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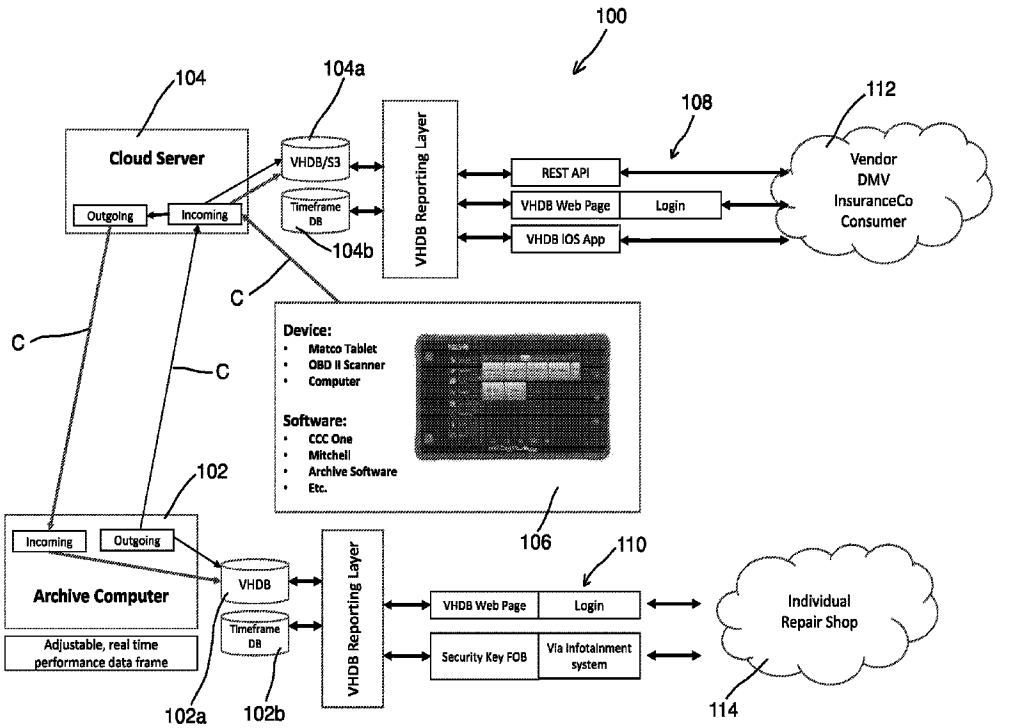

(57) Abrégé/Abstract:
Systems and methods to retrieve, process, and archive (e.g., via cloud systems) vehicle events, vehicle status, and historical data. The system provides real-time, or event-based, vehicle data acquisition to facilitate verifiable and accurate historical information on a vehicle. True and accurate vehicle data can be accessed by various companies, entities, and government agencies under a subscription service, or on a per-event basis.

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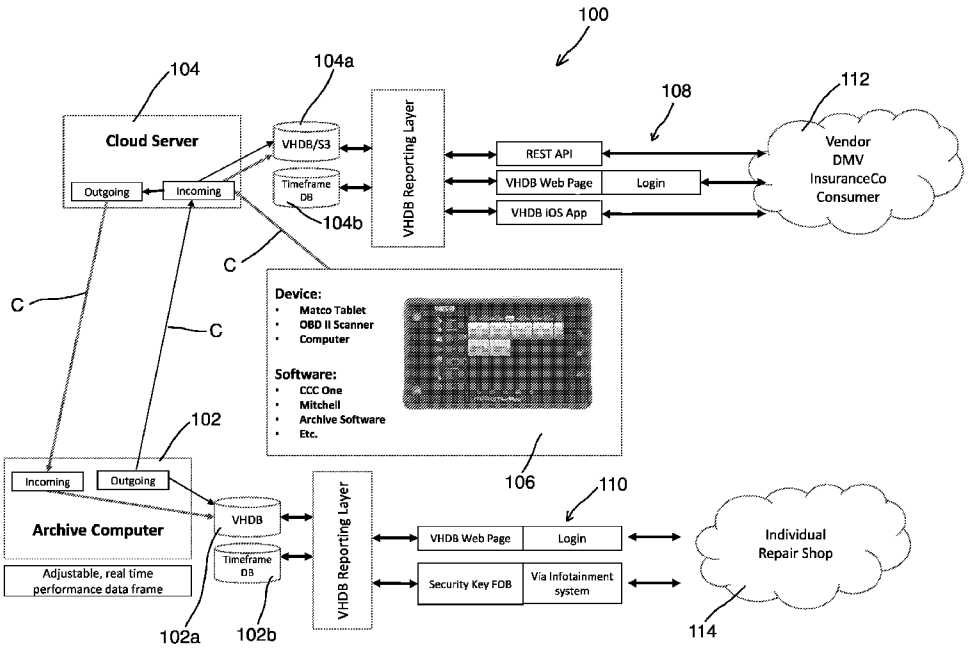

Fig. 1

(57) Abstract: Systems and methods to retrieve, process, and archive (e.g., via cloud systems) vehicle events, vehicle status, and historical data. The system provides real-time, or event-based, vehicle data acquisition to facilitate verifiable and accurate historical information on a vehicle. True and accurate vehicle data can be accessed by various companies, entities, and government agencies under a subscription service, or on a per-event basis.

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VEHICLE DATA ACQUISITION AND ACCESS SYSTEM AND METHOD

TECHNICAL FIELD

The present invention relates generally to systems, methods, and computer programs for acquiring, transferring, processing, and archiving vehicle data, including event, status, and historical data.

BACKGROUND OF THE INVENTION

Proposed or contemplated legislation in the U.S., and elsewhere, may require vehicle repair facilities (e.g., mechanical, auto body, etc.) to do a "health check" both on intake and delivery of a vehicle to ensure that all problems have been attended to. This is a major operational shift in the vehicle repair field. As such, OEMs are making a push for scan-in/scan-out health checks with OBD (On Board Diagnostics such as OBD-II) or like systems.

The current methods of storing, accessing relevant vehicle data, and the type of data that is accessible, is very limited, fragmented, and decentralized. This restricts access to needed vehicle data and jeopardizes the accuracy of the vehicle data.

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As such, there is a need for new and improved systems and methods of collecting, processing, archiving, searching, and retrieving a vast array of relevant and important vehicle data.

SUMMARY OF THE INVENTION

The systems and methods of the present invention solve many of the inherent deficiencies currently present in vehicle data acquisition and dissemination. Particular embodiments of the system are adapted to retrieve, process, and archive (e.g., via cloud systems) vehicle data, such as event, status, and historical data. The system provides real-time, or event-based, vehicle data acquisition to facilitate verifiable and accurate historical information on a vehicle.

The system of the present invention can include a vehicle data computing device or module, one or more cloud servers/services, and can communicate with one or more remote user computing devices. For instance, the vehicle computing module can store every function the vehicle performs, every error code, and a myriad of other relevant data. That data can then be communicated or transferred to an accessible cloud server. In certain embodiments, the system users can include vehicle vendors, departments of motor vehicles (DMVs), insurance companies, consumers, government agencies, vehicle repair facilities/technicians, and the like.

Embodiments of the present invention can implement an immutable and secure network to provide reasonable, legal, and redacted information for public consumption about vehicle repair history, sale information, and other documentation types around automotive record keeping. This implementation can include the employment of particular data security technology, such as Blockchain technology.

The above and other aspects and embodiments of the present invention are described below with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated herein and form part of the specification, illustrate various embodiments of the present disclosure and, together with the description, further explain the principles of the disclosure to enable a person skilled in the pertinent art to make and use the embodiments disclosed herein. In the drawings, like reference numbers indicate identical or functionally similar elements.

Fig. 1 is a diagram of the hardware and software aspects of a vehicle data acquisition and access system, in accordance with embodiments of the present invention.

Fig. 2 is a diagram of a user device interacting and receiving vehicle data via a vehicle data computing module, in accordance with embodiments of the present invention.

Fig. 3 is a diagram of a user device interacting and receiving vehicle data via a cloud service or server, in accordance with embodiments of the present invention.

Figs. 4-5 are diagrams of vehicle data acquisition and access software integration and use with a vehicle repair facility, in accordance with embodiments of the present invention.

Fig. 6 is a diagram of a vehicle manufacturer user device interacting and receiving vehicle data via a cloud service or server, in accordance with embodiments of the present invention.

Fig. 7 is a diagram of an agency user device interacting and receiving vehicle data via a cloud service or server, in accordance with embodiments of the present invention.

Fig. 8 is a diagram of an insurance company user device interacting and receiving vehicle data via a cloud service or server, in accordance with embodiments of the present invention.

Fig. 9 is a diagram of a consumer user device interacting and receiving vehicle data via a cloud service or server, in accordance with embodiments of the present invention.

Fig. 10 is a diagram of a vehicle owner interacting and receiving vehicle data via a vehicle and/or a vehicle data computing module, in accordance with embodiments of the present invention.

Fig. 11 is a diagram of a repair technician user device interacting and receiving vehicle data via a vehicle data computing module, in accordance with embodiments of the present invention.

DETAILED DESCRIPTION

Referring generally to Figs. 1-11, exemplary systems, devices, methods, computer programs, or software application systems are adapted to retrieve, process, and archive (e.g., via cloud systems) vehicle events, status, and historical data. The system 100 provides real-time, or event-based, vehicle data acquisition to facilitate verifiable and accurate historical information on a vehicle. This, in turn, supports a current focus in the industry on the interpolation of vehicle repair information.

The system 100 of the present invention is configured to collect a plurality of information or data on an event basis, or at scheduled intervals. This data provides an

uninterrupted, unedited, reliable, and accurate history of the vehicle from "birth" to "death" of that vehicle. As detailed herein, one or more electronic vehicle modules (e.g., linked to the vehicle's Vehicle Identification Number (VIN)) can be provided with the vehicle and can communicate with software of the present invention and an analyzer or system (e.g., OBD-II) such that all of the relevant information regarding the vehicle can be stored at the vehicle and in one or more remote servers, such as cloud servers, for centralized access.

Referring to Fig. 1, in various embodiments, the system 100 can include a vehicle data computing device or module 102 (e.g., Archive Computer), one or more cloud servers/services 104 (e.g., Archive Cloud), and one or more user systems or devices 106. The vehicle module 102 is operatively connected to, and in operative communication with, the vehicle's CAN (Controller Area Network) bus/network, its ECU (Electronic Control Unit) device, and other in-vehicle computing devices. The module 102 can be retrofitted with the vehicle for communication with the ECU, or it can be integrated as a separate computing device or included with the in-vehicle computer. The module 102 is configured to communicate with the cloud server 104 across one or more networks or communication elements C - e.g., cellular, satellite, the Internet, a transponder, or other wireless or wired communication means or protocols. The communications or data transfers across element C can include use of the AWS platform, SDK tools, remote administration protocols (e.g., SSH (secure shell)), and a myriad of other tools, protocols, and platforms. Each of the user devices, systems, and servers of the present invention can both receive vehicle data from, and send/transmit vehicle data to, other devices, systems, and servers of the system 100, as well as process and analyze that data.

Specific software applications are included with the cloud service 104 and the module 102 to facilitate the described processing of data, device communications, data storage, etc. Further, a VHDB (Vehicle History Database) 104a and a timeframe or temporal database 104b are provided with the cloud service 104, and a VHDB 102a and a timeframe database 102b can be included with the module 102.

The system 100 provides interaction with various users, interacting via computing devices or systems 112, 114 to permit operative communication with the cloud service 104 and the module 102, respectively. In certain embodiments, the users 112 can include vendors, DMVs, insurance companies, consumers, agencies, and the like. These users 112 can access the cloud database with a VIN or a batch of VINs. The users 114 can include individuals, vehicle owners, service technicians, repair shops, etc. The users 114 can access all data in the local database in the vehicle. In various embodiments, the local vehicle database will include only one VIN for the subject vehicle itself. Communication between the users 112 and the cloud service 104 can be facilitated by various interfaces, web pages, protocols, mobile or desktop applications, login requirements, and APIs at one or more linking elements 108, which can include communications via the Internet. These interface configurations can also be provided via one or more linking elements 110 to facilitate operative communication between users 114 and module 102 and/or cloud service 104. Again, various interfaces, web pages, protocols, mobile or desktop applications, login requirements, and APIs can be employed. Interfacing via element 110 can be facilitated with hardware devices (e.g., key FOBs), information systems (e.g., infotainment), and the like as well.

The devices 106 can be in operative communication with the server 104 to send and receive the referenced exemplary vehicle data, which can execute software

(e.g., CCC One™, Mitchell™, system 100 software, etc.) on various computing hardware, such as tablets, desktop or mobile computing devices, OBD-II scanners, etc.

Exemplary data that can be retrieved, processed, and archived can include, but are not limited to, current and true odometer readings, gauge or vehicle system, system warnings, current and past GPS locations, maintenance information, accident or damage information, repairs and official inspections that have been performed during the lifetime of the vehicle, vehicle performance data, vehicle operation and functionality data, and the like. This data can be stored in multiple places in various embodiments of the present invention. First, the data can be stored in the subject vehicle at module 102. As such, the owner/driver of the vehicle, technicians, and law enforcement or other agencies will have direct access to bona fide information of prior work/repairs, performance history, and other relevant vehicle data. Secondly, this data can be uploaded to the cloud server 104, allowing client users (e.g., service subscribers) access to information in many different ways, which creates multiple potential revenue streams, as further detailed herein.

The diagrams of Figs. 2-11 depict and describe the data processing, hardware architecture, software applications, interfaces, and uploading and downloading methods of the system 100, including between the vehicle module 102, the user devices 112, 114, and the cloud server 104.

As shown in Fig. 2, the user device 114 is in operative communication with the vehicle module 102 via the one or more interface elements 110 such that the module 102 processes, stores, and/or presents the vehicle data. The module 102 communicates with the cloud service 104 via the one or more communication links C. Various scripts, scheduling tools, and other communication and processing

languages/protocols can be employed to facilitate this processing and data transfer – such as Crontab Scheduler™, Python™ and PHP scripts, Web Server protocols, and the like. Further, the user device 114, such as an individual or repair facility/technician, can obtain in return the following information or data: a menu of items, OEM documentation, OEM repair manuals, relevant vehicle data, etc.

Referring to Fig. 3, the user device 112 is in operative communication with the cloud service 104 via the one or more linking elements 108, and the cloud server 104 is in operative communication with the vehicle module 102 via the one or more communication elements C. Again, the module 102 communicates with the cloud service 104 via the one or more communication links C, using the various disclosed scripts, scheduling tools, and other communication and processing languages/protocols to facilitate the processing and data transfer. In addition, the user device 114 can run or execute repair facility software to obtain the relevant vehicle data in return, to scan the vehicle in and out, prepare final invoices, and the like.

As shown in Fig. 4, the system 100 software processing and vehicle repair facility interaction is provided for exemplary embodiments. The system 100 software application/app (e.g., Archive App) 120 can run or operate on any of the computing devices described herein, including a desktop computer, a tablet, a smartphone, a technician's handheld computing device, the cloud server, etc. The software 120 provides customer profile tracking to allow for profile retrieval, controlled access to job/work data by customers and insurance companies, direct access to a social media-style platform to bring parties together for a better repair experience, and to direct chat or communication – video, text, or voice. The chat feature permits communication via the software 120 to other computing devices, such as a mobile device, a desktop computing device, a tablet, and the like. Bi-directional

communication is facilitated between a technician and the repair facility office (e.g., front office), and can further include features for the technician, or any other user, to employ hands-free note taking, audio note taking, intelligent voice recognition and natural language understanding services (e.g., Alexa™, Siri™, etc.), etc.

Digital workspaces 122 can be included that comprise digital job "pods." These pods permit processing and storage of vehicle data at a common or centralized workspace in the cloud (such as the cloud server 104), or at any of the user devices and computing system and devices disclosed herein. For example, tasks relating to these digital job pods can facilitate repair order documentation, customer/vendor communications, back/front office facility interaction, supplemental repair approval, and many other tasks and communications related to vehicle repair, tracking, and overall utilization of vehicle data and vehicle services. The pods provide a common communication platform for updates, estimates, approvals, surveys, parts ordering, and the like. This makes it possible for seamless communication between the repair or vehicle facility employees, insurance companies, parts suppliers, OEMs, customers, etc. Chat (video, voice, and text), along with notifications (e.g., mobile notifications) allow for constant communication, thereby saving valuable time. For instance, repair or other vehicle shops can use these chat/pod features to collaborate with estimators for instant approval, thereby expediting repair and turn-around times. The end result is better outcomes (e.g., more/higher sales), fewer canceled appointments, increased efficiency, higher customer satisfaction, and better quality control.

With certain embodiments, a first digital pod can be created when a vehicle arrives at the repair facility to track all aspects of the work or job being performed on the vehicle. The job data can be in communication and integrated with various

accounting software. The vehicle's documentation or data can be accessed from the vehicle module 102 and can be used to outline repair procedures, parts lists, costs, etc. This, in turn, facilitates better job status tracking for the vehicle by enabling part order and procedure tracking, and by creating an audit trail with date and time stamps. The digital workspaces 122 remedy confusion and delays caused by unknown parts and task statuses.

The vehicle repair facility F can interact with the system 100 and the software 120 via various user devices, systems, and servers to provide accounting access or integration (e.g., QuickBooks™), vehicle parts estimations, and by tracking, updating, and processing various tasks and station events during the repair and servicing process – including tear down stations, assembly stations, wash stations, paint booths, and the like.

Fig. 5 diagrams integration, tracking, and procedural steps (e.g., the digital job pods) between the front office 115a and various exemplary station projects/tasks 115b-115d for the software 120. While a myriad of vehicle servicing and repair projects are envisioned for integration with the software 120 of the present invention, certain embodiments can include, but are not limited to, integration with a teardown station 115b, a mechanical/body repair station 115c, and a paint shop station 115d.

Figs. 6-9 illustrate communication and interaction between user devices 112 and the cloud service or server 104. For instance, the embodiment of Fig. 6 shows the vehicle manufacturer devices 112 of the present invention 100 receiving the following from the server 104: a "genesis block" (the first block of encrypted blockchain data), a vehicle VIN, vehicle make and model, the date and time, the record type, the OBD-II response, and descriptions.

The embodiment of Fig. 7 shows that a government agency device 112, such as the DMV, can receive the following information: a genesis block, a transaction count, current vehicle owner profile ID, the vehicle VIN, the vehicle make and model, the date and time, the record type, and descriptions.

Fig. 8 provides a diagram of the following data an insurance company device 112 can receive in example embodiments: a genesis block, a current owner profile ID, a job ID, the vehicle VIN, the vehicle make and model, the date and time, the record type, and descriptions.

The embodiment of Fig. 9 illustrates the following information that can be received from the cloud server 104 by a consumer device 112: a genesis block, the vehicle VIN, the vehicle make and model, the date and time, the record type, and descriptions. Like other disclosed methods and means for communication between the computing devices 112, 114 and the cloud server 104, the embodiment of Fig. 9 further shows communication and data access over the Internet, via a web login or a mobile app.

Figs. 10-11 illustrate operative communication and interactions between user devices 114, such as vehicle owner and repair technician devices, and the vehicle computing module 102. Access and communication between the device 114 and the module 102 can be facilitated via key FOB access, a technician's scanner or device 106, etc. Data or information returned to the vehicle repair facility technician, or the vehicle owner, can include the following: a genesis block, all data for the vehicle, the vehicle VIN, owner information (e.g., redacted), the vehicle make and model, the data and time, the record type, OBD-II codes, descriptions, and the like.

The following are exemplary list/tables of the various users, companies, agencies, and other entities that would benefit from access to the data and information

provided with the system 100 of the present invention. This, in turn, details usage for the system, and revenue streams tied to uses of the system 100 via paid subscription or event access. This list is not intended to be exhaustive and other entity access and relevant data usage are envisioned for the system 100.

Insurance Companies
Verify actual mileage driven (bill by mile)
Verify registration
Verify actual work performed via invoice from repair facility
Verify "Health" check performed – OBD-II Scan in/Scan out
Verify vehicle location history
Verify vehicle history for initial coverage acceptability

5

Federal Agencies - NTSB, CAFE, Law Enforcement, etc.
Verify recalls performed
Bona Fide statistical analysis of data - Parts or systems failure requiring a recall, etc.
Actual gas mileage performance
Hrs./routes driven (commercial)
Actual real-time location
Verification of vehicle I.D. - VIN#/Unit#

State Agencies - DMV, BAR, Law Enforcement/Judicial
Verify actual miles driven (bill by mile)
Verify smog certification
Verification of recalls performed
The ability to renew registration online via credit card/interface with vehicle
Verify current insurance
Verify actual repairs performed by copies of original invoices with all information
Locate and track through use of VIN# or Plate# to locate – e.g., Amber alerts, hot pursuits, hit and runs, stolen vehicles, etc.

OEMs - Principal vendors
Vehicle history
Warranty history searches
Warranty of work performed
Verification of work performed by certified entity
Research of sales and other demographics
Research for future recalls or complaints
Verification of current recalls being performed

Used Car (Vehicle) Sales and Purchases
Complete authentic history available to used vehicle dealer
Complete authentic history available to purchaser
History generally available with VIN# only, protecting all parties everywhere – pre-transaction

Commercial/Enterprise (Trucking, Construction, Fleet, etc.)
Driver logs – seamless tracking and verification of driver identity for on-road expenses, e.g., ability to sync user profile to vehicle module to pay, track, store expenses such as toll roads, fuel purchases, bridge crossings, etc.

The system 100 of the present invention can vend the vehicle data software to a myriad of entities and gather a regular stipend or subscription fee (e.g., monthly, quarterly, yearly, etc.) for this service. The system 100 can also vend the acquired and stored data to customers on a per-transaction basis. As such, a fee can be obtained from every person/entity reviewing a vehicle's current and historical data.

Certain embodiments of the system 100 can employ an immutable and secure decentralized network to provide reasonable, legal, and redacted information for public consumption about vehicle repair history, sale information, and other documentation types around automotive record keeping. One or more control points can be included with the system 100 and/or software 120. The control points can exploit or utilize flexible smart contracts (e.g., as used in blockchain technology). One or more ledger capabilities (e.g., also as used in blockchain) can be included as well. This system 100 construct provides the increased security, privacy, and access control features and methodologies disclosed herein. Other system configurations and techniques can be employed to promote increased security and automation without deviating from the spirit and scope of the present invention.

Such embodiments of the system 100 can (1) bring separate entities from varying sectors in transportation together in agreement about a record keeping paradigm, giving them a stake in and responsibility to the process, and (2) bring security up to a level that has gained a lot of attention for its immutability and security options around the creation and storing of data.

The central data repository is distributed and divided in a co-ownership scheme of the distributed nodes, and smart contract types of varying functions are created to process, store, present, and monetize transactions. This provides a next-generation platform shift to more highly scalable secure environments that cannot be hacked.

With this ecosystem of secure connectivity and backend cryptography reliability (such as blockchain), vehicle information will be generated and stored in an automated fashion such that it is happening transparent to the owner of the vehicle. Stored data has the owner information removed for public consumption, to ensure the

information of the present system 100 is about the history of the vehicle. Sensitive data collected with any PAI, PII, or like regulation concerns, will be properly secured and retained for legal proceedings should the need arise, to assist in any relative investigations, and will not be available to the general public.

Insurance companies, state and federal agencies, the NTSB, OEMs, and others will all benefit from the availability of accurate and automated data about a variety of vehicle record types. Insurance companies may have the most to gain, as the system technology will afford much greater visibility into risk factors that were not previously available to them.

This security-based embodiment of the present invention provides greater automation to data gathering routines to glean consistent information about key touch points in the ownership of a vehicle. Automotive industry OEMs and the repair industry are adopting new procedural standards that are employed directly into the system 100 to make implementation transparent, resistant to errors, and simple to implement. Industry partnerships with repair facility scanner manufacturers (e.g., Matco™, Snap-on™, etc.) and repair invoice software companies (e.g., CCC Information Services™, Mitchell™, etc.) with system 100 development will render integrated software solutions that employ automated updates to enable compliance with stricter data protection and privacy policies.

As detailed above, various devices or computing systems 102, 106, 112, 114 can be included and adapted to process and carry out the aspects, computations, storage events, and algorithmic processing of the system 100. Computing systems and devices of the present invention may include a processor, which may include one or more microprocessors and/or one or more circuits, such as an application specific integrated circuit (ASIC), field-programmable gate arrays (FPGAs), etc. Further, the

devices can include a network interface. The network interface is configured to enable communication with the network (such as the Internet), other devices and systems, and servers, using a wired and/or wireless connection.

The devices or computing systems may include memory, such as non-transitive memory, which may include one or more non-volatile storage devices and/or one or more volatile storage devices (*e.g.*, random access memory (RAM)). In instances where the devices include a microprocessor, computer readable program code may be stored in a computer readable medium or memory, such as, but not limited to storage media (*e.g.*, a hard disk or solid-state drive), memory devices (*e.g.*, random access memory, flash memory), etc. The computer program or software code can be stored on a tangible, or non-transitive, machine-readable medium or memory. In some embodiments, computer readable program code is configured such that when executed by a processor, the code causes the computing device to perform the steps described and depicted above and herein. In other embodiments, the device is configured to perform steps described herein without the need for code.

It will be recognized by one skilled in the art that these operations, algorithms, logic, method steps, routines, sub-routines, and modules may be implemented in software, in firmware, in special purpose digital logic, and any combination thereof without deviating from the spirit and scope of the present invention as recited within the claims attached hereto.

Certain computing devices disclosed herein may include an input device. The input device is configured to receive an input from either a user or a hardware or software component – as disclosed herein in connection with the various user interface or data inputs. Examples of an input device include a keyboard, mouse, microphone, touch screen and software enabling interaction with a touch screen, etc.

The devices can also include an output device. Examples of output devices include displays, televisions, mobile device screens, tablet screens, speakers, remote screens, etc. The output device can be configured to display images, media files, text, or video, or play audio to a user through speaker output.

The disclosed server systems 104 of the present invention can include one or more microprocessors, and/or one or more circuits, such as an application specific integrated circuit (ASIC), field-programmable gate arrays (FPGAs), etc. A network interface can be configured to enable communication with the network, using a wired and/or wireless connection, including communication with devices or computing devices disclosed herein. Memory can include one or more non-volatile storage devices and/or one or more volatile storage devices (*e.g.*, random access memory (RAM)). In instances where the server system includes a microprocessor, computer readable program code may be stored in a computer readable medium, such as, but not limited to storage media (*e.g.*, a hard disk or solid-state drive), memory devices, etc.

Aspects of the present invention can be embodied as software code residing on the servers 104 or other computing devices 102, 105, 112, 114 (*e.g.*, the vehicle module, a desktop, a tablet, a smartphone, a specialized technician device, etc.). The data of the present invention can be included on and transferred to and from a storage area network (SAN), a data cloud or database, or any computing device for storing the file or files being uploaded, downloaded, or processed.

Aspects of the software code of the invention can take the form of a plugin or app, and can interface with various protocols or software using APIs or other means of interacting with computing software and systems.

While various embodiments have been described above, it should be understood that they have been presented by way of example only, and not limitation. Thus, the breadth and scope of the present disclosure should not be limited by any of the above-described exemplary embodiments. Moreover, any combination of the above-described elements in all possible variations thereof is encompassed by the disclosure unless otherwise indicated herein or otherwise clearly contradicted by context.

While the methods, steps, and processing described above and illustrated in the drawings are shown as a sequence of steps, this was done solely for the sake of illustration. Accordingly, it is contemplated that some steps may be added, some steps may be omitted, the order of steps may be re-arranged, and some steps may be performed in parallel.

It will be readily apparent to those of ordinary skill in the art that many modifications and equivalent arrangements can be made thereof without departing from the spirit and scope of the present disclosure, such scope to be accorded the broadest interpretation of the appended claims so as to encompass all equivalent structures and products.

For purposes of interpreting the claims for the present invention, it is expressly intended that the provisions of 35 U.S.C. §112(f) are not to be invoked unless the specific terms "means for" or "step for" are recited in a claim.

CLAIMS:

1. A system of facilitating access to vehicle data, comprising:

a vehicle electronic control unit;

a cloud storage system adapted to store vehicle data;

at least one user device in operative communication with the cloud storage system via a secure user communication channel; and

a vehicle data computing module in operative communication with the vehicle electronic control unit and the cloud storage system, the vehicle data computing module in direct operative secure communication with the cloud storage system via a secure vehicle communication channel and configured to process the vehicle data and transfer the vehicle data directly to the cloud storage system, without computing devices intermediate the vehicle data computing module and the cloud storage system accessing the vehicle data, with the vehicle data computing module further providing restricted read-only access to the vehicle data at the vehicle data computing module.

2. The system of claim 1, wherein the at least one user device is at least one of the following: a vehicle repair shop computing device, an individual user computing device, a consumer computing device, a vendor computing device, a government agency computing device, an original equipment manufacturers (OEMs) computing device, or an insurance company computing device.

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3. The system of claim 1, further including a computing device in secure communication with the vehicle data computing module to facilitate the restricted read-only access to the vehicle data.

4. The system of claim 3, wherein the computing device is a vehicle technician computing device.

5. The system of claim 3, wherein the vehicle technician computing device includes a device selected from the group consisting of a tablet, a smartphone, a desktop computing device, and a handheld scanning device.

6. The system of claim 1, wherein the computing device is an individual user or consumer computing device.

7. The system of claim 1, wherein the vehicle data computing module provides secure and automated transfer of the vehicle data to the cloud storage system.

8. The system of claim 1, wherein the at least one user device includes a first user device and a second user device, with the first user device and the second user device adapted to retrieve and process the vehicle data from the cloud storage system.

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9. The system of claim 1, wherein the at least one user device includes a vehicle technician device.

10. The system of claim 9, wherein the vehicle technician device includes a device selected from the group consisting of a tablet, a smartphone, a desktop computing device, and a handheld scanning device.

11. The system of claim 1, wherein at least the cloud storage system includes a vehicle history database adapted to store the vehicle data.

12. The system of claim 11, wherein the vehicle data includes at least vehicle maintenance data.

13. The system of claim 11, wherein the vehicle data includes at least vehicle location data.

14. The system of claim 11, wherein the vehicle data includes at least vehicle accident or damage data.

15. The system of claim 11, wherein the vehicle data includes at least vehicle inspection data.

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16. The system of claim 1, wherein the vehicle data computing module includes a secure vehicle history database adapted to store the vehicle data.

17. A system of facilitating access to vehicle data, comprising:

a cloud storage system adapted to store and facilitate access to vehicle data, the cloud storage system including a vehicle history database;

a first user device in operative secure communication with the cloud storage system;

a second user device in operative secure communication with the cloud storage system; and

a vehicle data computing module in operative communication with a vehicle electronic control unit and the cloud storage system, the vehicle data computing module in direct operative secure communication with the cloud storage system via a secure vehicle communication channel and configured to process the vehicle data and securely limit transfer of the vehicle data directly to the cloud storage system for storage at the vehicle history database, without computing devices intermediate the vehicle data computing module and the cloud storage system accessing the vehicle data, with the vehicle data computing module further providing restricted read-only access to the vehicle data at the vehicle data computing module.

18. The system of claim 17, wherein at least the first user device is selected from the group consisting of a vendor computing device, an insurance company

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computing device, a consumer computing device, a vehicle repair shop computing device, an original equipment manufacturers (OEMs) computing device, and a government agency computing device.

19. The system of claim 17, further including a computing device in secure communication with the vehicle data computing module to facilitate the restricted read-only access to the vehicle.

20. The system of claim 19, wherein the computing device is a vehicle technician device selected from the group consisting of a tablet, a smartphone, a desktop computing device, and a handheld scanning device.

21. The system of claim 17, wherein the vehicle data is data selected from a group consisting of: vehicle location data, vehicle damage or accident data, vehicle inspection data, vehicle repair data, and vehicle maintenance data.

22. The system of claim 17, wherein the vehicle data computing module includes a secure vehicle history database adapted to store the vehicle data.

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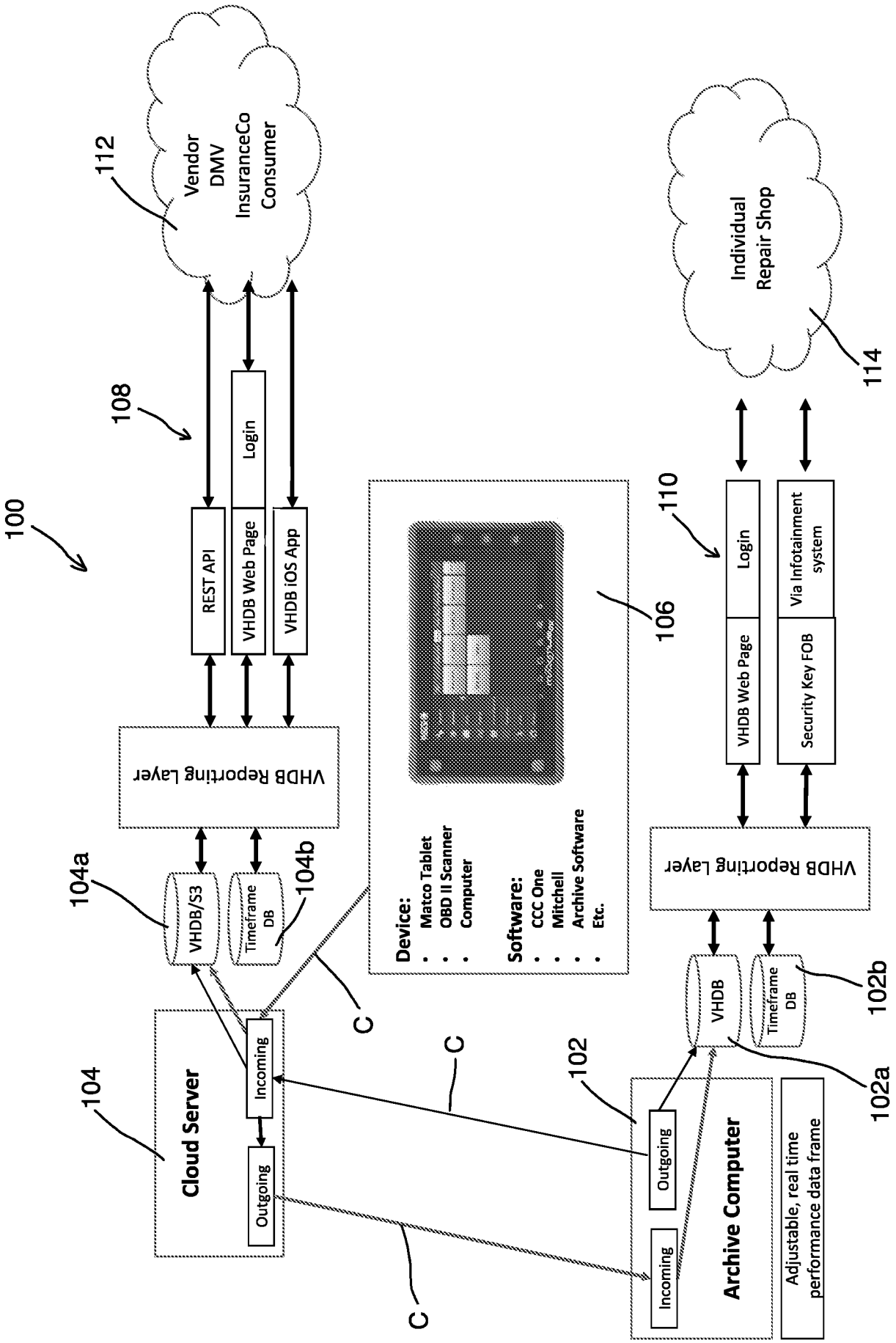

100
112
Vendor
DMV
InsuranceCo
Consumer
108
REST API
VHDB Web Page
Login
VHDB iOS App
VHDB Reporting Layer
104a
VHDB/S3
Timeframe DB
104b
104
Cloud Server
Incoming
Outgoing
C
C
C
Device:
Matco Tablet
OBD II Scanner
Computer
Software:
CCC One
Mitchell
Archive Software
Etc.
106
110
Login
VHDB Web Page
Via Infotainment system
Security Key FOB
VHDB Reporting Layer
Individual
Repair Shop
114
102
Outgoing
Incoming
Archive Computer
VHDB
Timeframe DB
102a
102b
Adjustable, real time performance data frame

Fig. 1

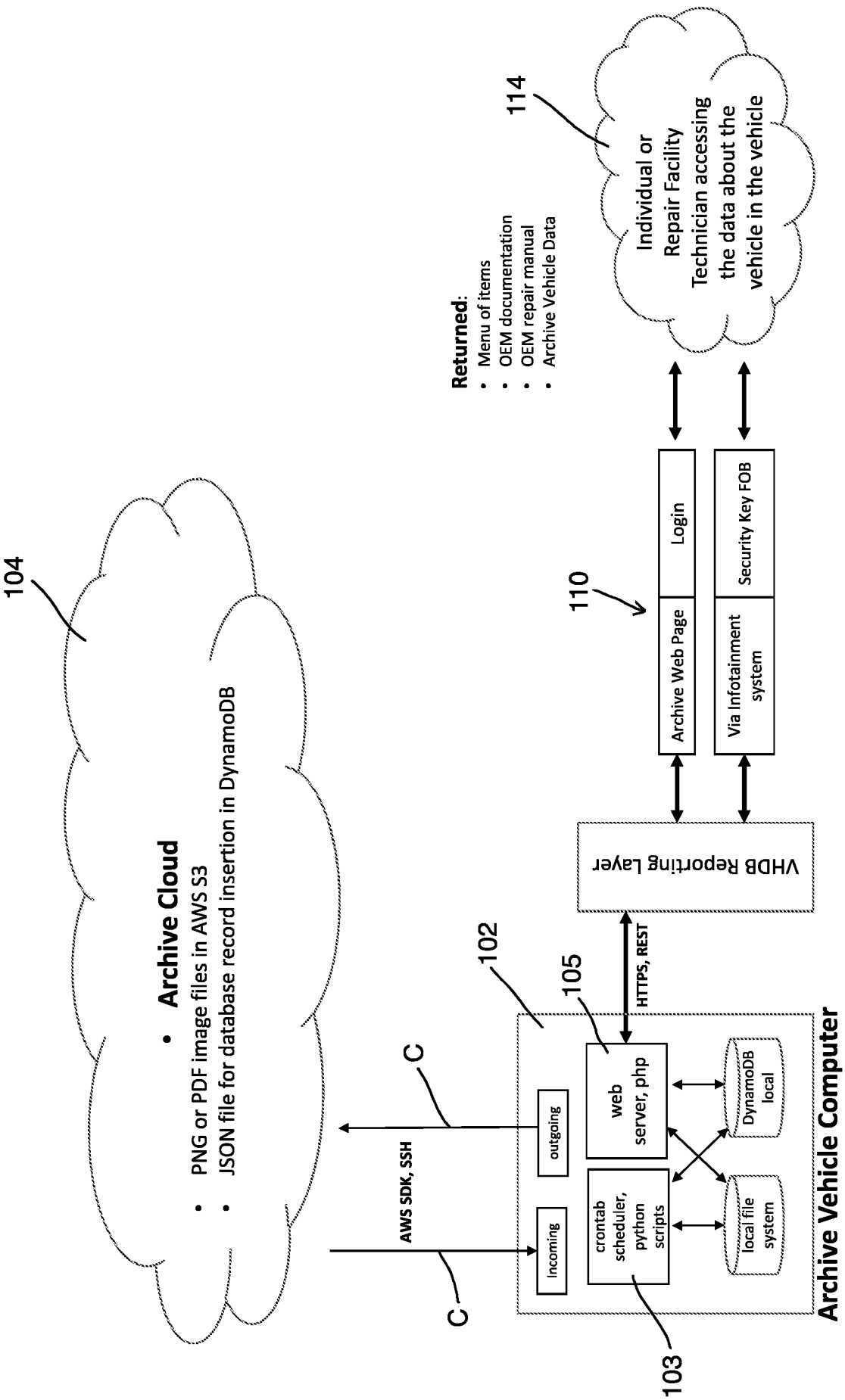

104
Archive Cloud
PNG or PDF image files in AWS S3
JSON file for database record insertion in DynamoDB
AWS SDK, SSH
C
C
102
105
Archive Vehicle Computer
Incoming
outgoing
crontab scheduler, python scripts
web server, php
DynamoDB local
local file system
HTTPS, REST
103
VHDB Reporting Layer
110
Archive Web Page
Login
Via Infotainment system
Security Key FOB
Returned:
Menu of items
OEM documentation
OEM repair manual
Archive Vehicle Data
114
Individual or Repair Facility Technician accessing the data about the vehicle in the vehicle

Fig. 2

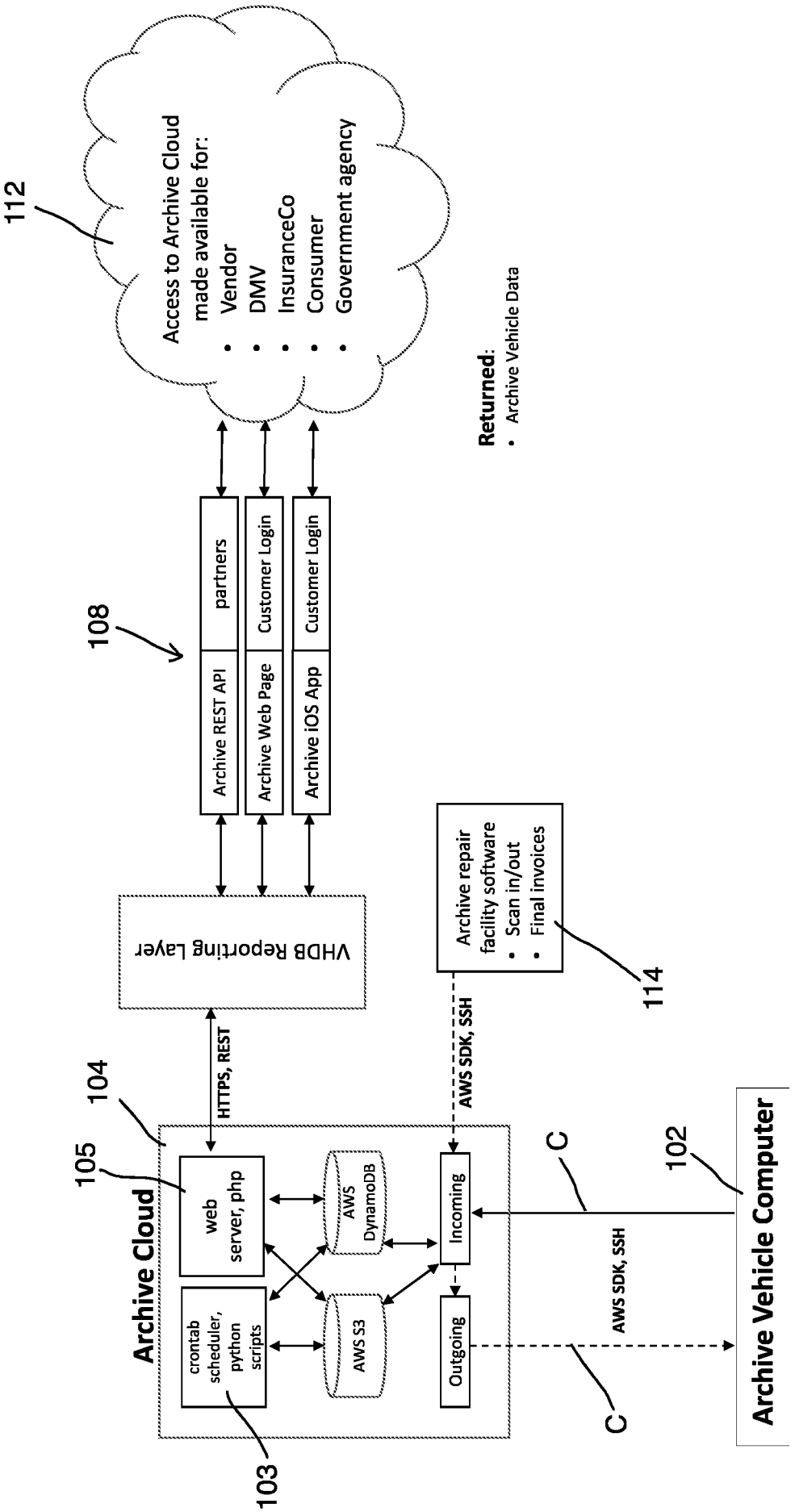

112
Access to Archive Cloud made available for:
• Vendor
• DMV
• InsuranceCo
• Consumer
• Government agency
Returned:
• Archive Vehicle Data
108
Archive REST API
partners
Archive Web Page
Customer Login
Archive iOS App
Customer Login
VHDB Reporting Layer
HTTPS, REST
AWS SDK, SSH
Archive repair facility software
• Scan in/out
• Final invoices
114
104
105
Archive Cloud
web server, php
crontab scheduler, python scripts
AWS DynamoDB
AWS S3
Incoming
Outgoing
C
C
AWS SDK, SSH
102
Archive Vehicle Computer
103

Fig. 3

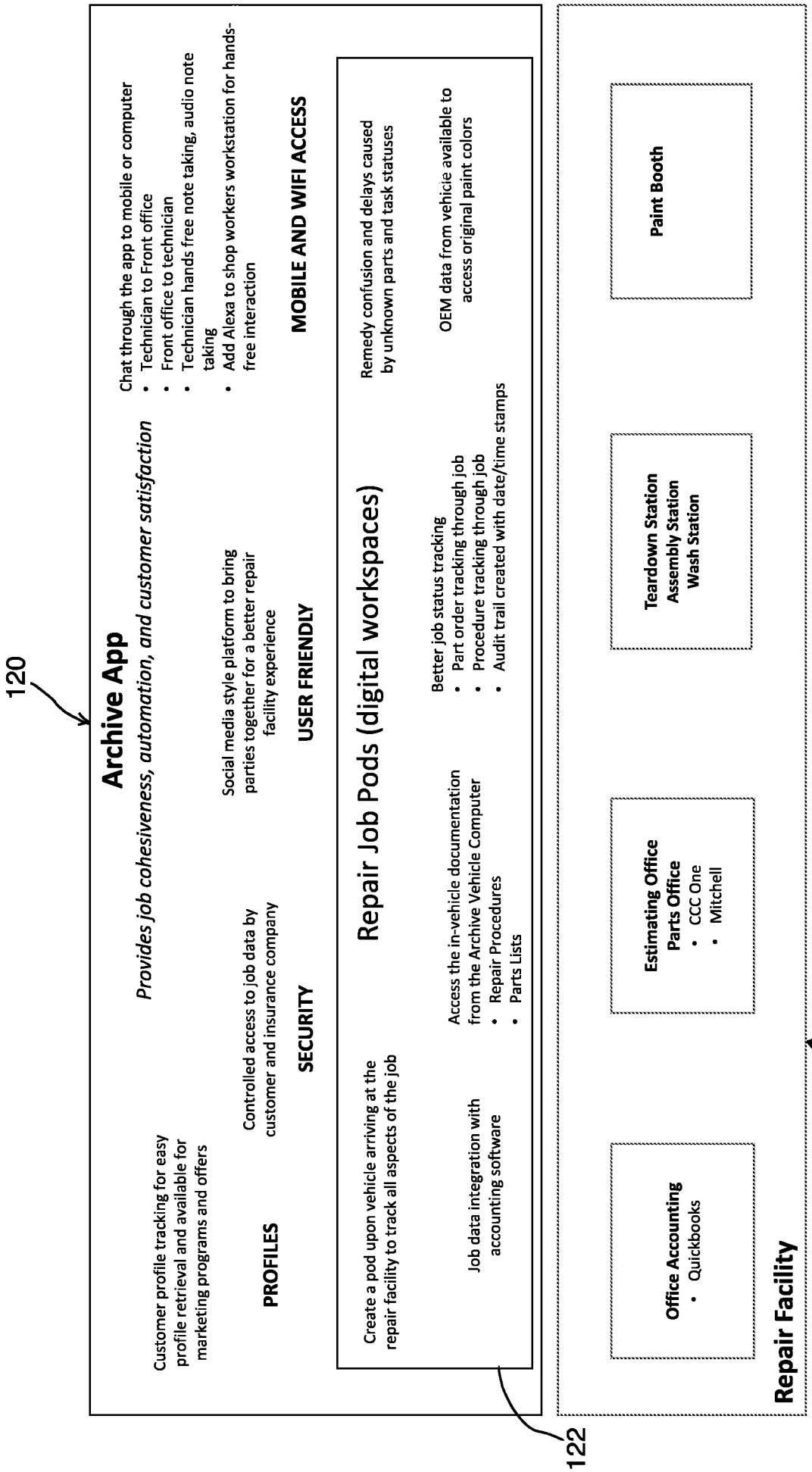

120
Archive App
Provides job cohesiveness, automation, and customer satisfaction
Customer profile tracking for easy profile retrieval and available for marketing programs and offers
PROFILES
Controlled access to job data by customer and insurance company
SECURITY
Social media style platform to bring parties together for a better repair facility experience
USER FRIENDLY
Chat through the app to mobile or computer
• Technician to Front office
• Front office to technician
• Technician hands free note taking, audio note taking
• Add Alexa to shop workers workstation for hands-free interaction
MOBILE AND WIFI ACCESS
Repair Job Pods (digital workspaces)
Create a pod upon vehicle arriving at the repair facility to track all aspects of the job
Job data integration with accounting software
Access the in-vehicle documentation from the Archive Vehicle Computer
• Repair Procedures
• Parts Lists
Better job status tracking
• Part order tracking through job
• Procedure tracking through job
• Audit trail created with date/time stamps
Remedy confusion and delays caused by unknown parts and task statuses
OEM data from vehicle available to access original paint colors
122
Repair Facility
Office Accounting
• Quickbooks
Estimating Office
Parts Office
• CCC One
• Mitchell
Teardown Station
Assembly Station
Wash Station
Paint Booth
F

Fig. 4

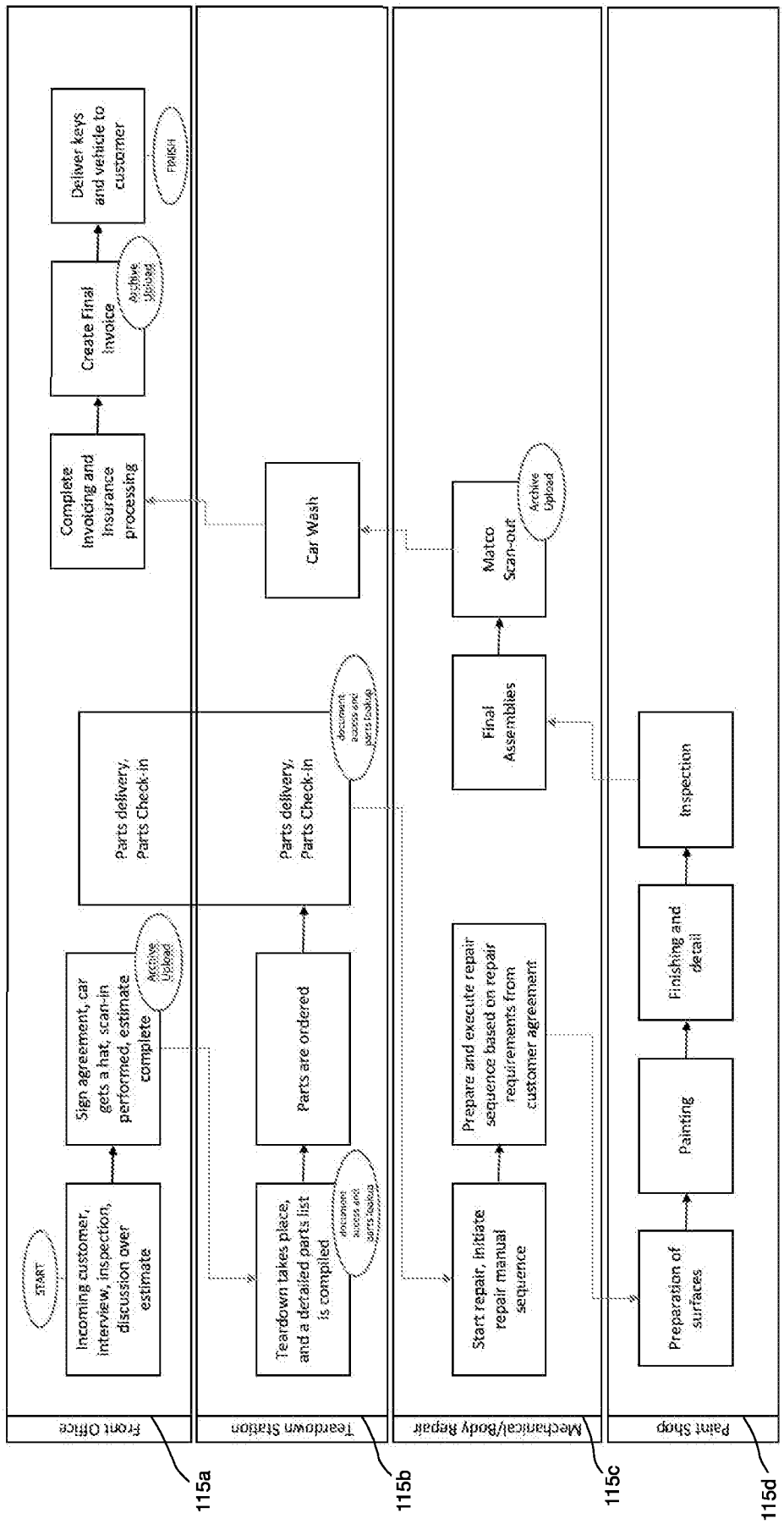

Front Office
Teardown Station
Mechanical/Body Repair
Paint Shop
115a
115b
115c
115d
START
Incoming customer, interview, inspection, discussion over estimate
Sign agreement, car gets a hat, scan-in performed, estimate complete
Archive Upload
Parts delivery, Parts Check-in
Teardown takes place, and a detailed parts list is compiled
Parts are ordered
Parts delivery, Parts Check-in
Start repair, initiate repair manual sequence
Prepare and execute repair sequence based on repair requirements from customer agreement
Final Assemblies
Matco Scan-out
Archive Upload
Car Wash
Complete invoicing and insurance processing
Create Final Invoice
Archive Upload
Deliver keys and vehicle to customer
FINISH
Preparation of surfaces
Painting
Finishing and detail
Inspection

Fig. 5

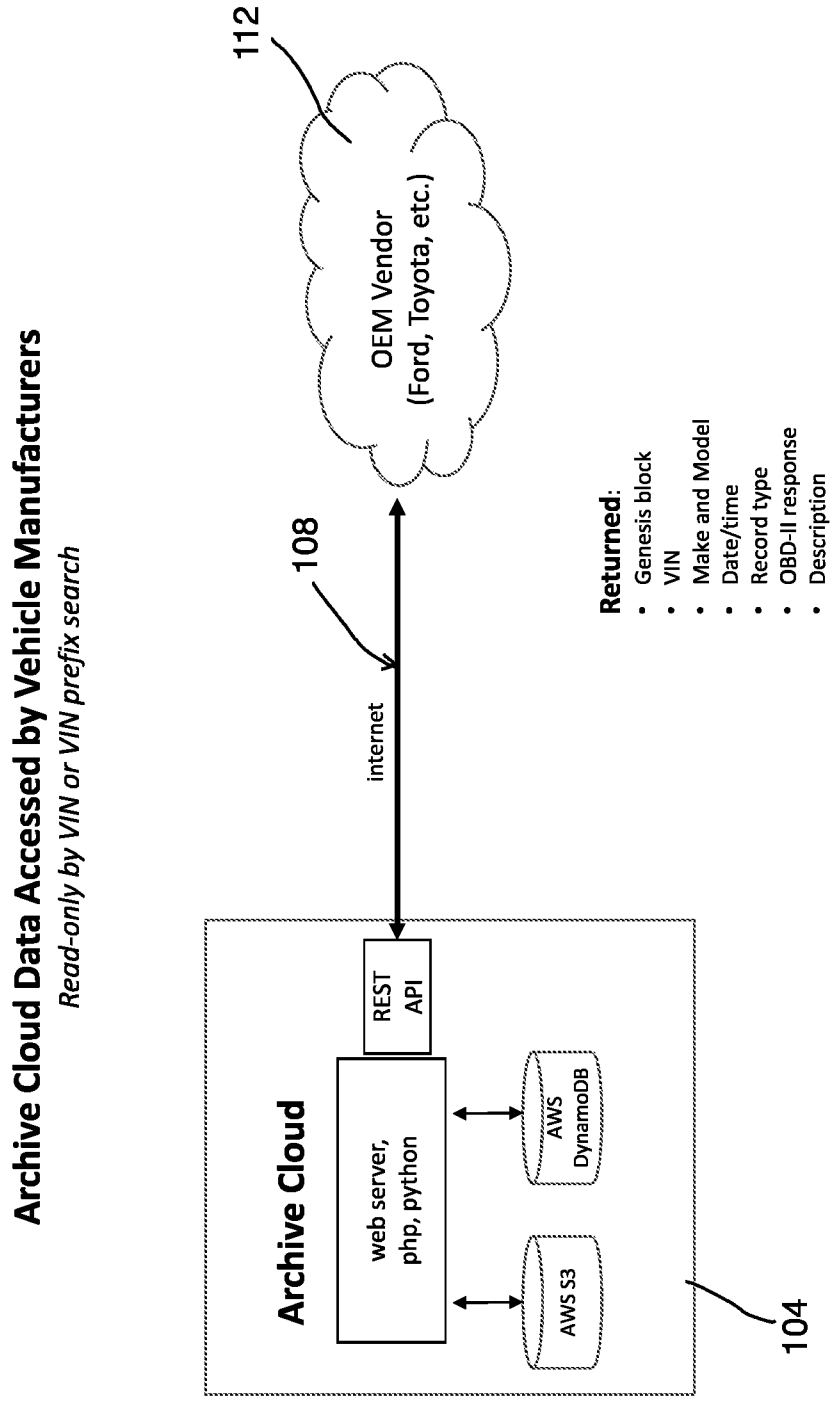

Archive Cloud Data Accessed by Vehicle Manufacturers
Read-only by VIN or VIN prefix search
112
OEM Vendor
(Ford, Toyota, etc.)
108
internet
Returned:
Genesis block
VIN
Make and Model
Date/time
Record type
OBD-II response
Description
Archive Cloud
REST API
web server, php, python
AWS DynamoDB
AWS S3
104

Fig. 6

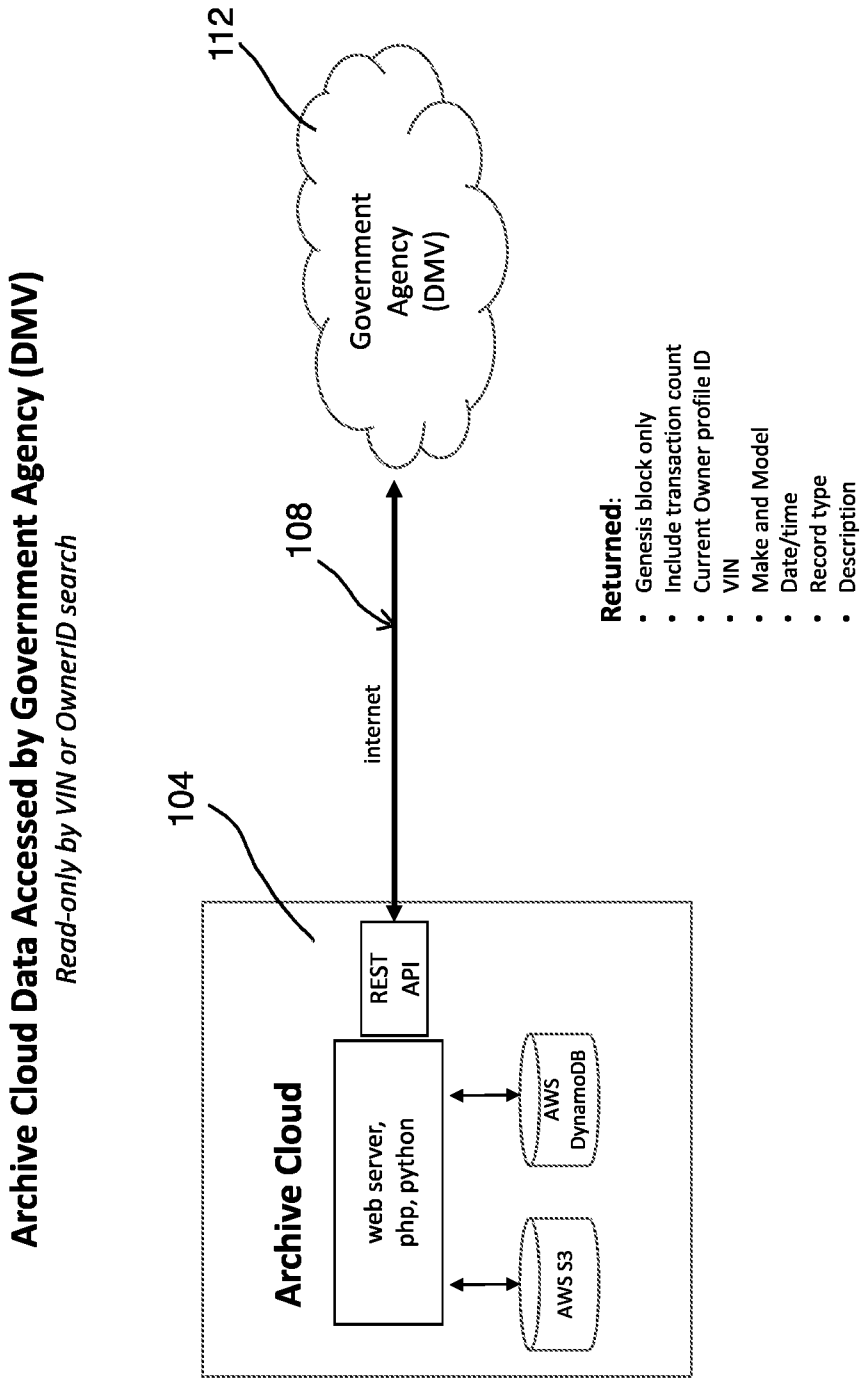

Archive Cloud Data Accessed by Government Agency (DMV)
Read-only by VIN or OwnerID search
112
Government Agency (DMV)
108
internet
104
Archive Cloud
REST API
web server, php, python
AWS DynamoDB
AWS S3
Returned:
Genesis block only
Include transaction count
Current Owner profile ID
VIN
Make and Model
Date/time
Record type
Description

Fig. 7

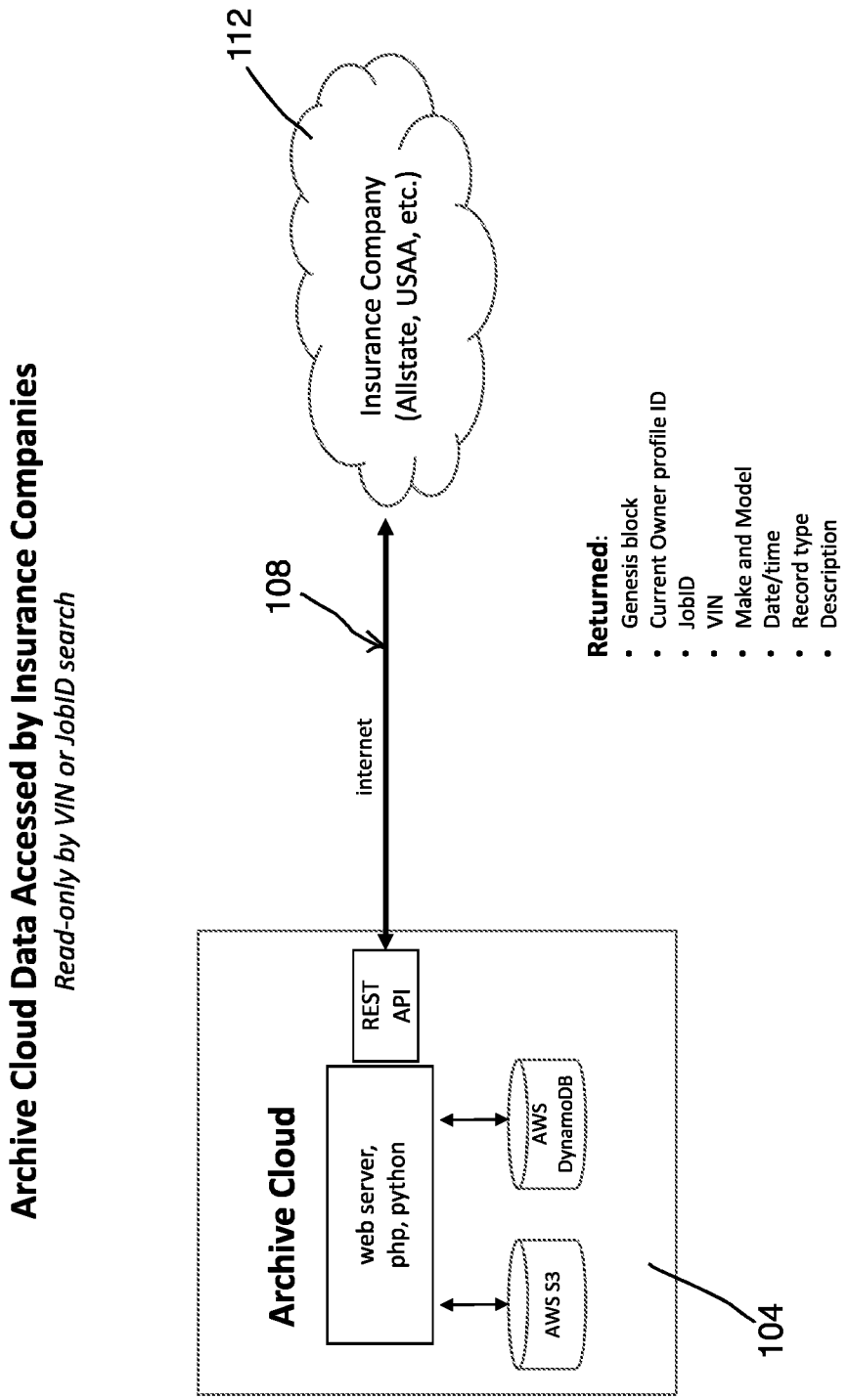

Archive Cloud Data Accessed by Insurance Companies
Read-only by VIN or JobID search
112
Insurance Company
(Allstate, USAA, etc.)
108
internet
Returned:
Genesis block
Current Owner profile ID
JobID
VIN
Make and Model
Date/time
Record type
Description
Archive Cloud
REST API
web server,
php, python
AWS DynamoDB
AWS S3
104

Fig. 8

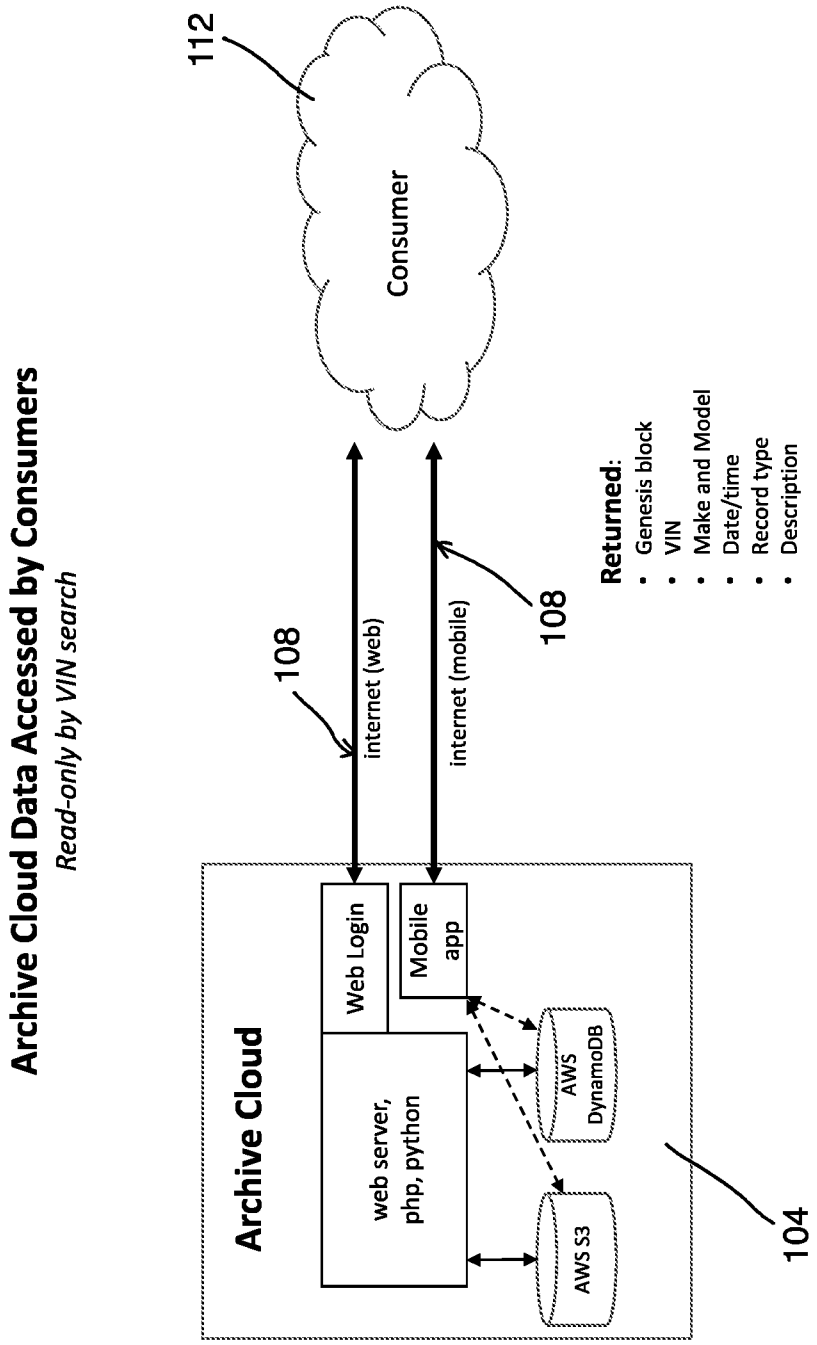

Archive Cloud Data Accessed by Consumers
Read-only by VIN search
112
Consumer
108
internet (web)
internet (mobile)
108
Returned:
Genesis block
VIN
Make and Model
Date/time
Record type
Description
Archive Cloud
Web Login
Mobile app
web server, php, python
AWS DynamoDB
AWS S3
104

Fig. 9

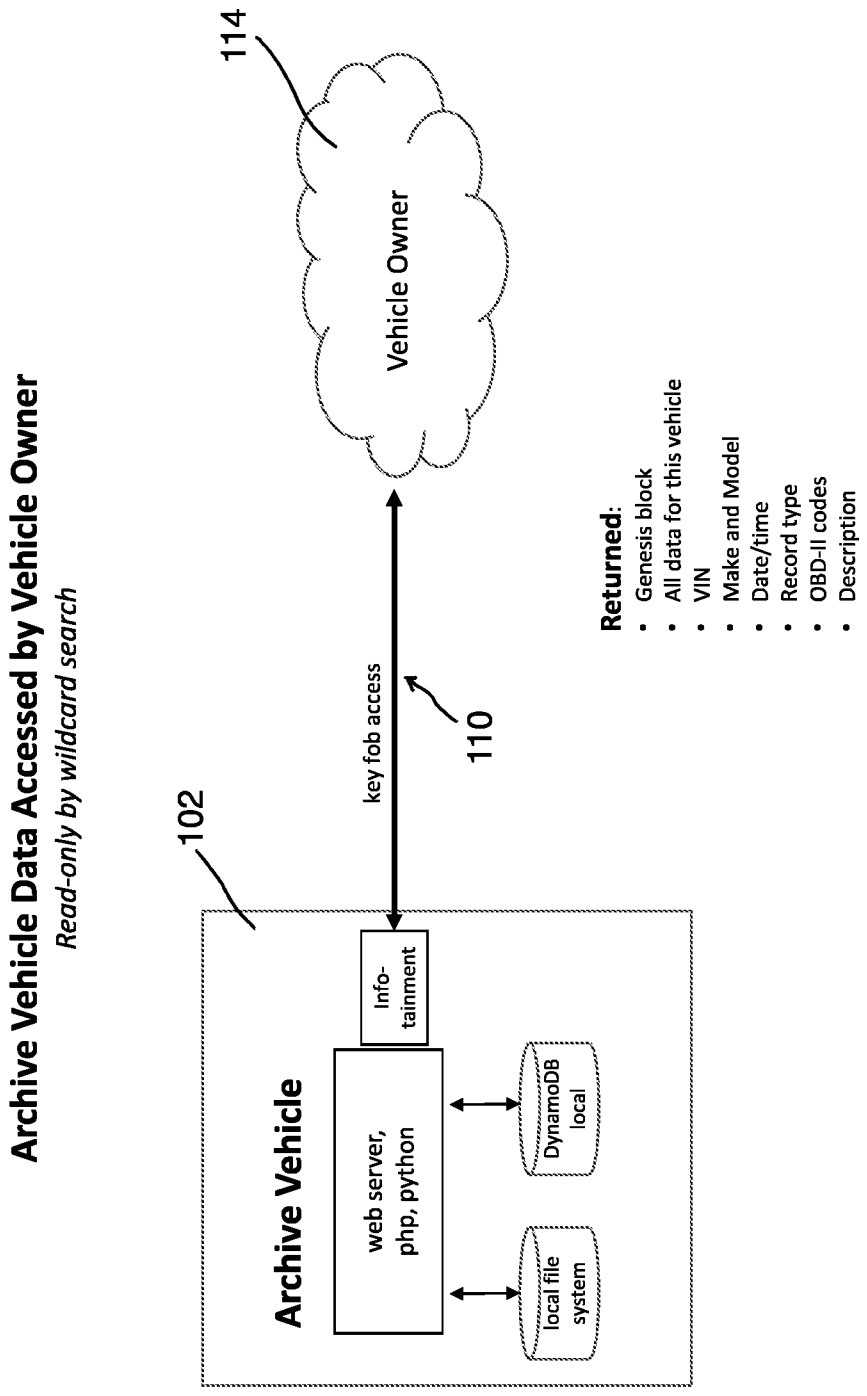

Archive Vehicle Data Accessed by Vehicle Owner
Read-only by wildcard search
114
Vehicle Owner
key fob access
110
102
Archive Vehicle
Info-tainment
web server, php, python
DynamoDB local
local file system
Returned:
Genesis block
All data for this vehicle
VIN
Make and Model
Date/time
Record type
OBD-II codes
Description

Fig. 10

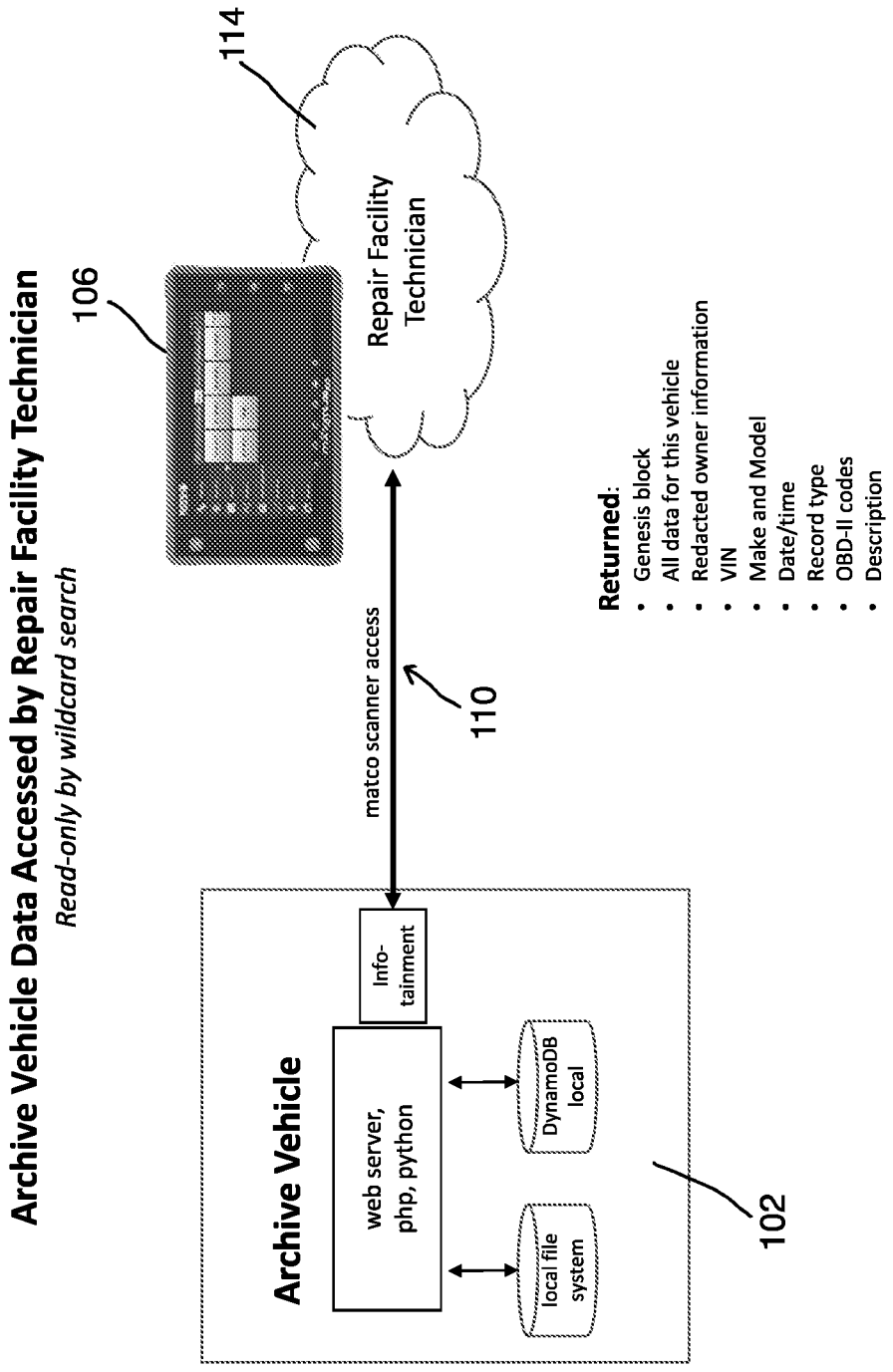
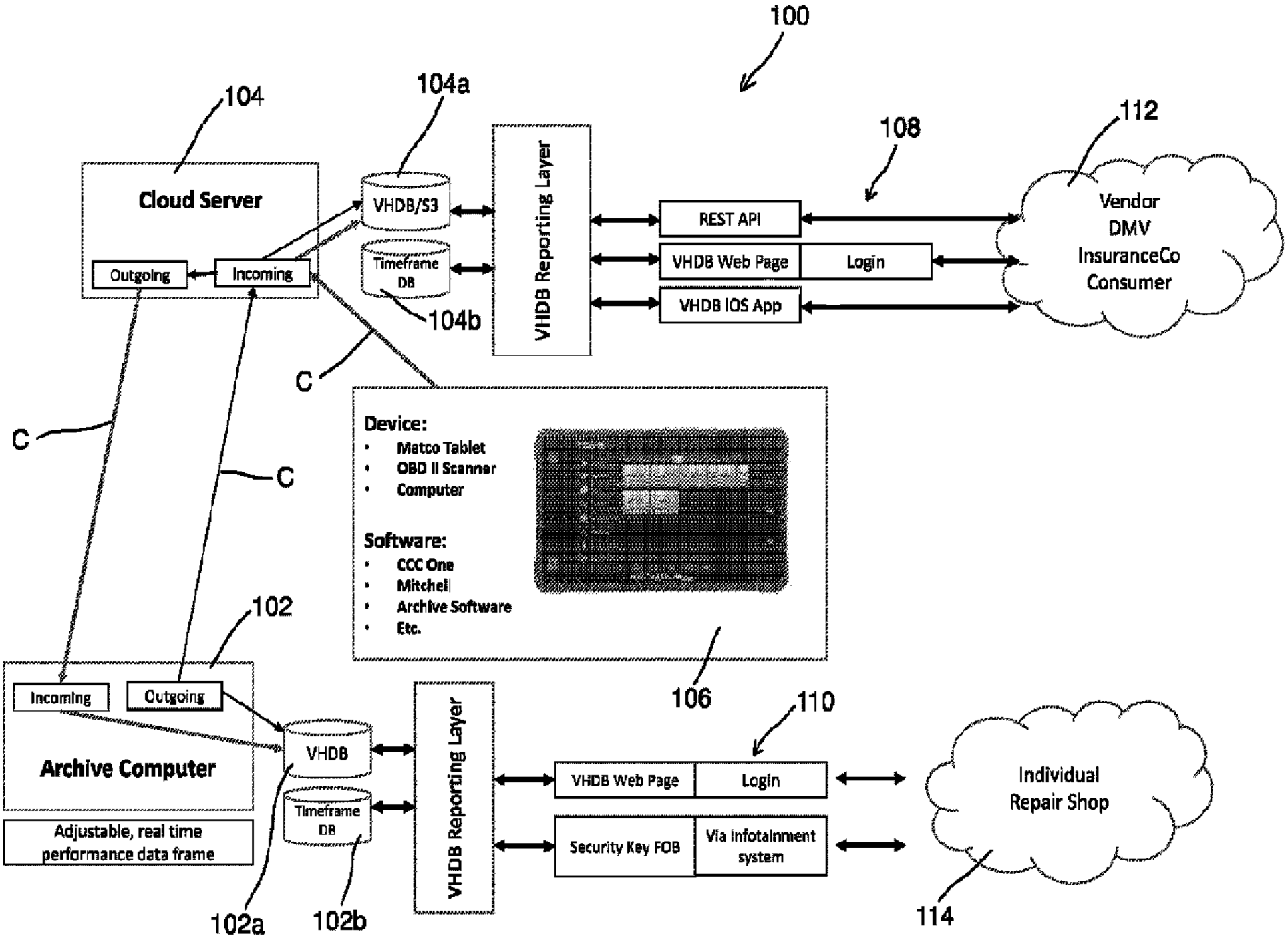

Archive Vehicle Data Accessed by Repair Facility Technician
Read-only by wildcard search
106
114
Repair Facility Technician
matco scanner access
110
Returned:
Genesis block
All data for this vehicle
Redacted owner information
VIN
Make and Model
Date/time
Record type
OBD-II codes
Description
Archive Vehicle
Info-tainment
web server, php, python
DynamoDB local
local file system
102

Fig. 11


100
104
104a
Cloud Server
VHDB/S3
Timeframe DB
104b
Outgoing
Incoming
VHDB Reporting Layer
108
112
REST API
VHDB Web Page
Login
VHDB IOS App
Vendor
DMV
InsuranceCo
Consumer
C
C
C
Device:
Matco Tablet
OBD II Scanner
Computer
Software:
CCC One
Mitchell
Archive Software
Etc.
106
102
Incoming
Outgoing
Archive Computer
VHDB
Timeframe DB
Adjustable, real time performance data frame
VHDB Reporting Layer
110
VHDB Web Page
Login
Security Key FOB
Via Infotainment system
Individual
Repair Shop
102a
102b
114