interfaces, and/or the like. For example, the operating system may contain, communicate, generate, obtain, and/or provide program module, system, user, and/or data communications, requests, and/or responses. The operating system, once executed by the CPU, may enable the interaction with an access terminal, communications networks, data, I/O peripheral devices, program modules, memory, user input devices, and/or the like. The operating system may provide communications protocols that allow the TCAP controller to communicate with other entities through an access terminal. Various communication protocols may be used by the TCAP controller as a subcarrier transport mechanism for interaction, such as, but not limited to: TCP/IP, USB, and/or the like.

Information Server

An information server module 1016 is stored program code that is executed by the CPU. The information server may be a conventional Internet information server such as, but not limited to Apache Software Foundation's Apache, and/or the like. The information server may allow for the execution of program modules through facilities such as Active Server Page (ASP), ActiveX, (ANSI) (Objective-) C (++), Common Gateway Interface (CGI) scripts, Java, JavaScript, Practical Extraction Report Language (PERL), Python, WebObjects, and/or the like. The information server may support secure communications protocols such as, but not limited to, File Transfer Protocol (FTP); HyperText Transfer Protocol (HTTP); Secure Hypertext Transfer Pro-

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toocol (HTTPS), Secure Socket Layer (SSL), and/or the like. The information server provides results in the form of Web pages to Web browsers, and allows for the manipulated generation of the Web pages through interaction with other program modules. An information server may communicate to and/or with other modules in a module collection, including itself, and/or facilities of the like. Most frequently, the information server communicates with the TCAP database 1019, operating systems, other program modules, user interfaces, Web browsers, and/or the like.

Access to TCAP database may be achieved through a number of database bridge mechanisms such as through scripting languages as enumerated below (e.g., CGI) and through inter-application communication channels as enumerated below (e.g., CORBA, WebObjects, etc.). Any data requests through a Web browser are parsed through the bridge mechanism into appropriate grammars as required by the TCAP. In one embodiment, the information server would provide a Web form accessible by a Web browser. Entries made into supplied fields in the Web form are tagged as having been entered into the particular fields, and parsed as such. The entered terms are then passed along with the field tags, which act to instruct the parser to generate queries directed to appropriate tables and/or fields. In one embodiment, the parser may generate queries in standard SQL by instantiating a search string with the proper join/select commands based on the tagged text entries, wherein the resulting command is provided over the bridge mechanism to the TCAP as a query. Upon generating query results from the query, the results are passed over the bridge mechanism, and may be parsed for formatting and generation of a new results Web page by the bridge mechanism. Such a new results Web page is then provided to the information server, which may supply it to the requesting Web browser.

Also, an information server may contain, communicate, generate, obtain, and/or provide program module, system, user, and/or data communications, requests, and/or responses.

User Interface

A user interface module 1017 is stored program code that is executed by the CPU. The user interface may be a conventional graphic user interface as provided by, with, and/or atop operating systems and/or operating environments, such as Apple Macintosh OS, e.g., Aqua, Microsoft Windows (NT/XP), Unix X Windows (KDE, Gnome, and/or the like), and/or the like. The TCAP may employ code natively compiled for various operating systems, or code compiled using Java. The user interface may allow for the display, execution, interaction, manipulation, and/or operation of program modules and/or system facilities through textual and/or graphical facilities. The user interface provides a facility through which users may affect, interact, and/or operate a computer system. A user interface may communicate to and/or with other modules in a module collection, including itself, and/or facilities of the like. Most frequently, the user interface communicates with operating systems, other program modules, and/or the like. The user interface may contain, communicate, generate, obtain, and/or provide program module, system, user, and/or data communications, requests, and/or responses.

Web Browser

A Web browser module 1018 is stored program code that is executed by the CPU. A small-scale embedded Web

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browser may allow the TCAP to access and communicate with an attached access terminal, and beyond across a communications network. An example browser is Blazer, Opera, FireFox, etc. A browsing module may contain, communicate, generate, obtain, and/or provide program module, system, user, and/or data communications, requests, and/or responses. Of course, in place of a Web browser and information server, a combined application may be developed to perform similar functions of both. The combined application would similarly affect the obtaining and the provision of information to users, user agents, and/or the like from TCAP enabled nodes. The combined application may be nugatory on systems employing standard Web browsers.

TCAP Database

A TCAP database module 1019 may be embodied in a database and its stored data. The database is stored program code, which is executed by the CPU; the stored program code portion configuring the CPU to process the stored data. In one embodiment, the TCAP database may be implemented using various standard data-structures, such as an array, hash, (linked) list, struct, structured text file (e.g., XML), table, and/or the like. Such data-structures may be stored in memory and/or in (structured) files. If the TCAP database is implemented, as a data-structure, the use of the TCAP database may be integrated into another module such as the TCAP module. Databases may be consolidated and/or distributed in countless variations through standard data processing techniques. Portions of databases, e.g., tables, may be exported and/or imported and thus decentralized and/or integrated. In one embodiment, the database module 1019 includes three tables 1019a-c. A user accounts table 1019a includes fields such as, but not limited to: a user name, user address, user authorization information (e.g., user name, password, biometric data, etc.), user credit card, organization, organization account, TCAP unique identifier, account creation data, account expiration date; and/or the like. In one embodiment, user accounts may be activated only for set amounts of time and will then expire once a specified date has been reached. An user data table 1019b includes fields such as, but not limited to: a TCAP unique identifier, backup image, data store, organization account, and/or the like. In one embodiment, the entire TCAP memory 1029 is processes into an image and spooled to a TCAPS for backup storage. A user programs table 1019c includes fields such as, but not limited to: system programs, organization programs, programs to be synchronized, and/or the like. It should be noted that any unique fields may be designated as a key field throughout. In an alternative embodiment, these tables have been decentralized into their own databases and their respective database controllers (i.e., individual database controllers for each of the above tables). Employing standard data processing techniques, one may further distribute the databases over several computer systemizations and/or storage devices. Similarly, configurations of the decentralized database controllers may be varied by consolidating and/or distributing the various database modules 1019a-c. The TCAP may be configured to keep track of various settings, inputs, and parameters via database controllers.

A TCAP database may communicate to and/or with other modules in a module collection, including itself, and/or facilities of the like. Most frequently, the TCAP database communicates with a TCAP module, other program mod-

ules, and/or the like. The database may contain, retain, and provide information regarding other nodes and data.

Cryptographic Server

A cryptographic server module **1020** is stored program code that is executed by the CPU **1003**, cryptographic processor **1026**, cryptographic processor interface **1027**, and/or the like. Cryptographic processor interfaces will allow for expedition of encryption and/or decryption requests by the cryptographic module; however, the cryptographic module, alternatively, may run on a conventional CPU. The cryptographic module allows for the encryption and/or decryption of provided data. The cryptographic module allows for both symmetric and asymmetric (e.g., Pretty Good Protection (PGP)) encryption and/or decryption. The cryptographic module may employ cryptographic techniques such as, but not limited to: digital certificates (e.g., X.509 authentication framework), digital signatures, dual signatures, enveloping, password access protection, public key management, and/or the like. The cryptographic module will facilitate numerous (encryption and/or decryption) security protocols such as, but not limited to: checksum, Data Encryption Standard (DES), Elliptical Curve Encryption (ECC), International Data Encryption Algorithm (IDEA), Message Digest 5 (MD5, which is a one way hash function), passwords, Rivest Cipher (RC5), Rijndael, RSA (which is an Internet encryption and authentication system that uses an algorithm developed in 1977 by Ron Rivest, Adi Shamir, and Leonard Adleman), Secure Hash Algorithm (SHA), Secure Socket Layer (SSL), Secure Hypertext Transfer Protocol (HTTPS), and/or the like. The cryptographic module facilitates the process of "security authorization" whereby access to a resource is inhibited by a security protocol wherein the cryptographic module effects authorized access to the secured resource. In addition, the cryptographic module may provide unique identifiers of content, e.g., employing and MD5 hash to obtain a unique signature for an digital audio file. A cryptographic module may communicate to and/or with other modules in a module collection, including itself, and/or facilities of the like. The cryptographic module supports encryption schemes allowing for the secure transmission of information across a communications network to enable a TCAP module to engage in secure transactions if so desired. The cryptographic module facilitates the secure accessing of resources on TCAP and facilitates the access of secured resources on remote systems; i.e., it may act as a client and/or server of secured resources. Most frequently, the cryptographic module communicates with information servers, operating systems, other program modules, and/or the like. The cryptographic module may contain, communicate, generate, obtain, and/or provide program module, system, user, and/or data communications, requests, and/or responses. In one embodiment, the TCAP employs the cryptographic server to encrypt all data stored in memory **1029** based on the TCAP's unique ID and user's authorization information. In another embodiment, the TCAP employs the cryptographic server to encrypt all data sent through the access terminal based in the TCAP's unique ID and user's authorization information.

TCAP

A TCAP module **1035** is stored program code that is executed by the CPU. The TCAP affects accessing, obtaining and the provision of information, services, storage, transactions, and/or the like within its memory and/or across

various communications networks. The TCAP enables users to simply access data and/or services from any location where an access terminal is available. It provides secure, extremely low powerful and ultra portable access to data and services that were heretofore impossible. The TCAP coordinates with the TCAP database to identify interassociated items in the generation of entries regarding any related information. A TCAP module enabling access of information between nodes may be developed by employing standard development tools such as, but not limited to: (ANSI) (Objective-) C (++), Apache modules, binary executables, Java, Javascript, mapping tools, procedural and object oriented development tools, PERL, Python, shell scripts, SQL commands, web application server extensions, WebObjects, and/or the like. In one embodiment, the TCAP server employs a cryptographic server to encrypt and decrypt communications. A TCAP module may communicate to and/or with other modules in a module collection, including itself, and/or facilities of the like. Most frequently, the TCAP module communicates with a TCAP database; a TCAP access terminal module **1021** running on an access terminal **1011b**, operating systems, other program modules, and/or the like. The TCAP may contain, communicate, generate, obtain, and/or provide program module, system, user, and/or data communications, requests, and/or responses.

Access Terminal Module

An access terminal module **1021** is stored program code that is executed by a CPU. In one embodiment, the TCAP allows the access terminal **1011b** to access its memory **1029** across its I/O **1008** and the access terminal executes the module. The access terminal module affects accessing, obtaining and the provision of information, services, storage, transactions, and/or the like within the TCAP's and access terminal's memory and/or across various communications networks. The access terminal module **1021** acts as a bridge through which the TCAP can communicate with communications network, and through which users may interact with the TCAP by using the I/O of the access terminal. The access terminal module coordinates with the TCAP module **1035** to send data and communications back and forth. A access terminal module enabling access of information between the TCAP and access terminal may be developed by employing standard development tools such as, but not limited to: (ANSI) (Objective-) C (++), Apache modules, binary executables, Java, Javascript, mapping tools, procedural and object oriented development tools, PERL, Python, shell scripts, SQL commands, web application server extensions, WebObjects, and/or the like. In one embodiment, the access terminal module is compiled for target access terminal platform, e.g., for Windows. In an alternative embodiment, a processor independent approach is taken, e.g., Java is used, so that the access terminal module will run on multiple platforms. In another embodiment, the TCAP server employs a cryptographic server to encrypt and decrypt communications as between it, the TCAP, and outside servers. A access terminal module may communicate to and/or with other modules in a module collection, including itself, and/or facilities of the like. Most frequently, the access terminal module communicates with a TCAP, other program modules, and/or the like. The access terminal module may contain, communicate, generate, obtain, and/or provide program module, system, user, and/or data communications, requests, and/or responses.

Distributed TCAP

The structure and/or operation of any of the TCAP node controller components may be combined, consolidated, and/

or distributed in any number of ways to facilitate development and/or deployment. Similarly, the module collection may be combined in any number of ways to facilitate deployment and/or development. To accomplish this, one may integrate the components into a common code base or in a facility that can dynamically load the components on demand in an integrated fashion.

The module collection may be consolidated and/or distributed in countless variations through standard data processing and/or development techniques. Multiple instances of any one of the program modules in the program module collection may be instantiated on a single node, and/or across numerous nodes to improve performance through load-balancing and/or data-processing techniques. Furthermore, single instances may also be distributed across multiple controllers and/or storage devices; e.g., databases. All program module instances and controllers working in concert may do so through standard data processing communication techniques.

The configuration of the TCAP controller will depend on the context of system deployment. Factors such as, but not limited to, the budget, capacity, location, and/or use of the underlying hardware resources may affect deployment requirements and configuration. Regardless of if the configuration results in more consolidated and/or integrated program modules, results in a more distributed series of program modules, and/or results in some combination between a consolidated and distributed configuration, data may be communicated, obtained, and/or provided. Instances of modules consolidated into a common code base from the program module collection may communicate, obtain, and/or provide data. This may be accomplished through intra-application data processing communication techniques such as, but not limited to: data referencing (e.g., pointers), internal messaging, object instance variable communication, shared memory space, variable passing, and/or the like.

If module collection components are discrete, separate, and/or external to one another, then communicating, obtaining, and/or providing data with and/or to other module components may be accomplished through inter-application data processing communication techniques such as, but not limited to: Application Program Interfaces (API) information passage; (distributed) Component Object Model ((D) COM), (Distributed) Object Linking and Embedding ((D) OLE), and/or the like), Common Object Request Broker Architecture (CORBA), process pipes, shared files, and/or the like. Messages sent between discrete module components for inter-application communication or within memory spaces of a singular module for intra-application communication may be facilitated through the creation and parsing of a grammar. A grammar may be developed by using standard development tools such as lex, yacc, and/or the like, which allow for grammar generation and parsing functionality, which in turn may form the basis of communication messages within and between modules. Again, the configuration will depend upon the context of system deployment.

The entirety of this disclosure (including the Cover Page, Title, Headings, Field, Background, Summary, Brief Description of the Drawings, Detailed Description, Claims, Abstract, Figures, and otherwise) shows by way of illustration various embodiments in which the claimed inventions may be practiced. The advantages and features of the disclosure are of a representative sample of embodiments only, and are not exhaustive and/or exclusive. They are presented only to assist in understanding and teach the claimed principles. It should be understood that they are not

representative of all claimed inventions. As such, certain aspects of the disclosure have not been discussed herein. That alternate embodiments may not have been presented for a specific portion of the invention or that further undescribed alternate embodiments may be available for a portion is not to be considered a disclaimer of those alternate embodiments. It will be appreciated that many of those undescribed embodiments incorporate the same principles of the invention and others are equivalent. Thus, it is to be understood that other embodiments may be utilized and functional, logical, organizational, structural and/or topological modifications may be made without departing from the scope and/or spirit of the disclosure. As such, all examples and/or embodiments are deemed to be non-limiting throughout this disclosure. Also, no inference should be drawn regarding those embodiments discussed herein relative to those not discussed herein other than for purposes of space and reducing repetition. For instance, it is to be understood that the logical and/or topological structure of any combination of any program modules (a module collection), other components and/or any present feature sets as described in the figures and/or throughout are not limited to a fixed operating order and/or arrangement, but rather, any disclosed order is exemplary and all equivalents, regardless of order, are contemplated by the disclosure. Furthermore, it is to be understood that such features are not limited to serial execution, but rather, any number of threads, processes, services, servers, and/or the like that may execute asynchronously, simultaneously, synchronously, and/or the like are contemplated by the disclosure. As such, some of these features may be mutually contradictory, in that they cannot be simultaneously present in a single embodiment. Similarly, some features are applicable to one aspect of the invention, and inapplicable to others. In addition, the disclosure includes other inventions not presently claimed. Applicant reserves all rights in those presently unclaimed inventions including the right to claim such inventions, file additional applications, continuations, continuations in part, divisions, and/or the like thereof. As such, it should be understood that advantages, embodiments, examples, functional, features, logical, organizational, structural, topological, and/or other aspects of the disclosure are not to be considered limitations on the disclosure as defined by the claims or limitations on equivalents to the claims.

I claim:

1. A portable device configured to communicate with (i) a communications network comprising a plurality of communications network nodes and (ii) a terminal comprising a processor, an output component, and a memory configured to store program code, including first program code which, when executed by the terminal processor, is configured to facilitate a key exchange between the terminal and the portable device, the portable device comprising:

- (a) a network interface configured to enable transmission of communications between the portable device and a communications network node;
- (b) a communication interface configured to enable transmission of communications between the portable device and the terminal;
- (c) a processor; and
- (d) a memory having executable program code stored thereon, including:

- (1) second program code which, when executed by the portable device processor, is configured to cause a communication to be transmitted to the terminal to display an interactive user interface by the terminal output component, the interactive user interface

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comprising at least one user interface element configured to be manipulated by a user to cause the portable device processor to execute stored program code;

- (2) third program code which, when executed by the portable device in response to a command resulting from user manipulation of a user interface element of the interactive user interface, is configured to cause a communication to be transmitted to the terminal to affect the display of the interactive user interface by the terminal output component;
- (3) fourth program code which, when executed by the portable device processor in response to a command resulting from user manipulation of a user interface element on an interactive user interface, is configured to cause a secure communication to be transmitted through the portable device network interface to a communications network node; and
- (4) fifth program code which, when executed by the portable device processor, is configured to (i) process secure data received from the communications network node through the portable device network interface and (ii) cause the processed data to be securely transmitted through the communications interface to the terminal for display by the terminal output component, wherein the portable device is configured to employ a key exchange between the portable device and the terminal to securely transmit the processed data through the communication interface to the terminal.
2. The portable device according to claim 1, wherein the key exchange between the portable device and the terminal comprises high-bandwidth digital content protection protocol.
3. The portable device according to claim 1, wherein the communication interface comprises a video interface connection.
4. The portable device according to claim 3, wherein the portable device is configured to employ video interface connection protocols to securely communicate with the terminal.
5. The portable device according to claim 3, wherein the portable device is configured to employ video interface connection protocols to securely communicate video data content to the terminal for display by the terminal output device.
6. The portable device according to claim 1, wherein the second program code, when executed by the portable device processor, is configured to cause a data stream comprising video data content to be transmitted to the terminal to display an interactive user interface by the terminal output component.
7. The portable device according to claim 1, wherein the third program code, when executed by the portable device processor in response to a command resulting from user manipulation of a user interface element of the interactive user interface, is configured to cause a data stream comprising video data content to be transmitted to the terminal to affect the display of the interactive user interface by the terminal output component.
8. The portable device according to claim 7, wherein the third program code, when executed by the portable device processor, is configured to cause a data stream comprising video data content to be transmitted to the terminal to affect the display of an object on the interactive user interface.
9. The portable device according to claim 1, wherein the fifth program code, when executed by the portable device

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processor, is configured to cause the processed data to be securely transmitted as a data stream through the communication interface to the terminal for display by the terminal output component.

10. The portable device according to claim 9, wherein the data stream comprises a digital data stream.
11. The portable device according to claim 9, wherein the data stream comprises video data content.
12. The portable device according to claim 9, wherein the data stream comprises audio data content.
13. The portable device according to claim 9, wherein the data stream comprises a live data feed.
14. The portable device according to claim 9, wherein the fifth program code, when executed by the portable device processor, is configured to cause the processed data to be securely transmitted as a data stream through the communication interface for display of an interactive user interface by the terminal output component.
15. The portable device according to claim 9, wherein the fifth program code, when executed by the portable device processor, is configured to cause the processed data to be securely transmitted as a data stream through the communication interface to the terminal for display of an object on an interactive user interface by the terminal output component.
16. The portable device according to claim 9, wherein the data stream comprises bitmap formatted data for a video display by the terminal output component.
17. The portable device according to claim 1, wherein the portable device is configured to employ an encryption format to securely communicate with the communications network node.
18. The portable device according to claim 17, wherein the encryption format is selected from the group consisting of checksum, Data Encryption Standard (DES), Elliptical Curve Encryption (ECC), International Data Encryption Algorithm (IDEA), Message Digest 5 (MD5) passwords, Rivest Cipher (RC5), Rijndael, RSA, Secure Hash Algorithm (SHA), Secure Socket Layer (SSL), and Secure Hypertext Transfer Protocol (HTTPS).
19. The portable device according to claim 1, wherein the portable device is configured to employ a cryptographic technique to securely communicate with the communications network node.
20. The portable device according to claim 19, where the cryptographic technique is selected from the group consisting of digital certificates, digital signatures, dual signatures, enveloping, password access protection, and public key management.
21. The portable device according to claim 1, wherein the portable device processor comprises a cryptographic processor configured to facilitate transmission of secure communications.
22. The portable device according to claim 1, wherein the second program code, when executed by the portable device processor, is configured to cause a communication to be transmitted to the terminal to display a graphic interactive user interface by the terminal output component, the graphic interactive user interface comprising at least one graphic user interface element configured to be manipulated by a user to cause the portable device processor to execute stored program code.
23. The portable device according to claim 1, wherein the second program code, when executed by the portable device processor, is configured to cause a secure communication to be transmitted to the terminal to display an interactive user interface by the terminal output component.

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24. The portable device according to claim 1, wherein the third program code, when executed by the portable device processor in response to a command resulting from user manipulation of a user interface element of the interactive user interface, is configured to cause a secure communication to be transmitted to the terminal to affect the display of the interactive user interface by the terminal output component.

25. The portable device according to claim 1, wherein the fourth program code, when executed by the portable device processor, is configured to cause a secure communication to be transmitted to the communications network node to facilitate portable device verification.

26. The portable device according to claim 25, wherein the fourth program code, when executed by the portable device processor, is configured to cause a secure communication comprising a device identifier stored on the portable device memory to be transmitted to the communications network node to facilitate portable device verification.

27. The portable device according to claim 1, wherein the fourth program code, when executed by the portable device processor, is configured to cause a secure communication to be transmitted to the communication network node to facilitate user authentication.

28. The portable device according to claim 27, wherein the fourth program code, when executed by the portable device processor, is configured to cause a secure communication comprising a user password to be transmitted to the communications network node to facilitate user authentication.

29. The portable device according to claim 1, wherein the fourth program code, when executed by the portable device processor, is configured to cause a secure communication to be transmitted through the portable device network interface to the communications network node to facilitate a payment transaction.

30. The portable device according to claim 1, wherein the fourth program code, when executed by the portable device processor, is configured to cause a secure communication to be transmitted through the portable device network interface to the communications network node to facilitate synchronizing data stored on the portable device memory with data stored on a communications network node.

31. The portable device according to claim 1, wherein the fourth program code, when executed by the portable device processor, is configured to cause a secure communication to be transmitted through the portable device network interface to the communications network node to facilitate a download of data from a communication network node to the portable device.

32. The portable device according to claim 31, wherein the fifth program code is configured to be executed in response to the portable device receiving the download of data from the communications network node.

33. The portable device according to claim 32, wherein the fifth program code, when executed by the portable device processor in response to the portable device receiving the download of data from the communications network node, is configured to (i) process the download of data received from the communications network node through the portable device network interface and (ii) cause the processed download of data to be securely transmitted through the communication interface to the terminal for display by the terminal output component.

34. The portable device according to claim 33, wherein the fifth program code, when executed by the portable device processor, is configured to cause the processed down-

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load of data to be securely transmitted as a data stream through the communication interface to the terminal for display by the terminal output component.

35. The portable device according to claim 34, wherein the data stream comprises video data content.

36. The portable device according to claim 1, further comprising sixth program code stored on the portable device memory which, when executed by the portable device processor in response to a command resulting from user manipulation of a user interface element of the interactive user interface, is configured to (i) cause a communication to be transmitted through the communication interface to the terminal and (ii) receive a responsive communication from the terminal.

37. The portable device according to claim 36, further comprising seventh program code stored on the portable device memory which, when executed by the portable device processor in response to receiving the responsive communication from the terminal, is configured to cause a communication to be transmitted through the communications interface to the terminal to affect the display of the interactive user interface by the terminal output component.

38. The portable device according to claim 36, further comprising seventh program code stored on the portable device memory which, when executed by the portable device processor in response to receiving the responsive communication from the terminal, is configured to cause a communication to be transmitted through the portable device network interface to a communications network node.

39. A method implemented on a portable device comprising a processor, a memory having executable program code stored thereon, a network interface configured to enable transmission of communications between the processor and a communications network comprising a plurality of communications network nodes, a communication interface configured to enable transmission of communications between the portable device and the terminal, the terminal comprising a processor, an output component, and a memory configured to store executable program code, including first program code which, when executed by the terminal processor, is configured to facilitate a key exchange between the terminal and the portable device, the method comprising:

- (a) executing second program code stored on the portable device memory to cause a communication to be transmitted to the terminal to display an interactive user interface by the terminal output component, the interactive user interface comprising at least one user interface element configured to be manipulated by a user to cause the portable device processor to execute stored program code;
- (b) executing, in response to a command resulting from user manipulation of a user interface element of an interactive user interface displayed by the terminal output component, third program code stored on the portable device memory to cause a communication to be transmitted to the terminal to affect the display of the interactive user interface by the terminal output component;
- (c) executing, in response to a command resulting from user manipulation of a user interface element of an interactive user interface displayed by the terminal output component, fourth program code stored on the portable device memory to cause a secure communication to be transmitted through the portable device network interface to a communications network node;

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(d) executing fifth program code stored on the portable device memory to (i) process secure data received from the communications network node through the portable device network interface and (ii) cause the processed data to be securely transmitted through the communication interface to the terminal for display by the terminal output component; and

(e) employing a key exchange between the portable device and the terminal to securely transmit the processed data through the communication interface to the terminal.

40. The method according to claim 39, wherein step of employing a key exchange between the portable device and the terminal to securely transmit the processed data through the communication interface to the terminal comprises implementing high-bandwidth digital content protection protocol.

41. The method according to claim 39, wherein the communication interface comprises a video interface connection.

42. The method according to claim 41, further comprising employing video interface connection protocols to securely communicate with the terminal.

43. The method according to claim 41, further comprising employing video interface connection protocols to securely communicate video data content to the terminal for display by the terminal output device.

44. The method according to claim 39, wherein the step of executing the second program code comprises causing a data stream comprising video data content to be transmitted to the terminal to display an interactive user interface by the terminal output component.

45. The method according to claim 39, wherein the step of executing the third program code comprises causing a data stream comprising video data content to be transmitted to the terminal to affect the display of the interactive user interface by the terminal output component.

46. The method according to claim 45, wherein the step of executing the third program code comprises causing a data stream comprising video data content to be transmitted to the terminal to affect the display of an object on the interactive user interface.

47. The method according to claim 39, wherein the step of executing the fifth program code comprises causing the processed data to be securely transmitted as a data stream through the communication interface to the terminal for display by the terminal output component.

48. The method according to claim 47, wherein the data stream comprises a digital data stream.

49. The method according to claim 47, wherein the data stream comprises video data content.

50. The method according to claim 47, wherein the data stream comprises audio data content.

51. The method according to claim 47, wherein the data stream comprises a live data feed.

52. The method according to claim 47, wherein the step of executing the fifth program code comprises causing the processed data to be securely transmitted as a data stream through the communication interface to the terminal for display of an interactive user interface by the terminal output component.

53. The method according to claim 47, wherein the step of executing the fifth program code comprises causing the processed data to be securely transmitted as a data stream through the communication interface to the terminal for display of an object on an interactive user interface by the terminal output component.

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54. The method according to claim 39, further comprising employing an encryption format to securely communicate with the communications network node.

55. The method according to claim 54, wherein the encryption format is selected from the group consisting of checksum, Data Encryption Standard (DES), Elliptical Curve Encryption (ECC), International Data Encryption Algorithm (IDEA), Message Digest 5 (MD5) passwords, Rivest Cipher (RC5), Rijndael, RSA, Secure Hash Algorithm (SHA), Secure Socket Layer (SSL), and Secure Hypertext Transfer Protocol (HTTPS).

56. The method according to claim 39, further comprising employing a cryptographic technique to securely communicate with the communications network node.

57. The method according to claim 56, where the cryptographic technique is selected from the group consisting of digital certificates, digital signatures, dual signatures, enveloping, password access protection, and public key management.

58. The method according to claim 39, wherein the step of executing the second program code causes a communication to be transmitted to the terminal to display a graphic interactive user interface by the terminal output component, the graphic interactive user interface comprising at least one graphic user interface element configured to be manipulated by a user.

59. The method according to claim 39, wherein the step of executing the fourth program code causes a secure communication to be transmitted to the communications network node to facilitate portable verification.

60. The method according to claim 59, wherein the step of executing the fourth program code causes a secure communication comprising a device identifier stored on the portable device memory to be transmitted to the communications network node to facilitate portable device verification.

61. The method according to claim 39, wherein the step of executing the fourth program code causes a secure communication to be transmitted to the communication network node to facilitate user authentication.

62. The method according to claim 61, wherein the step of executing the fourth program code causes a secure communication comprising a user password to be transmitted to the communications network node to facilitate user authentication.

63. The method according to claim 39, wherein the step of executing the fourth program code causes a secure communication to be transmitted to the communications network node to facilitate a payment transaction.

64. The method according to claim 39, wherein the step of executing the fourth program code causes a secure communication to be transmitted to the communications network node to facilitate synchronizing data stored on the portable device memory with data stored on a communications network node.

65. The method according to claim 39, wherein the step of executing the fourth program code causes a secure communication to be transmitted to the communications network node to facilitate a download of data from a communication network node to the portable device.

66. The method according to claim 65, further comprising:

- (a) receiving a download of data from a communications network node; and
- (b) executing the fifth program code in response to receiving the download of data from the communications network node.

67. The method according to claim 66, wherein the step of executing the fifth program code is configured to (i) process the download of data received from the communications network node and (ii) cause the processed download of data to be securely transmitted through the communication interface to the terminal for display by the terminal output component.

68. The method according to claim 67, wherein the step of executing the fifth program code is configured to cause the processed download of data to be securely transmitted as a data stream through the communication interface to the terminal for display by the terminal output component.

69. The method according to claim 68, wherein the data stream comprises video data content.

70. The method according to claim 39, further comprising executing, in response to a command resulting from user manipulation of a user interface element of the interactive user interface, sixth program code stored on the portable device memory to (i) cause a communication to be transmitted through the communication interface to the terminal and (ii) receive a responsive communication from the terminal.

71. The method according to claim 70, further comprising executing, in response to receiving the responsive communication from the terminal, seventh program code stored on the portable device memory to cause a communication to be transmitted through the communication interface to the terminal to affect the display of the interactive user interface by the terminal output component.

72. The method according to claim 70, further comprising executing, in response to receiving the responsive communication from the terminal, seventh program code stored on the portable device memory to cause a communication to be transmitted through the portable device network interface to a communications network node.

73. A system implementing (i) a communications network comprising a plurality of communications network nodes, and (ii) a terminal comprising a processor, an output component, and a memory configured to store program code, including first program code which, when executed by the terminal processor, is configured to facilitate a key exchange with a device coupled in communication with the terminal, the system comprising:

(a) a portable device comprising a network interface configured to enable transmission of communications between the portable device and a communications network node, a communication interface configured to enable transmission of communications between the portable device and the terminal, a processor, and a memory having executable program code stored thereon, the portable device configured to:

(1) execute second program code stored on the portable device memory to cause a communication to be transmitted to the terminal to display an interactive user interface by the terminal output component, the interactive user interface comprising at least one user interface element configured to be manipulated by a user to cause the portable device processor to execute stored program code;

(2) execute, in response to a command resulting from user manipulation of a user interface element of an interactive user interface displayed by the terminal output component, third program code stored on the portable device memory to cause a communication to be transmitted to the terminal to affect the display of the interactive user interface by the terminal output component;

(3) execute, in response to a command resulting from user manipulation of a user interface element of an interactive user interface displayed by the terminal output component, fourth program code stored on the portable device memory to cause a secure communication to be transmitted through the portable device network interface to a communications network node;

(4) execute fifth program code stored on the portable device memory to (i) process secure data received from the communications network node through the portable device network interface and (ii) cause the processed data to be securely transmitted through the communication interface to the terminal for display by the terminal output component; and

(5) employ a key exchange between the portable device and the terminal to securely transmit the processed data through the communication interface to the terminal.

74. The system according to claim 73, wherein the portable device is configured to employ high-bandwidth digital content protection protocol key exchange with the terminal to securely transmit the processed data through the communication interface to the terminal.

75. The system according to claim 73, wherein the portable device communication interface comprises a video interface connection.

76. The system according to claim 75, wherein the portable device is configured to employ video interface connection protocols to securely communicate with the terminal.

77. The system according to claim 75, wherein the portable device is configured to employ video interface connection protocols to securely communicate video data content to the terminal for display by the terminal output device.

78. The system according to claim 73, wherein the second program code, when executed by the portable device processor, is configured to cause a data stream comprising video data content to be transmitted to the terminal to display an interactive user interface by the terminal output component.

79. The system according to claim 73, wherein the third program code, when executed by the portable device processor in response to a command resulting from user manipulation of a user interface element of the interactive user interface, is configured to cause a data stream comprising video data content to be transmitted to the terminal to affect the display of the interactive user interface by the terminal output component.

80. The system according to claim 73, wherein the fifth program code, when executed by the portable device processor, is configured to cause the processed data to be securely transmitted as a data stream through the communications interface to the terminal for display by the terminal output component.

81. The system according to claim 80, wherein the data stream comprises a digital data stream.

82. The system according to claim 80, wherein the data stream comprises video data content.

83. The system according to claim 80, wherein the data stream comprises audio data content.

84. The system according to claim 80, wherein the data stream comprises a live data feed.

85. The system according to claim 73, wherein the portable device is configured to employ an encryption format to securely communicate with the communications network node.

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86. The system according to claim 85, wherein the encryption format is selected from the group consisting of checksum, Data Encryption Standard (DES), Elliptical Curve Encryption (ECC), International Data Encryption Algorithm (IDEA), Message Digest 5 (MD5) passwords, Rivest Cipher (RC5), Rijndael, RSA, Secure Hash Algorithm (SHA), Secure Socket Layer (SSL), and Secure Hypertext Transfer Protocol (HTTPS).

87. The system according to claim 73, wherein the portable device is configured to employ a cryptographic technique to securely communicate with the communications network node.

88. The system according to claim 87, where the cryptographic technique is selected from the group consisting of digital certificates, digital signatures, dual signatures, enveloping, password access protection, and public key management.

89. The system according to claim 73, wherein the portable device processor comprises a cryptographic processor configured to facilitate transmission of secure communications.

90. The system according to claim 73, wherein the second program code, when executed by the portable device processor, is configured to cause a communication to be transmitted to the terminal to display a graphic interactive user interface by the terminal output component, the graphic interactive user interface comprising at least one graphic user interface element configured to be manipulated by a user to cause the portable device processor to execute stored program code.

91. The system according to claim 73, wherein the second program code, when executed by the portable device processor, is configured to cause a secure communication to be transmitted to the terminal to display an interactive user interface by the terminal output component.

92. The system according to claim 73, wherein the third program code, when executed by the portable device in response to a command resulting from user manipulation of a user interface element of the interactive user interface, is configured to cause a secure communication to be transmitted

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ted to the terminal to affect the display of the interactive user interface by the terminal output component.

93. The system according to claim 73, wherein the fourth program code, when executed by the portable device processor, is configured to cause a secure communication to be transmitted to the communications network node to facilitate portable device verification.

94. The system according to claim 93, wherein the fourth program code, when executed by the portable device processor, is configured to cause a secure communication comprising a device identifier stored on the portable device memory to be transmitted to the communications network node to facilitate portable device verification.

95. The system according to claim 73, wherein the fourth program code, when executed by the portable device processor, is configured to cause a secure communication to be transmitted to the communication network node to facilitate user authentication.

96. The system according to claim 95, wherein the fourth program code, when executed by the portable device processor, is configured to cause a secure communication comprising a user password to be transmitted to the communications network node to facilitate user authentication.

97. The system according to claim 73, further comprising an input device configured to enable a user to manipulate a user interface element of the interactive user interface displayed by the terminal output component and the portable device is configured to receive a command resulting from user manipulation of a user interface element of the interactive user interface enabled by the input device.

98. The system according to claim 97, wherein the portable device further comprises a third communication interface configured to enable transmission of communications between the portable device and the input device.

99. The system according to claim 97, wherein the input device and the portable device are configured to employ Bluetooth connectivity protocol to enable transmission of communications between the input device and the portable device.

* * * * *

Exhibit B

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT6915250

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
CONTINENTAL AUTOMOTIVE SYSTEMS, INC.	08/10/2021

RECEIVING PARTY DATA

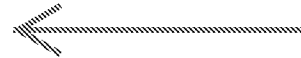
Name:	VITESCO TECHNOLOGIES USA, LLC
Street Address:	2400 EXECUTIVE HILLS BLVD
City:	AUBURN HILLS
State/Country:	MICHIGAN
Postal Code:	48326

PROPERTY NUMBERS Total: 96

Property Type	Number
Patent Number:	10797905
Patent Number:	10360832
Patent Number:	10449824
Patent Number:	10345872
Patent Number:	10345894
Patent Number:	10010307
Patent Number:	9683176
Patent Number:	10903918
Patent Number:	10861319
Patent Number:	10964000
Patent Number:	9683180
Patent Number:	9683171
Patent Number:	10637754
Patent Number:	10346724
Patent Number:	10309793
Patent Number:	9957840
Patent Number:	9853771
Patent Number:	11014695
Patent Number:	10972651
Patent Number:	10972652

PATENT

Property Type	Number
Patent Number:	10972864
Patent Number:	10972583
Patent Number:	10972585
Patent Number:	10935589
Patent Number:	10990643
Patent Number:	10891502
Patent Number:	10848000
Patent Number:	10991579
Patent Number:	10810678
Patent Number:	10833348
Patent Number:	10807340
Patent Number:	10848078
Patent Number:	10835617
Patent Number:	10793117
Patent Number:	10972584
Patent Number:	10644012
Patent Number:	10645777
Patent Number:	10645781
Patent Number:	10404673
Patent Number:	10642629
Patent Number:	10642628
Patent Number:	10618713
Patent Number:	10863250
Patent Number:	10411291
Patent Number:	10790963
Patent Number:	10372900
Patent Number:	10779055
Patent Number:	10725866
Patent Number:	10753377
Patent Number:	10753481
Patent Number:	10753378
Patent Number:	10608389
Patent Number:	10253468
Patent Number:	10253499
Patent Number:	10455630
Patent Number:	10247351
Patent Number:	10246483
Patent Number:	10253476



Property Type	Number
Patent Number:	10610610
Patent Number:	10183392
Patent Number:	10184471
Patent Number:	10452840
Patent Number:	10112768
Patent Number:	10402969
Application Number:	11689088
Application Number:	11689036
Application Number:	11708993
Application Number:	11652754
Application Number:	11414429
Application Number:	11352749
Application Number:	11352712
Application Number:	12007306
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Application Number:	11168176
Application Number:	11895476
Application Number:	11284249
Application Number:	11291623
Application Number:	11269081
Application Number:	11453543
Application Number:	11270124
Application Number:	11453628

CORRESPONDENCE DATA**Fax Number:**

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Email: michelle.heike@vitesco.com**Correspondent Name:** VITESCO TECHNOLOGIES USA, LLC**Address Line 1:** 2400 EXECUTIVE HILLS BLVD**Address Line 4:** AUBURN HILLS, MICHIGAN 48326

NAME OF SUBMITTER:	MICHELLE E. HEIKE
SIGNATURE:	/Michelle E. Heike/
DATE SIGNED:	09/14/2021

Total Attachments: 7

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PATENT ASSIGNMENT

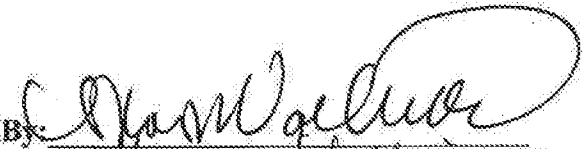
WHEREAS, Continental Automotive Systems, Inc., ("Assignor"), a corporation, organized and existing under the laws of Delaware and having its principal place of business in Auburn Hills, Michigan, USA, is the owner of the patent applications listed in Schedule "A" attached hereto (collectively, the "Patent Applications") and the inventions and improvements ("Inventions") described therein; and

WHEREAS, Vitesco Technologies USA, LLC ("Assignee"), a limited liability company, organized and existing under the laws of Delaware and having its principal place of business in Auburn Hills, Michigan, USA, is desirous of acquiring from Assignor its whole right, title and interest in and to the Patent Applications and the Inventions described therein;


NOW THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by the parties hereto, Assignor hereby sells, assigns and transfers, unto Assignee and its successors, assigns, and legal representatives, the exclusive right, title and interest in and for the United States, in an and to any Inventions disclosed in the Patent Applications, and in and to said Patent Applications and all divisional, continuation, continuing substitute, renewal, reissue and all other applications for Letters Patent which have been or shall be filed in the United States on any of said Inventions; and in and to all original and reissued patents which shall be issued in the United States on said Inventions; and hereby authorizes and requests the Commissioner of Patents of the United States to issue Letters Patent upon the Patent Applications, division, extension, continuation or reissue, to Assignee, for the sole use and benefit of Assignee, its successors, assigns and legal representatives, to the full end of the term for which any Letters Patent may be granted, the same as they would have been held and enjoyed by Assignor had this assignment not been made.

IN WITNESS WHEREOF, Assignor has caused this Patent Assignment to be executed by its respective duly authorized representative as of *Aug 10*, 2021.

Continental Automotive Systems, Inc.

By: 
 Name: *Mary M. Velhever*
 Title: *Assistant Secretary*

Vitesco Technologies USA, LLC

By: 
 Name: *Shaina M. M. Schiffman*
 Title: *Secretary*

Schedule A

No.	Internal file number	Title	Filing date	Application number	Grant date	Grant number	Applicant
1	2007P10160 US01	DIESEL DOSING SYSTEM RELIEF OF TRAPPED VOLUME FLUID PRESSURE AT SHUTDOWN	17.04.2008	12/081,537	25.05.2010	US7721533	Continental Automotive Systems, Inc.
2	2007P05491 US	Method for Determining RMS Values For Grid-Linked Converters	09.03.2004	10/797,905	04.07.2006	US7071759	Continental Automotive Systems, Inc.
3	2007P05420 US	Integrated Traction Inverter Module And DC/DC Converter	07.02.2003	10/360,832	14.03.2006	US7012822	Continental Automotive Systems, Inc.
4	2007P05417 US	Method and Apparatus for Motor Control	30.05.2003	10/449,824	30.08.2005	US6936991	Continental Automotive Systems, Inc.
5	2007P05414 US	Overmodulation Systems and Methods for Induction Motor Control	15.01.2003	10/345,872	18.01.2005	US6844701	Continental Automotive Systems, Inc.
6	2007P05404 US	Device and Method of Commutation Control for an Isolated Boost Converter	15.01.2003	10/345,894	30.08.2005	US6937483	Continental Automotive Systems, Inc.
7	2007P05383 US	System and Method for Induction Motor Control	13.11.2001	10/010,307	16.03.2004	US6707270	Continental Automotive Systems, Inc.
8	2007P05168 US	System and Method for Controlling Torque in an Electrical Machine	29.11.2001	09/683,176	15.10.2002	US6465977	Continental Automotive Systems, Inc.
9	2007P04710 US	Method, Apparatus and Article for Motor Control Voltage Dropout Detection	30.07.2004	10/903,918	01.08.2006	US7084588	Continental Automotive Systems, Inc.
10	2007P04594 US	Apparatus, System, and method for AC BUS Loss Detection and AC BUS Disconnection for Electric Vehicles Having a House Keeping Power Supply	22.12.2005	11/317,658	10.11.2009	US7616460	Continental Automotive Systems, Inc.
11	2007P04591 US	System and Method of Over Voltage Control for a Power System	27.10.2005	11/262,519	06.07.2010	US7750501	Continental Automotive Systems, Inc.
12	2007P04480 US	System and Method for Commonly Controlling Power Converters	18.11.2005	11/282,301	25.11.2008	US7456602	Continental Automotive Systems, Inc.
13	2007P04202 US	Interleaved Power Converter	04.06.2004	10/861,319	13.11.2007	US7295448	Continental Automotive Systems, Inc.
14	2007P04115 US	Integration of Planar Transformer And/or Planar Inductor with Power Switches in Power Converter	12.10.2004	10/964,000	30.10.2007	US7289329	Continental Automotive Systems, Inc.
15	2007P04025 US01	Unique Mounting System for Bearing-Mounted Automotive ABS (Anti-Lock Brake) Sensor	22.02.2008	12/035,660	29.11.2011	US8065790	Continental Automotive Systems, Inc.

16	2007P03915 US	System and Method for Induction Motor Control	29.11.2001	09/683,180	07.10.2003	US6630809	Continental Automotive Systems, Inc.
17	2007P03907 US	Series Regenerative Braking Torque Control Systems and Methods	28.11.2001	09/683,171	14.10.2003	US6631960	Continental Automotive Systems, Inc.
18	2007P03896 US	Ride Through In Electronic Power Converters	06.08.2003	10/637,754	31.05.2005	US6900643	Continental Automotive Systems, Inc.
19	2007P03885 US	Power Generation System Suitable for Hybrid Electric Vehicles	20.06.2006	11/472,486	06.04.2010	US7690456	Continental Automotive Systems, Inc.
20	2007P03795 US01	DC/DC Converter	08.01.2008	11/970,721	21.09.2010	US7800921	Continental Automotive Systems, Inc.
21	2007P03786 US01	Operating and Controlling Insulated Gate Bipolar Transistors in High Speed Failure Mode Situations	29.11.2007	11/947,272	19.07.2011	US7983013	Continental Automotive Systems, Inc.
22	2007P03613 US	Circuit Configuration for Permanent Magnet Synchronous Motor Control	16.01.2003	10/346,724	17.05.2005	US6894450	Continental Automotive Systems, Inc.
23	2007P03612 US	Method and System for Non-Invasive Power Transistor Die Voltage measurement	03.12.2002	10/309,793	01.03.2005	US6861835	Continental Automotive Systems, Inc.
24	2007P01155 US01	Friction Spring for Leak Detection Poppet	09.01.2008	12/007,306	05.07.2011	US7971853	Continental Automotive Systems, Inc.
25	2006P25225 US01	IDLE AIR CONTROL VALVE BEARING IMPROVEMENT	26.11.2007	11/984,920	08.03.2011	US7900888	Continental Automotive Systems, Inc.
26	2006P23933 US01	Laser Welded Automotive Diesel Exhaust HC Dosing Valve	11.06.2007	11/808,511	06.10.2015	US9151201	Continental Automotive Systems, Inc.
27	2006P12618 US01	Automotive Diesel Exhaust Water Cooled HC Dosing	21.05.2007	11/802,209	25.03.2014	US8678300	Continental Automotive Systems, Inc.
28	2006P11490 US01	Fuel Injection Circuit With Selectable Peak Injection Currents	31.05.2007	11/755,820	07.09.2010	US7789072	Continental Automotive Systems, Inc.
29	2006P05505 US01	Inductive Heated Injector Using A Three Wire Connection	21.03.2007	11/689,088	15.04.2014	US8695901	Continental Automotive Systems, Inc.
30	2006P05502 US01	Inductive Heated Injector Using Voltage Transformer Technology	21.03.2007	11/689,036	03.03.2015	US8967124	Continental Automotive Systems, Inc.
31	2006P03916 US01	Constant Current Zero-Voltage Switching Induction Heater Driver for Variable Spray Injection	21.02.2007	11/708,993	08.12.2009	US7628340	Continental Automotive Systems, Inc.
32	2006P01419 US	Transmission Shift Position Sensor	21.09.2001	09/957,840	09.12.2003	US6658960	Continental Automotive Systems, Inc.
33	2006P01331 US02	Electronic Circuit for Automatic DC Offset Compensation for a Linear Displacement Sensor	11.05.2001	09/853,771	09.03.2004	US6703827	Continental Automotive Systems, Inc.
34	2006P00688 US01	High Speed Gasoline Unit Fuel Injector	12.01.2007	11/652,754	27.07.2010	US762478	Continental Automotive Systems, Inc.

35	2006P00488 US	Position Adjustable (Outtrigger) Printed Circuit Board	28.04.2006	11/414,429	23.11.2010	US7839657	Continental Automotive Systems, Inc.
36	2005P14739 US01	Demagnetization Field-Enhancing Magnetometer	13.02.2006	11/352,749	05.01.2010	US7640814	Continental Automotive Systems, Inc.
37	2005P14729 US01	Torque Sensor Magnetometer	13.02.2006	11/352,712	22.01.2008	US7320255	Continental Automotive Systems, Inc.
38	2005P14383 US01	Fluid Quality Sensor	07.08.2006	11/500,164	16.12.2008	US7466147	Continental Automotive Systems, Inc.
39	2005P11707 US	Magnetometer Circuit	21.11.2005	11/284,249	08.04.2008	US7355397	Continental Automotive Systems, Inc.
40	2005P11706 US	Digital Fluxgate Magnetometer	08.11.2005	11/269,081	24.06.2008	US7391211	Continental Automotive Systems, Inc.
41	2005P11690 US	Sensor Hysteresis Reduction	09.11.2005	11/270,124	05.06.2007	US7228247	Continental Automotive Systems, Inc.
42	2005P10481 US01	Blowout Resistant Weld Method for Laser Welds for Press Fit Parts	15.06.2006	11/453,628	26.04.2011	US7930825	Continental Automotive Systems, Inc.
43	2005P10474 US01	Component Geometry and Method for Blow-Out Resistant Welds	15.06.2006	11/453,543	17.11.2009	US7617605	Continental Automotive Systems, Inc.
44	2005P05009 US	Fuel Sensor	28.06.2005	11/168,176	30.01.2007	US7170303	Continental Automotive Systems, Inc.
45	2004P20716 US	Fuel Injector with a Metering Assembly with a Polymeric Support Member and an Orifice Disk Positioned at a Terminal End of the Polymeric Housing	20.12.2004	11/014,695	22.05.2007	US7219847	Continental Automotive Systems, Inc.
46	2004P20710 US01	Polymeric Bodied Fuel Injector with a Seat and Elastomeric Seal Molded to a Polymeric Support Member	24.08.2007	11/895,476	27.07.2010	US7762477	Continental Automotive Systems, Inc.
47	2004P20208 US01	Pressure Regulator with Ceramic Valve Element	01.12.2005	11/291,623	26.10.2010	US7819132	Continental Automotive Systems, Inc.
48	2004P18213 US	Asymmetric Fluidic Flow Controller Orifice Disc for Fuel Injector	26.10.2004	10/972,651	18.03.2008	US7344090	Continental Automotive Systems, Inc.
49	2004P18211 US	Fuel Injector with Sauter-Mean-Diameter Atomization Spray of Less than 70 Microns	26.10.2004	10/972,652	27.11.2007	US7299997	Continental Automotive Systems, Inc.
50	2004P18210 US	Unitary Fluidic Flow Controller Orifice Disc for Fuel Injector	26.10.2004	10/972,864	11.11.2008	US7448560	Continental Automotive Systems, Inc.
51	2004P18209 US	Methods of Making Fluidic Flow Controller Orifice Disc for Fuel Injector	26.10.2004	10/972,583	29.05.2007	US7222407	Continental Automotive Systems, Inc.
52	2004P18208 US	Fluidic Flow Controller Orifice Disc with Dual-Flow Dividers for Fuel Injector	26.10.2004	10/972,585	11.12.2007	US7306172	Continental Automotive Systems, Inc.
53	2004P18135 US01	Fuel Pressure Regulator Valve Assembly	21.10.2005	11/256,312	26.07.2011	US7984728	Continental Automotive Systems, Inc.
54	2004P16490 US	Spray Pattern Control with Angular Orientation in Fuel Injector and Method	08.09.2004	10/935,589	09.01.2007	US7159800	Continental Automotive Systems, Inc.
55	2004P14607 US	Automotive Control Module Housing	17.11.2004	10/990,643	23.05.2006	US7050305	Continental Automotive Systems, Inc.

56	2004P09100 US01	Deep Pocket Seat Assembly in Modular Fuel Injector with Fuel Filter Mounted to Spring Bias Adjusting Tube and Methods	02.08.2005	11/195,151	18.12.2007	US7309033	Continental Automotive Systems, Inc.
57	2004P09097 US01	DEEP POCKET SEAT ASSEMBLY IN MODULAR FUEL INJECTOR WITH UNITARY FILTER AND O-RING RETAINER ASSEMBLY AND METHODS	02.08.2005	11/195,057	24.06.2008	US7389952	Continental Automotive Systems, Inc.
58	2004P08657 US	Unitary Fuel Injector Module for Fuel System	15.07.2004	10/891,502	08.08.2006	US7086385	Continental Automotive Systems, Inc.
59	2004P08158 US	Magnetic Circuit Using Negative Magnetic Susceptibility	19.05.2004	10/848,000	05.08.2008	US7407119	Continental Automotive Systems, Inc.
60	2004P05812 US	In Line Fluid Quality Sensor	18.11.2004	10/991,579	18.04.2006	US7030629	Continental Automotive Systems, Inc.
61	2004P05182 US	Regulator with Flow Distributor	29.03.2004	10/810,678	01.08.2006	US7082956	Continental Automotive Systems, Inc.
62	2004P01677 US	Asymmetrical Punch	28.04.2004	10/833,348	09.01.2007	US7159436	Continental Automotive Systems, Inc.
63	2004P01676 US	Method of Using a Tool to Form Angled Orifices in a Metering Orifice Disc	24.03.2004	10/807,340	18.09.2007	US7269989	Continental Automotive Systems, Inc.
64	2004P01675 US	Fuel Injector Including an Orifice Disc and a Method of Forming an Oblique Spiral Fuel Flow	19.05.2004	10/848,078	08.08.2006	US7086615	Continental Automotive Systems, Inc.
65	2004P01674 US	Fuel Injector Including a Compound Angle Orifice Disc for Adjusting Spray Targeting	30.04.2004	10/835,617	10.04.2007	US7201329	Continental Automotive Systems, Inc.
66	2004P00819 US	Compound-Angled Orifices in Fuel Injection Metering Disc	04.03.2004	10/793,117	23.05.2006	US7048202	Continental Automotive Systems, Inc.
67	2003P16341 US01	Fluidic Flow Controller Orifice Disc for Fuel Injector	26.10.2004	10/972,584	30.12.2008	US7469845	Continental Automotive Systems, Inc.
68	2003P15051 US04	Injector Seat That Includes A Coined Seal Band	27.07.2010	12/843,903	11.09.2012	US8261446	Continental Automotive Systems, Inc.
69	2003P15051 US03	Injector Seat That Includes A Coined Seal Band	28.09.2004	12/843,902	13.11.2012	US8307550	Continental Automotive Systems, Inc.
70	2003P15051 US02	Injector Seat That Includes A Coined Seal Band	30.07.2008	12/219,881	16.11.2010	US7832661	Continental Automotive Systems, Inc.
71	2003P14513 US	Modular Fuel Injector and Method of Assembling the Modular Fuel Injector	20.08.2003	10/644,012	25.03.2008	US7347383	Continental Automotive Systems, Inc.

		Modular Fuel Injector Having a Surface Treatment on an Impact Surface of an Electromagnetic Actuator and Having an Integral Filter and Dynamic Adjustment Assembly	22.08.2003	10/645,777			11.01.2005	US6840500	Continental Automotive Systems, Inc.
72	2003P12856 US								
		Magneto-Hydraulic Compensator For A Fuel Injector	22.08.2003	10/645,781			23.05.2006	US7048209	Continental Automotive Systems, Inc.
73	2003P12854 US								
		Self-Locking Spring Stop For Fuel Injector Calibration	02.04.2003	10/404,673			20.07.2004	US6764032	Continental Automotive Systems, Inc.
74	2003P12702 US								
		Fuel Injector With A Deep Pocket Seat And Method of Maintaining Spatial Orientation	19.08.2003	10/642,629			03.07.2007	US7237731	Continental Automotive Systems, Inc.
75	2003P12572 US								
		Modular Fuel Injector with a Deep Pocket Seat and Method of Maintaining Spatial Orientation	19.08.2003	10,642,628			04.04.2006	US7021566	Continental Automotive Systems, Inc.
76	2003P12570 US								
		Fuel Injector Including a Compound Angle Orifice Disc	15.07.2003	10/618,713			16.01.2007	US7163159	Continental Automotive Systems, Inc.
77	2003P10276 US								
		MODULAR FUEL INJECTOR WITH DI-POLE MAGNETIC CIRCUIT	09.06.2004	10/863,250			08.08.2006	US7086606	Continental Automotive Systems, Inc.
78	2003P06653 US01								
		Modular Fuel Injector Having a Low Mass, High Efficiency Electromagnetic Actuator and Having an Integral Filter and O-Ring Retainer Assembly	11.04.2003	10/411,291			08.02.2005	US6851631	Continental Automotive Systems, Inc.
79	2003P05614 US								
		Non-Contact Thrust Force Sensor Assembly	02.03.2004	10/790,963			04.10.2005	US6951145	Continental Automotive Systems, Inc.
80	2003P04239 US01								
		Self-Locking Spring Stop For Fuel Injector Calibration	26.02.2003	10/372,900			02.12.2003	US6655610	Continental Automotive Systems, Inc.
81	2003P02857 US								
		Inductive Load Powering Arrangement	13.02.2004	10/779,055			19.09.2006	US7107976	Continental Automotive Systems, Inc.
82	2003P01905 US01								
		Fuel Supply and Diagnostics Module	02.12.2003	10/725,866			30.08.2005	US6935317	Continental Automotive Systems, Inc.
83	2003P01320 US01								
		Spray Pattern Control with Non-Angled Orifices Formed on a Dimpled Fuel Injection Metering Disc Having a SAC Volume Reducer	09.01.2004	10/753,377			26.07.2005	US6921021	Continental Automotive Systems, Inc.
84	2003P00229 US01								
		Spray Pattern Control with Non-Angled Orifices Formed a Generally Planar Metering Disc and Reoriented on Subsequently Dimpled Fuel Injection Metering Disc	09.01.2004	10/753,481			22.11.2005	US6966499	Continental Automotive Systems, Inc.
85	2003P00228 US01								

86	2003P00213 US01	Spray Pattern Control With Non-Angled Orifices Formed On A dimpled Fuel Injection Metering Disc Having A Sac Volume Reducer	09.01.2004	10/753,378	26.07.2005	US6921022	Continental Automotive Systems, Inc.
87	2002P18433 US	Fuel Injector Including An Orifice Disc, and A Method of Forming The Orifice Disc With An Asymmetrical Punch	30.06.2003	10/608,389	27.09.2005	US6948665	Continental Automotive Systems, Inc.
88	2002P15894 US	Spray Pattern Control with Angular Orientation in Fuel Injector and Method	25.09.2002	10/253,468	14.09.2004	US6789754	Continental Automotive Systems, Inc.
89	2002P15889 US01	Generally Circular Spray Pattern Control with Non-Angled Orifices in Fuel Injection Metering Disc and Method	25.09.2002	10/253,499	16.08.2005	US6929197	Continental Automotive Systems, Inc.
90	2002P15887 US	Spray Targeting To An Arcuate Sector With Non-Angled Orifices In Fuel Injection Metering Disc And Method	25.09.2002	10/253,467	23.11.2004	US6820826	Continental Automotive Systems, Inc.
91	2002P15883 US01	Flow-Through Pressure Regulator Including A Closure Member Assembly Integrated With A Housing	06.06.2003	10/455,630	20.06.2006	US7063104	Continental Automotive Systems, Inc.
92	2002P15586 US	Injection Valve With Single Disc Turbulence Generation	20.09.2002	10/247,351	04.05.2004	US6729563	Continental Automotive Systems, Inc.
93	2002P15573 US	Fuel Injector and Method of Forming a Hermetic Seal for The Fuel Injector	19.09.2002	10/246,483	21.09.2004	US6793162	Continental Automotive Systems, Inc.
94	2002P13650 US	Fuel Injector Cup With Improved Lead-In Dimensions For Reduced Insertion Force	25.09.2002	10/253,476	27.03.2007	US7195004	Continental Automotive Systems, Inc.
95	2002P11741 US01	Automotive Control Module Housing	01.07.2003	10/610,610	19.04.2005	US6881077	Continental Automotive Systems, Inc.
96	2002P10434 US	Spray Control with Non-Angled Orifices in Fuel Injection Metering Disc and Methods Utilizing Increasing Width For Identification Voltages	28.06.2002	10/183,392	22.11.2005	US6966505	Continental Automotive Systems, Inc.
97	2002P10071 US	Fuel Sensor	27.06.2002	10/184,471	08.02.2005	US6851305	Continental Automotive Systems, Inc.
98	2002P08447 US01	Apparatus and Method of Connecting a Fuel Injector and a Fuel Rail	02.06.2003	10/452,840	09.08.2005	US6927583	Continental Automotive Systems, Inc.
99	2002P07671 US	Injector Valve for an Integrated Air/Fuel Module	02.04.2002	10/112,768	16.03.2004	US6705292	Continental Automotive Systems, Inc.
100	2002P07281 US01		01.04.2003	10/402,969	07.09.2004	US6786203	Continental Automotive Systems, Inc.

Exhibit C

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT6987834

SUBMISSION TYPE:	NEW ASSIGNMENT	
NATURE OF CONVEYANCE:	ASSIGNMENT	
CONVEYING PARTY DATA		
	Name	Execution Date
	SCOTT MCNULTY	10/07/2014
RECEIVING PARTY DATA		
Name:	IOENGINE, LLC	
Street Address:	22 ENSIGN ROAD	
City:	NORWALK	
State/Country:	CONNECTICUT	
Postal Code:	06853	
PROPERTY NUMBERS Total: 7		
Property Type	Number	
Application Number:	15712714	
Application Number:	15712780	
Application Number:	16516244	
Application Number:	16579169	
Application Number:	17222294	
Application Number:	17241038	
Application Number:	17409761	
CORRESPONDENCE DATA		
Fax Number:		
<i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i>		
Phone:	6465531590	
Email:	patent@koffskyschwalb.com	
Correspondent Name:	MARK I. KOFFSKY	
Address Line 1:	KOFFSKY SCHWALB LLC	
Address Line 2:	500 SEVENTH AVENUE, 8TH FLOOR	
Address Line 4:	NEW YORK, NEW YORK 10018	
ATTORNEY DOCKET NUMBER:	1372.XXXX	
NAME OF SUBMITTER:	MARK I. KOFFSKY	
SIGNATURE:	/Mark I. Koffsky/	
DATE SIGNED:	10/26/2021	

PATENT

Total Attachments: 2

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PATENT

REEL: 058908 FRAME: 0846

PATENT ASSIGNMENT

This ASSIGNMENT is by and between Scott McNulty, an individual residing at 22 Ensign Road, Rowayton, Connecticut, 06853 ("Assignor") and IOENGINE, LLC, a Delaware limited liability company ("Assignee").

WHEREAS, Assignor is the sole inventor of the inventions disclosed and/or claimed in U.S. Patent No. 7,861,006, U.S. Patent No. 8,539,047 and U.S. Patent Application Serial No. 13/960,514 (hereinafter "Patents");

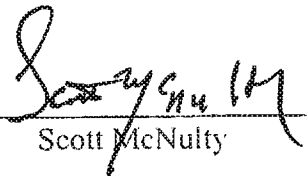
WHEREAS, Assignor is the owner of all right, title and interest in, to and under the Patents;

WHEREAS, Assignor wishes to assign, transfer, convey, sell and deliver to Assignee all right, title and interest in, to and under the Patents; and

NOW, THERETOFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged:

1. Assignor hereby assigns, transfers, conveys, sells and delivers to Assignee all right, title and interest in, to and under the Patents and all issuances, divisions, continuations, continuations-in-part, reissues, extensions, reexaminations and renewals of such Patents, together with the right to sue and recover damages for future or past infringements of the Patents or any patents that may issue from the Patents and to fully stand in the place of Assignor in all matters related thereto.
2. Assignor hereby authorizes and requests the Commissioner of Patents and Trademarks of the United States of America to record this ASSIGNMENT to Assignee.
3. Assignor hereby represents and warrants that he has full right to convey the entire right, title and interest in, to and under the Patents to Assignee.
4. Assignor hereby covenants and agrees that the Assignee, its successors, legal representatives, or assigns, may apply for further divisions, continuations, continuations-in-part, reissues, extensions, reexaminations and renewals of such Patents, and that I will, at any time, when called upon to do so by Assignee, its successors, legal representatives, or assigns, communicate to the Assignee, its successors, legal representatives, or assigns, as the case may be, any facts know to me respecting the inventions disclosed and/or claimed in the Patents, and execute and deliver any and all lawful papers that may be necessary or desirable to perfect the title to the inventions, applications and Patents in the Assignee, its successors, legal representatives and assigns.
5. Assignor hereby further covenants and agrees that if any divisions, continuations, continuations-in-part, reissues, extensions, reexaminations and renewals of any of the Patents shall hereafter be desired by Assignee, its successors, legal representative, or assigns, I will, at any time, when called upon to do so by the

Assignee, its successors, legal representatives, or assigns, sign all papers, make all rightful oaths, execute and deliver all such disclaimers and all divisions, continuations, continuations-in-part, reissues, extensions, reexaminations and renewals applications so desired, and do all lawful acts requisite for the filing and procuring thereof, and generally do everything possible to aid the Assignee, its successors, legal representatives and assigns, to obtain and enforce proper patent protection for the inventions, all without further compensation but at the expense of the Assignee, its successors, legal representatives and assigns.

By: 
Scott McNulty

Date: 10-7-14

Exhibit D

PATENT ASSIGNMENT

This ASSIGNMENT is by and between Scott McNulty, an individual residing at 22 Ensign Road, Rowayton, Connecticut, 06853 ("Assignor") and IOENGINE, LLC, a Delaware limited liability company ("Assignee").

WHEREAS, Assignor is the sole inventor of the inventions disclosed and/or claimed in U.S. Patent No. 7,861,006, U.S. Patent No. 8,539,047, U.S. Patent No. 9,059,969, U.S. Patent No. 9,774,703, U.S. Patent Application Serial No. 15/712,714 and U.S. Patent Application Serial No. 15/712,780 (hereinafter "Patents");

WHEREAS, Assignor previously assigned, transferred, conveyed, sold and delivered all right, title and interest in, to or under the Patents to Assignee;

WHEREAS, Assignor wishes to confirm the previous assignment, transfer, conveyance, sale and delivery to Assignee of all right, title and interest in, to or under the Patents, and, to the extent any prior assignment was, is, or becomes ineffective, Assignor wishes now to assign, transfer, convey, sell and deliver to Assignee all right, title and interest in, to or under the Patents;

WHEREAS, to the extent Assignor is the owner of any right, title and interest in, to or under the Patents, Assignor wishes to assign, transfer, convey, sell and deliver to Assignee all such right, title and interest in, to or under the Patents; and

NOW, THERETOFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged:

1. To the extent Assignor is the owner of any right, title and interest in, to or under the Patents, he hereby assigns, transfers, conveys, sells and delivers to Assignee all such right, title and interest in, to or under the Patents and all issuances, divisions, continuations, continuations-in-part, reissues, extensions, reexaminations and renewals of such Patents, together with the right to sue and recover damages for future or past infringements of the Patents or any patents that may issue from the Patents and to fully stand in the place of Assignor in all matters related thereto.
2. Assignor hereby authorizes and requests the Commissioner of Patents and Trademarks of the United States of America to record this ASSIGNMENT to Assignee.
3. Assignor hereby represents and warrants that to the extent he is the owner of any right, title and interest in, to or under the Patents, he has full right to convey all such right, title and interest in, to or under the Patents to Assignee.
4. Assignor hereby covenants and agrees that the Assignee, its successors, legal representatives, or assigns, may apply for further divisions, continuations, continuations-in-part, reissues, extensions, reexaminations and renewals of such Patents, and that I will, at any time, when called upon to do so by Assignee, its

successors, legal representatives, or assigns, communicate to the Assignee, its successors, legal representatives, or assigns, as the case may be, any facts know to me respecting the inventions disclosed and/or claimed in the Patents, and execute and deliver any and all lawful papers that may be necessary or desirable to perfect the title to the inventions, applications and Patents in the Assignee, its successors, legal representatives and assigns.

5. Assignor hereby further covenants and agrees that if any divisions, continuations, continuations-in-part, reissues, extensions, reexaminations and renewals of any of the Patents shall hereafter be desired by Assignee, its successors, legal representative, or assigns, I will, at any time, when called upon to do so by the Assignee, its successors, legal representatives, or assigns, sign all papers, make all rightful oaths, execute and deliver all such disclaimers and all divisions, continuations, continuations-in-part, reissues, extensions, reexaminations and renewals applications so desired, and do all lawful acts requisite for the filing and procuring thereof, and generally do everything possible to aid the Assignee, its successors, legal representatives and assigns, to obtain and enforce proper patent protection for the inventions, all without further compensation but at the expense of the Assignee, its successors, legal representatives and assigns.

By: 
Scott McNulty

Date: 2-9-18