US 20240154946A1

(19) **United States**

(12) **Patent Application Publication**

Tucker et al.

(10) **Pub. No.: US 2024/0154946 A1**

(43) **Pub. Date: May 9, 2024**

(54) **METHODS AND SYSTEMS FOR PERFORMING DOMAIN-WIDE AUTHENTICATION AND AUTHORIZATION**

(71) Applicant: **Box, Inc.**, Redwood City, CA (US)

(72) Inventors: **Christopher Tucker**, South San Francisco, CA (US); **Fernando Cerenza**, San Francisco, CA (US); **Kimberly Kung**, San Bruno, CA (US); **Prachi Jadhav**, Emerald Hills, CA (US)

(21) Appl. No.: **18/171,948**

(22) Filed: **Feb. 21, 2023**

Related U.S. Application Data

(60) Provisional application No. 63/423,331, filed on Nov. 7, 2022.

Publication Classification

(51) **Int. Cl.**

H04L 9/40 (2006.01)

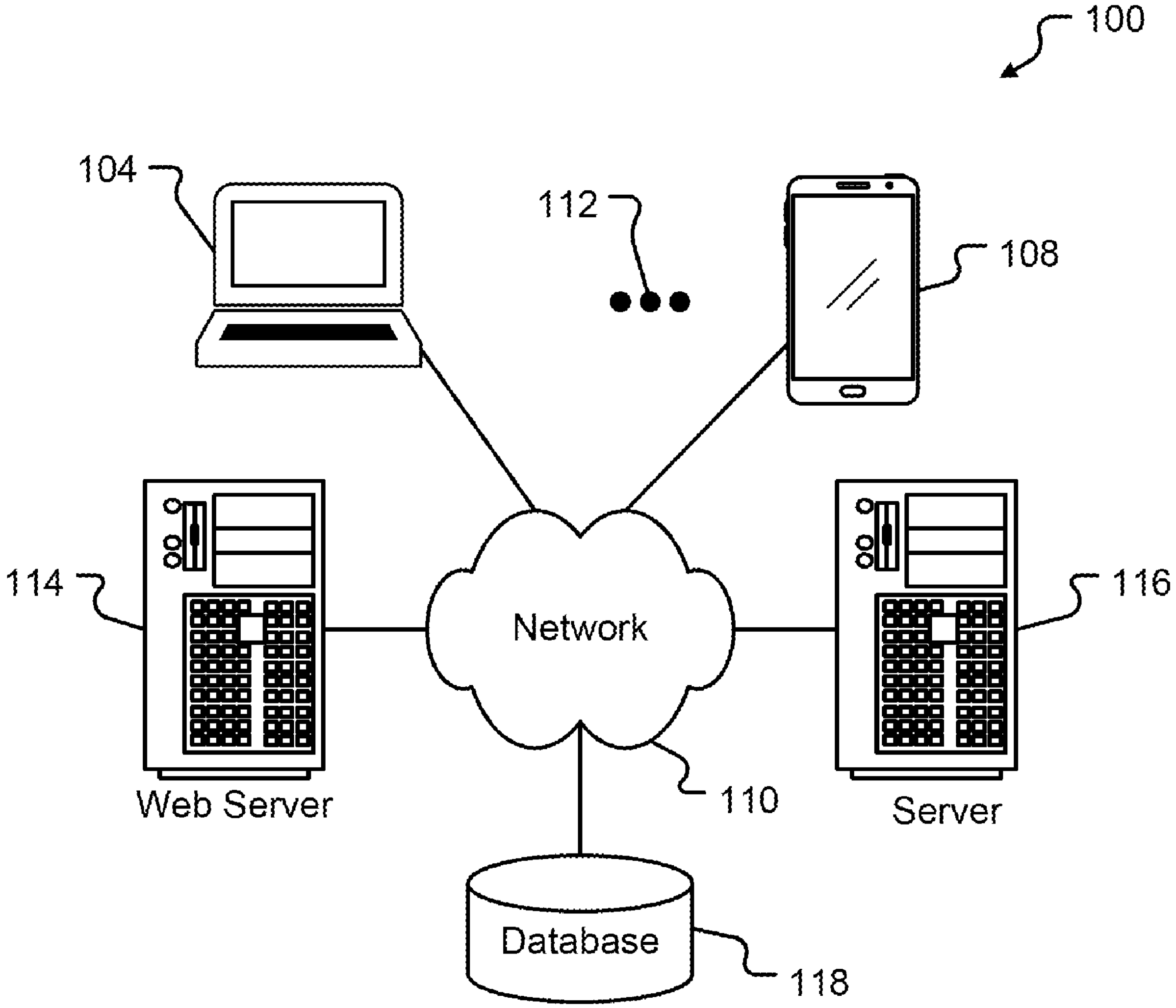
H04L 67/53 (2006.01)

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

CPC *H04L 63/0807* (2013.01); *H04L 67/53* (2022.05)

(57) **ABSTRACT**

According to one embodiment, a method for performing domain-wide authentication and authorization in a cloud-based environment can comprise receiving, from a third-party service of the cloud-based environment, a request to perform authentication and authorization of a user of the third-party service for accessing a cloud-based storage system of the cloud-based environment. A mapping of the user of the third-party service to a user account of the cloud-based storage system can be generated and one or more tokens for the user of the third-party service can in turn be generated based on the mapping of the user of the third-party service to the user account of the cloud-based storage system. The one or more tokens can provide access to services of the cloud-based storage system. The one or more tokens can be provided to the third-party service.



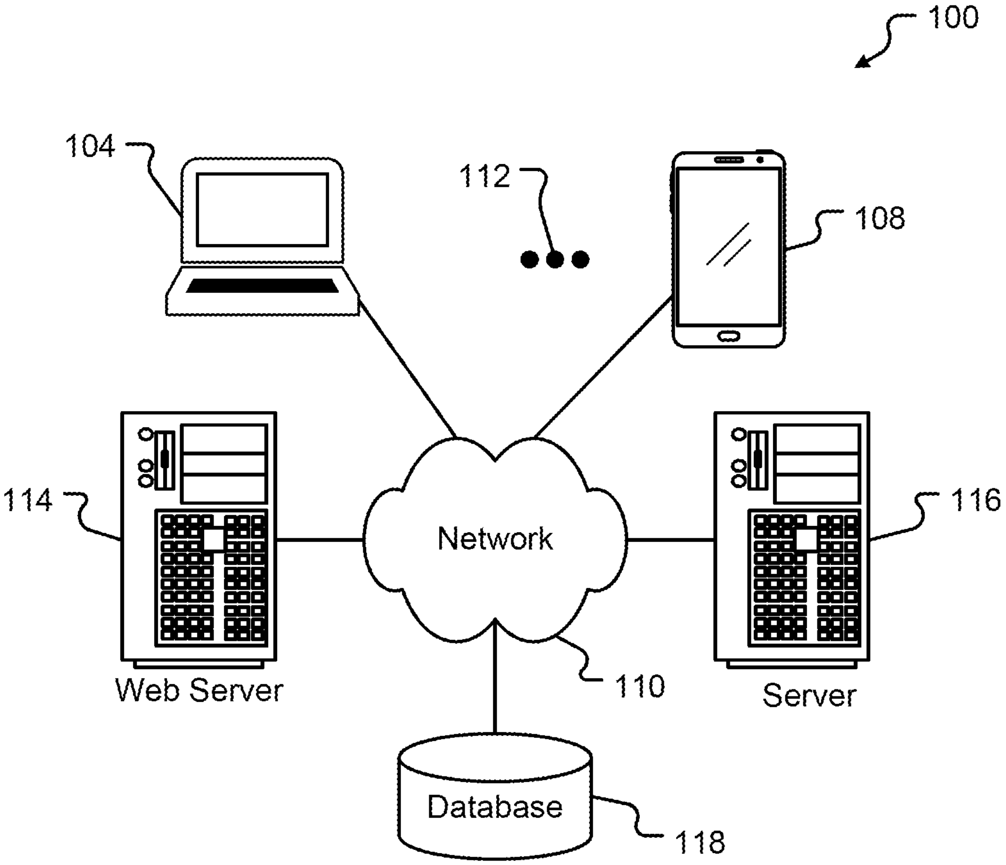

100
104
112
108
114
Network
116
Web Server
110
Server
Database
118

FIG. 1

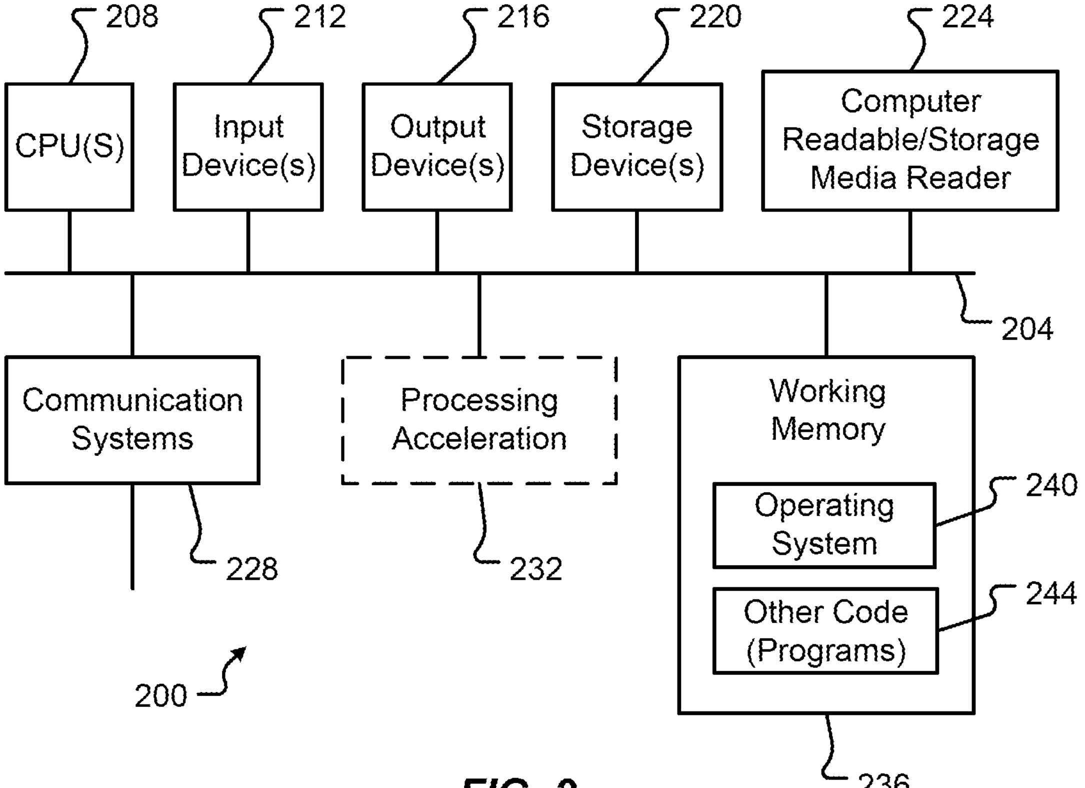

208
212
216
220
224
CPU(S)
Input Device(s)
Output Device(s)
Storage Device(s)
Computer Readable/Storage Media Reader
204
Communication Systems
Processing Acceleration
Working Memory
Operating System
Other Code (Programs)
240
244
228
232
200
236

FIG. 2

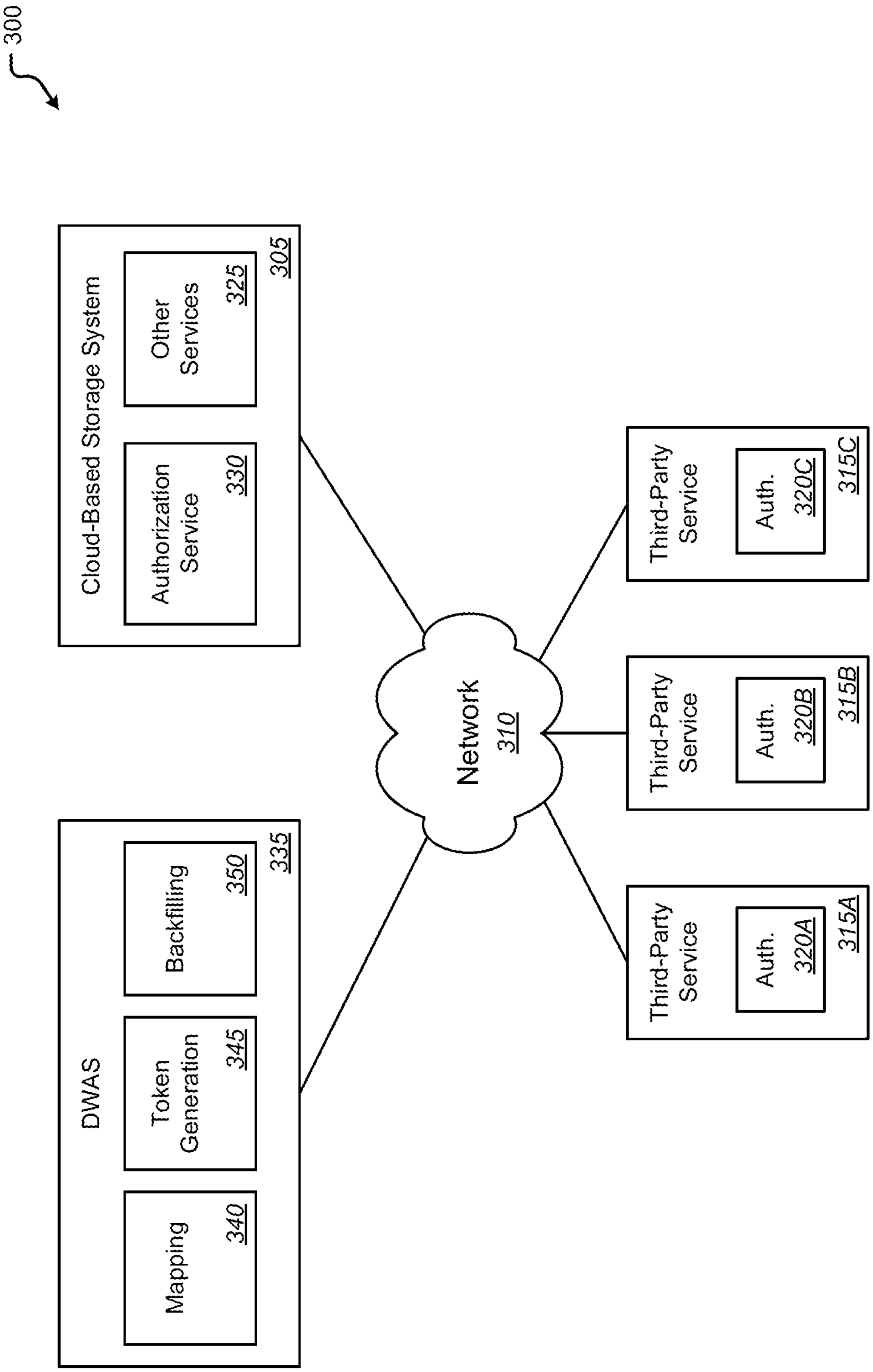

300
Cloud-Based Storage System
305
Authorization Service
330
Other Services
325
Network
310
DWAS
335
Mapping
340
Token Generation
345
Backfilling
350
Third-Party Service
315A
Auth.
320A
Third-Party Service
315B
Auth.
320B
Third-Party Service
315C
Auth.
320C

FIG. 3

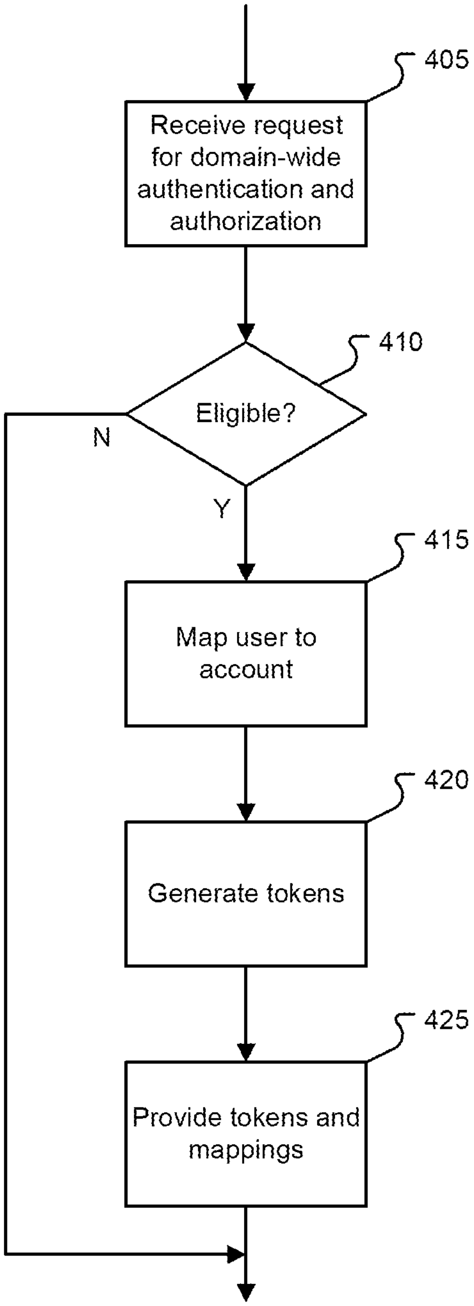

405
Receive request for domain-wide authentication and authorization
410
Eligible?
N
Y
415
Map user to account
420
Generate tokens
425
Provide tokens and mappings

Fig. 4

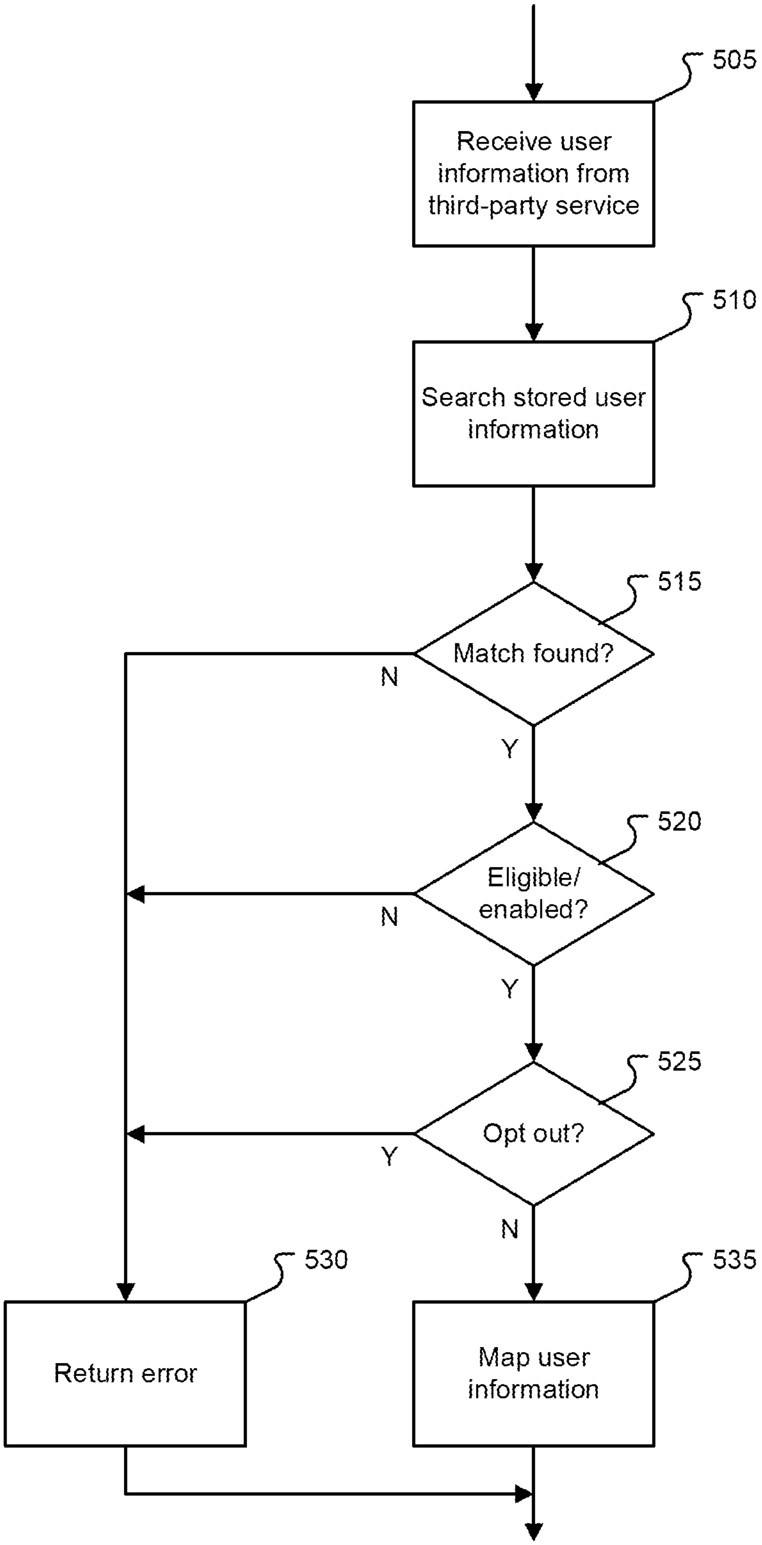

505
Receive user information from third-party service
510
Search stored user information
515
Match found?
N
Y
520
Eligible/ enabled?
N
Y
525
Opt out?
Y
N
530
Return error
535
Map user information

FIG. 5

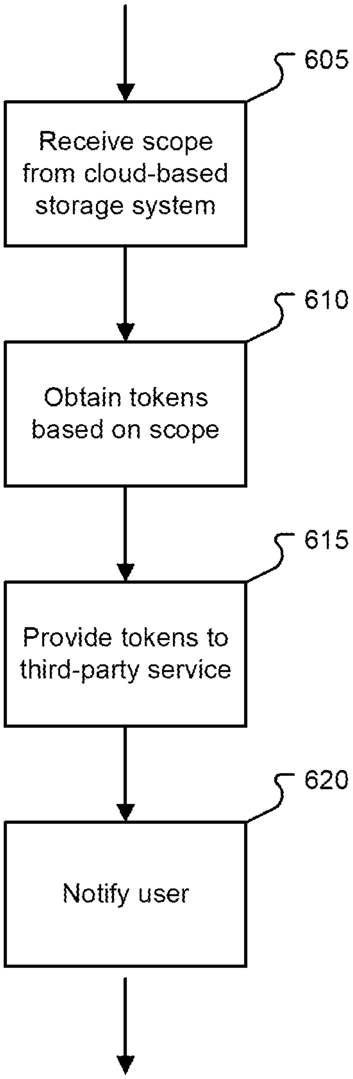

605
Receive scope from cloud-based storage system
610
Obtain tokens based on scope
615
Provide tokens to third-party service
620
Notify user

FIG. 6

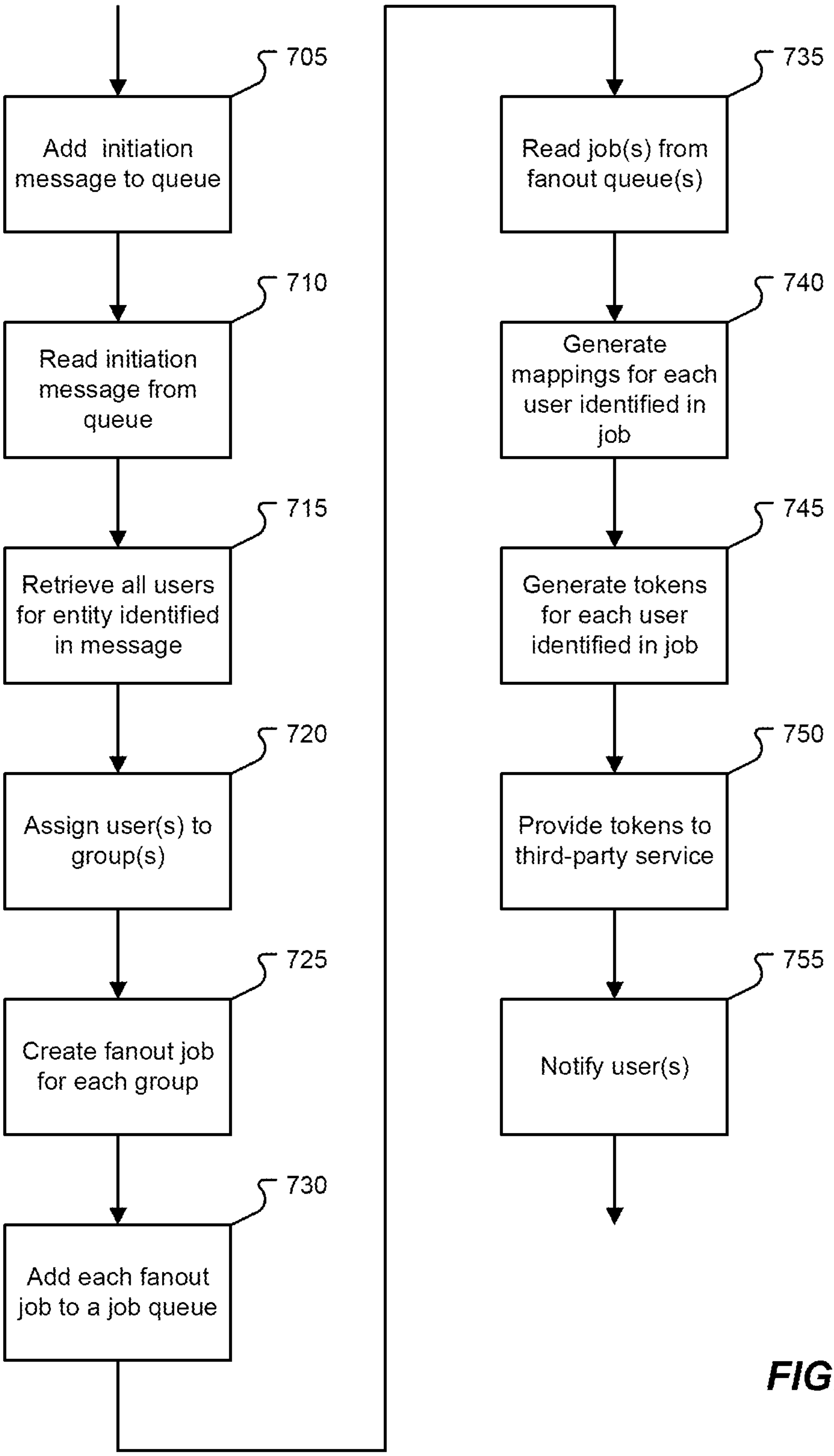

705
Add initiation message to queue
710
Read initiation message from queue
715
Retrieve all users for entity identified in message
720
Assign user(s) to group(s)
725
Create fanout job for each group
730
Add each fanout job to a job queue
735
Read job(s) from fanout queue(s)
740
Generate mappings for each user identified in job
745
Generate tokens for each user identified in job
750
Provide tokens to third-party service
755
Notify user(s)

FIG. 7

METHODS AND SYSTEMS FOR PERFORMING DOMAIN-WIDE AUTHENTICATION AND AUTHORIZATION

CROSS REFERENCE TO RELATED APPLICATION

[0001] The present application claims the benefits of and priority, under 35 U.S.C. § 119(e), to U.S. Provisional Application No. 63/423,331 filed Nov. 7, 2022 by Tucker et al. and entitled "Methods and Systems for Performing Domain-Wide Authentication and Authorization" of which the entire disclosure is incorporated herein by reference for all purposes.

FIELD OF THE DISCLOSURE

[0002] Embodiments of the present disclosure relate generally to methods and systems for access controls in a cloud-based environment and more particularly to authenticating and authorizing users across a domain in a cloud-based environment.

BACKGROUND

[0003] A cloud-based storage system can provide access to remote storage as well as a number of services related to that storage including, but not limited to cloud-based backup of data, file sharing, a collaboration environment, etc. In some cases, additional, third-party services can operate in conjunction with the services provided by the cloud-based storage system to augment those services. For example, a third-party communications service may be used in a collaboration environment provided by the cloud-based storage system. In such cases, users of the third-party service log into that service but cannot access the services of the cloud-based storage system until they are also authenticated and authorized by that system. To do so, the users must then perform second login process for the cloud-based storage system. This additional, seemingly redundant step can be frustrating for users. Additionally, when a group of new users are added to the services provided by the cloud-based storage system, onboarding each of those users individually can be time consuming for administrators of the cloud-based storage system. Hence there is a need in the art for improved systems and methods for authenticating and authorizing users across a domain in a cloud-based environment

BRIEF SUMMARY

[0004] Embodiments of the disclosure provide systems and methods for authenticating and authorizing users across a domain in a cloud-based environment. According to one embodiment, a method for performing domain-wide authentication and authorization in a cloud-based environment can comprise receiving, from a third-party service of the cloud-based environment, a request to perform authentication and authorization of a user of the third-party service for accessing a cloud-based storage system of the cloud-based environment. A mapping of the user of the third-party service to a user account of the cloud-based storage system can be generated and one or more tokens for the user of the third-party service can in turn be generated based on the mapping of the user of the third-party service to the user account of the cloud-based storage system. The one or more tokens can provide access to services of the cloud-based storage system. The one or more tokens can be provided to the third-party service. In some cases, prior to generating the mapping of the user of the third-party service to the user account of the cloud-based storage system, a determination can be made as to whether the user of the third-party service is eligible for domain-wide authentication and authorization. In such cases, generating the mapping of the user of the third-party service to the user account of the cloud-based storage system, generating the one or more tokens for the user of the third-party service, and providing the one or more tokens to the third-party service can be performed in response to determining the user of the third-party service is eligible for domain-wide authentication and authorization.

[0005] Generating the mapping of the user of the third-party service to the user account of the cloud-based storage system can comprise receiving, from the third-party service, user information for the user of the third-party service, searching a set of user information of the cloud-based storage system based on the received user information for the user of the third-party service, and determining whether the user information for the user of the third-party service matches any user information in the set of user information of the cloud-based storage system. Mapping of the user of the third-party service to the user account of the cloud-based storage system can be performed in response to determining the user information for the user of the third-party service matches user information in the set of user information of the cloud-based storage system. In some cases, generating the mapping of the user of the third-party service to the user account of the cloud-based storage system can further comprise determining whether the user of the third-party service is eligible for domain-wide authentication and authorization. In such cases, mapping of the user of the third-party service to the user account of the cloud-based storage system can be performed in response to determining the user of the third-party service is eligible for domain-wide authentication and authorization. Additionally, or alternatively, generating the mapping of the user of the third-party service to the user account of the cloud-based storage system can comprise determining whether the user of the third-party service has opted out of domain-wide authentication and authorization, In such cases, mapping of the user of the third-party service to the user account of the cloud-based storage system can be performed in response to determining the user of the third-party service has not opted out of domain-wide authentication and authorization.

[0006] Generating the one or more tokens for the user of the third-party service based on the mapping of the user of the third-party service to the user account of the cloud-based storage system can comprise receiving, from the cloud-based storage system, information indicating a scope for authorization of the user of the third-party system and obtaining the one or more tokens for the user of the third-party service based on the information indicating the scope for authorization of the user of the third-party system. The one or more tokens for the user of the third-party service can then be provided to the third-party service and the user of the third-party service can be notified.

[0007] In some cases, a backfill process performing domain-wide authentication and authorization automatically for a set of users of the third-party service can be initiated. The backfill process can comprise adding an initiation message for the backfill process to a backfill queue. The initiation message can identify an entity for which the backfill process is performed. The user and the set of users can be associated with the entity. The backfill process can further comprise reading the initiation message for the backfill process from the backfill queue, retrieving user information for the set of users based on the entity identified in the initiation message, assigning the set of users to a group of users for the backfill process, creating a fanout job for the group of users, adding the fanout job to a job queue, reading the fanout job from the job queue, mapping the set of users of the third-party service to a set of users account of the cloud-based storage system, generating one or more tokens for the set of users of the third-party service based on the mapping of the set of users of the third-party service to the set of users account of the cloud-based storage system, providing the one or more tokens for the set of users of the third-party service to the third-party service, and notifying the set of users of the third-party service of authorization completion.

[0008] According to another embodiment, a system can comprise a processor and a memory coupled with and readable by the processor. The memory can store therein a set of instructions which, when executed by the processor, causes the processor to perform domain-wide authentication and authorization in a cloud-based environment by receiving, from a third-party service of the cloud-based environment, a request to perform authentication and authorization of a user of the third-party service for accessing a cloud-based storage system of the cloud-based environment, generating a mapping of the user of the third-party service to a user account of the cloud-based storage system, and generating one or more tokens for the user of the third-party service based on the mapping of the user of the third-party service to the user account of the cloud-based storage system. The one or more tokens can provide access to services of the cloud-based storage system. The instructions can further cause the processor to provide the one or more tokens to the third-party service.

[0009] Generating the mapping of the user of the third-party service to the user account of the cloud-based storage system can comprise receiving, from the third-party service, user information for the user of the third-party service, searching a set of user information of the cloud-based storage system based on the received user information for the user of the third-party service, and determining whether the user information for the user of the third-party service matches any user information in the set of user information of the cloud-based storage system. Mapping of the user of the third-party service to the user account of the cloud-based storage system can be performed in response to determining the user information for the user of the third-party service matches user information in the set of user information of the cloud-based storage system. In some cases, generating the mapping of the user of the third-party service to the user account of the cloud-based storage system can further comprise determining whether the user of the third-party service is eligible for domain-wide authentication and authorization. In such cases, mapping of the user of the third-party service to the user account of the cloud-based storage system can be performed in response to determining the user of the third-party service is eligible for domain-wide authentication and authorization. Additionally, or alternatively, generating the mapping of the user of the third-party service to the user account of the cloud-based storage system can comprise determining whether the user of the third-party service has opted out of domain-wide authentication and authorization, In such cases, mapping of the user of the third-party service to the user account of the cloud-based storage system can be performed in response to determining the user of the third-party service has not opted out of domain-wide authentication and authorization.

[0010] Generating the one or more tokens for the user of the third-party service based on the mapping of the user of the third-party service to the user account of the cloud-based storage system can comprise receiving, from the cloud-based storage system, information indicating a scope for authorization of the user of the third-party system and obtaining the one or more tokens for the user of the third-party service based on the information indicating the scope for authorization of the user of the third-party system. The one or more tokens for the user of the third-party service can then be provided to the third-party service and the user of the third-party service can be notified.

[0011] In some cases, the instructions can further cause the processor to initiate a backfill process performing domain-wide authentication and authorization automatically for a set of users of the third-party service. The backfill process can comprise adding an initiation message for the backfill process to a backfill queue. The initiation message can identify an entity for which the backfill process is performed. The user and the set of users can be associated with the entity. The backfill process can further comprise reading the initiation message for the backfill process from the backfill queue, retrieving user information for the set of users based on the entity identified in the initiation message, assigning the set of users to a group of users for the backfill process, creating a fanout job for the group of users, adding the fanout job to a job queue, reading the fanout job from the job queue, mapping the set of users of the third-party service to a set of users account of the cloud-based storage system, generating one or more tokens for the set of users of the third-party service based on the mapping of the set of users of the third-party service to the set of users account of the cloud-based storage system, providing the one or more tokens for the set of users of the third-party service to the third-party service, and notifying the set of users of the third-party service of authorization completion.

[0012] According to yet another embodiment, a non-transitory, computer-readable medium can comprise a set of instructions stored therein which, when executed by a processor, causes the processor to perform domain-wide authentication and authorization in a cloud-based environment by receiving, from a third-party service of the cloud-based environment, a request to perform authentication and authorization of a user of the third-party service for accessing a cloud-based storage system of the cloud-based environment, generating a mapping of the user of the third-party service to a user account of the cloud-based storage system, and generating one or more tokens for the user of the third-party service based on the mapping of the user of the third-party service to the user account of the cloud-based storage system. The one or more tokens can provide access to services of the cloud-based storage system. The instructions can further cause the processor to provide the one or more tokens to the third-party service.

[0013] Generating the mapping of the user of the third-party service to the user account of the cloud-based storage system can comprise receiving, from the third-party service, user information for the user of the third-party service, searching a set of user information of the cloud-based storage system based on the received user information for the user of the third-party service, and determining whether the user information for the user of the third-party service matches any user information in the set of user information of the cloud-based storage system. Mapping of the user of the third-party service to the user account of the cloud-based storage system can be performed in response to determining the user information for the user of the third-party service matches user information in the set of user information of the cloud-based storage system. In some cases, generating the mapping of the user of the third-party service to the user account of the cloud-based storage system can further comprise determining whether the user of the third-party service is eligible for domain-wide authentication and authorization. In such cases, mapping of the user of the third-party service to the user account of the cloud-based storage system can be performed in response to determining the user of the third-party service is eligible for domain-wide authentication and authorization. Additionally, or alternatively, generating the mapping of the user of the third-party service to the user account of the cloud-based storage system can comprise determining whether the user of the third-party service has opted out of domain-wide authentication and authorization, In such cases, mapping of the user of the third-party service to the user account of the cloud-based storage system can be performed in response to determining the user of the third-party service has not opted out of domain-wide authentication and authorization.

[0014] Generating the one or more tokens for the user of the third-party service based on the mapping of the user of the third-party service to the user account of the cloud-based storage system can comprise receiving, from the cloud-based storage system, information indicating a scope for authorization of the user of the third-party system and obtaining the one or more tokens for the user of the third-party service based on the information indicating the scope for authorization of the user of the third-party system. The one or more tokens for the user of the third-party service can then be provided to the third-party service and the user of the third-party service can be notified.

[0015] In some cases, the instructions can further cause the processor to initiate a backfill process performing domain-wide authentication and authorization automatically for a set of users of the third-party service. The backfill process can comprise adding an initiation message for the backfill process to a backfill queue. The initiation message can identify an entity for which the backfill process is performed. The user and the set of users can be associated with the entity. The backfill process can further comprise reading the initiation message for the backfill process from the backfill queue, retrieving user information for the set of users based on the entity identified in the initiation message, assigning the set of users to a group of users for the backfill process, creating a fanout job for the group of users, adding the fanout job to a job queue, reading the fanout job from the job queue, mapping the set of users of the third-party service to a set of users account of the cloud-based storage system, generating one or more tokens for the set of users of the third-party service based on the mapping of the set of users of the third-party service to the set of users account of the cloud-based storage system, providing the one or more tokens for the set of users of the third-party service to the third-party service, and notifying the set of users of the third-party service of authorization completion.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] FIG. **1** is a block diagram illustrating elements of an exemplary computing environment in which embodiments of the present disclosure may be implemented.

[0017] FIG. **2** is a block diagram illustrating elements of an exemplary computing device in which embodiments of the present disclosure may be implemented.

[0018] FIG. **3** is a block diagram illustrating elements of an exemplary environment in which domain-wide authentication and authorization may be implemented according to one embodiment of the present disclosure.

[0019] FIG. **4** is a flowchart illustrating an exemplary process for performing domain-wide authentication and authorization according to one embodiment of the present disclosure.

[0020] FIG. **5** is a flowchart illustrating an exemplary process for performing user mapping according to one embodiment of the present disclosure.

[0021] FIG. **6** is a flowchart illustrating an exemplary process for performing token generation according to one embodiment of the present disclosure.

[0022] FIG. **7** is a flowchart illustrating an exemplary process for performing backfilling according to one embodiment of the present disclosure.

[0023] In the appended figures, similar components and/or features may have the same reference label. Further, various components of the same type may be distinguished by following the reference label by a letter that distinguishes among the similar components. If only the first reference label is used in the specification, the description is applicable to any one of the similar components having the same first reference label irrespective of the second reference label.

DETAILED DESCRIPTION

[0024] In the following description, for the purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of various embodiments disclosed herein. It will be apparent, however, to one skilled in the art that various embodiments of the present disclosure may be practiced without some of these specific details. The ensuing description provides exemplary embodiments only and is not intended to limit the scope or applicability of the disclosure. Furthermore, to avoid unnecessarily obscuring the present disclosure, the preceding description omits a number of known structures and devices. This omission is not to be construed as a limitation of the scopes of the claims. Rather, the ensuing description of the exemplary embodiments will provide those skilled in the art with an enabling description for implementing an exemplary embodiment. It should however be appreciated that the present disclosure may be practiced in a variety of ways beyond the specific detail set forth herein.

[0025] While the exemplary aspects, embodiments, and/or configurations illustrated herein show the various components of the system collocated, certain components of the system can be located remotely, at distant portions of a distributed network, such as a Local-Area Network (LAN) and/or Wide-Area Network (WAN) such as the Internet, or within a dedicated system. Thus, it should be appreciated, that the components of the system can be combined in to one or more devices or collocated on a particular node of a distributed network, such as an analog and/or digital telecommunications network, a packet-switch network, or a circuit-switched network. It will be appreciated from the following description, and for reasons of computational efficiency, that the components of the system can be arranged at any location within a distributed network of components without affecting the operation of the system.

[0026] Furthermore, it should be appreciated that the various links connecting the elements can be wired or wireless links, or any combination thereof, or any other known or later developed element(s) that is capable of supplying and/or communicating data to and from the connected elements. These wired or wireless links can also be secure links and may be capable of communicating encrypted information. Transmission media used as links, for example, can be any suitable carrier for electrical signals, including coaxial cables, copper wire and fiber optics, and may take the form of acoustic or light waves, such as those generated during radio-wave and infra-red data communications.

[0027] As used herein, the phrases "at least one," "one or more," "or," and "and/or" are open-ended expressions that are both conjunctive and disjunctive in operation. For example, each of the expressions "at least one of A, B and C," "at least one of A, B, or C," "one or more of A, B, and C," "one or more of A, B, or C" "A, B, and/or C," and "A, B, or C" means A alone, B alone, C alone, A and B together, A and C together, B and C together, or A, B and C together.

[0028] The term "a" or "an" entity refers to one or more of that entity. As such, the terms "a" (or "an"), "one or more" and "at least one" can be used interchangeably herein. It is also to be noted that the terms "comprising," "including," and "having" can be used interchangeably.

[0029] The term "automatic" and variations thereof, as used herein, refers to any process or operation done without material human input when the process or operation is performed. However, a process or operation can be automatic, even though performance of the process or operation uses material or immaterial human input, if the input is received before performance of the process or operation. Human input is deemed to be material if such input influences how the process or operation will be performed. Human input that consents to the performance of the process or operation is not deemed to be "material."

[0030] The term "computer-readable medium" as used herein refers to any tangible storage and/or transmission medium that participate in providing instructions to a processor for execution. Such a medium may take many forms, including but not limited to, non-volatile media, volatile media, and transmission media. Non-volatile media includes, for example, Non-Volatile Random-Access Memory (NVRAM), or magnetic or optical disks. Volatile media includes dynamic memory, such as main memory. Common forms of computer-readable media include, for example, a floppy disk, a flexible disk, hard disk, magnetic tape, or any other magnetic medium, magneto-optical medium, a Compact Disk Read-Only Memory (CD-ROM), any other optical medium, punch cards, paper tape, any other physical medium with patterns of holes, a Random-Access Memory (RAM), a Programmable Read-Only Memory (PROM), and Erasable Programmable Read-Only Memory (EPROM), a Flash-EPROM, a solid state medium like a memory card, any other memory chip or cartridge, a carrier wave as described hereinafter, or any other medium from which a computer can read. A digital file attachment to e-mail or other self-contained information archive or set of archives is considered a distribution medium equivalent to a tangible storage medium. When the computer-readable media is configured as a database, it is to be understood that the database may be any type of database, such as relational, hierarchical, object-oriented, and/or the like. Accordingly, the disclosure is considered to include a tangible storage medium or distribution medium and prior art-recognized equivalents and successor media, in which the software implementations of the present disclosure are stored.

[0031] A "computer readable signal" medium may include a propagated data signal with computer readable program code embodied therein, for example, in baseband or as part of a carrier wave. Such a propagated signal may take any of a variety of forms, including, but not limited to, electro-magnetic, optical, or any suitable combination thereof. A computer readable signal medium may be any computer readable medium that is not a computer readable storage medium and that can communicate, propagate, or transport a program for use by or in connection with an instruction execution system, apparatus, or device. Program code embodied on a computer readable medium may be transmitted using any appropriate medium, including but not limited to wireless, wireline, optical fiber cable, Radio Frequency (RF), etc., or any suitable combination of the foregoing.

[0032] The terms "determine," "calculate," and "compute," and variations thereof, as used herein, are used interchangeably and include any type of methodology, process, mathematical operation or technique.

[0033] It shall be understood that the term "means" as used herein shall be given its broadest possible interpretation in accordance with 35 U.S.C., Section 112, Paragraph 6. Accordingly, a claim incorporating the term "means" shall cover all structures, materials, or acts set forth herein, and all of the equivalents thereof. Further, the structures, materials or acts and the equivalents thereof shall include all those described in the summary of the disclosure, brief description of the drawings, detailed description, abstract, and claims themselves.

[0034] Aspects of the present disclosure may take the form of an entirely hardware embodiment, an entirely software embodiment (including firmware, resident software, micro-code, etc.) or an embodiment combining software and hardware aspects that may all generally be referred to herein as a "circuit," "module" or "system." Any combination of one or more computer readable medium(s) may be utilized. The computer readable medium may be a computer readable signal medium or a computer readable storage medium.

[0035] In yet another embodiment, the systems and methods of this disclosure can be implemented in conjunction with a special purpose computer, a programmed microprocessor or microcontroller and peripheral integrated circuit element(s), an ASIC or other integrated circuit, a digital signal processor, a hard-wired electronic or logic circuit such as discrete element circuit, a programmable logic device or gate array such as Programmable Logic Device (PLD), Programmable Logic Array (PLA), Field Programmable Gate Array (FPGA), Programmable Array Logic (PAL), special purpose computer, any comparable means, or the like. In general, any device(s) or means capable of implementing the methodology illustrated herein can be used to implement the various aspects of this disclosure. Exemplary hardware that can be used for the disclosed embodiments, configurations, and aspects includes computers, handheld devices, telephones (e.g., cellular, Internet enabled, digital, analog, hybrids, and others), and other hardware known in the art. Some of these devices include processors (e.g., a single or multiple microprocessors), memory, nonvolatile storage, input devices, and output devices. Furthermore, alternative software implementations including, but not limited to, distributed processing or component/object distributed processing, parallel processing, or virtual machine processing can also be constructed to implement the methods described herein.

[0036] Examples of the processors as described herein may include, but are not limited to, at least one of Qualcomm® Snapdragon® 800 and 801, Qualcomm® Snapdragon® 610 and 615 with 4G LTE Integration and 64-bit computing, Apple® A7 processor with 64-bit architecture, Apple® M7 motion coprocessors, Samsung® Exynos® series, the Intel® Core™ family of processors, the Intel® Xeon® family of processors, the Intel® Atom™ family of processors, the Intel Itanium® family of processors, Intel® Core® i5-4670K and i7-4770K 22 nm Haswell, Intel® Core® i5-3570K 22 nm Ivy Bridge, the AMD® FX™ family of processors, AMD® FX-4300, FX-6300, and FX-8350 32 nm Vishera, AMD® Kaveri processors, Texas Instruments® Jacinto C6000™ automotive infotainment processors, Texas Instruments® OMAP™ automotive-grade mobile processors, ARM® Cortex™-M processors, ARM® Cortex-A and ARM926EJ-S™ processors, other industry-equivalent processors, and may perform computational functions using any known or future-developed standard, instruction set, libraries, and/or architecture.

[0037] In yet another embodiment, the disclosed methods may be readily implemented in conjunction with software using object or object-oriented software development environments that provide portable source code that can be used on a variety of computer or workstation platforms. Alternatively, the disclosed system may be implemented partially or fully in hardware using standard logic circuits or Very Large-Scale Integration (VLSI) design. Whether software or hardware is used to implement the systems in accordance with this disclosure is dependent on the speed and/or efficiency requirements of the system, the particular function, and the particular software or hardware systems or microprocessor or microcomputer systems being utilized.

[0038] In yet another embodiment, the disclosed methods may be partially implemented in software that can be stored on a storage medium, executed on programmed general-purpose computer with the cooperation of a controller and memory, a special purpose computer, a microprocessor, or the like. In these instances, the systems and methods of this disclosure can be implemented as program embedded on personal computer such as an applet, JAVA® or Common Gateway Interface (CGI) script, as a resource residing on a server or computer workstation, as a routine embedded in a dedicated measurement system, system component, or the like. The system can also be implemented by physically incorporating the system and/or method into a software and/or hardware system.

[0039] Although the present disclosure describes components and functions implemented in the aspects, embodiments, and/or configurations with reference to particular standards and protocols, the aspects, embodiments, and/or configurations are not limited to such standards and protocols. Other similar standards and protocols not mentioned herein are in existence and are considered to be included in the present disclosure. Moreover, the standards and protocols mentioned herein and other similar standards and protocols not mentioned herein are periodically superseded by faster or more effective equivalents having essentially the same functions. Such replacement standards and protocols having the same functions are considered equivalents included in the present disclosure.

[0040] Various additional details of embodiments of the present disclosure will be described below with reference to the figures. While the flowcharts will be discussed and illustrated in relation to a particular sequence of events, it should be appreciated that changes, additions, and omissions to this sequence can occur without materially affecting the operation of the disclosed embodiments, configuration, and aspects.

[0041] FIG. **1** is a block diagram illustrating elements of an exemplary computing environment in which embodiments of the present disclosure may be implemented. More specifically, this example illustrates a computing environment **100** that may function as the servers, user computers, or other systems provided and described herein. The environment **100** includes one or more user computers, or computing devices, such as a computing device **104**, a communication device **108**, and/or more **112**. The computing devices **104**, **108**, **112** may include general purpose personal computers (including, merely by way of example, personal computers, and/or laptop computers running various versions of Microsoft Corp.'s Windows® and/or Apple Corp.'s Macintosh® operating systems) and/or workstation computers running any of a variety of commercially-available UNIX® or UNIX-like operating systems. These computing devices **104**, **108**, **112** may also have any of a variety of applications, including for example, database client and/or server applications, and web browser applications. Alternatively, the computing devices **104**, **108**, **112** may be any other electronic device, such as a thin-client computer, Internet-enabled mobile telephone, and/or personal digital assistant, capable of communicating via a network **110** and/or displaying and navigating web pages or other types of electronic documents. Although the exemplary computer environment **100** is shown with two computing devices, any number of user computers or computing devices may be supported.

[0042] Environment **100** further includes a network **110**. The network **110** may can be any type of network familiar to those skilled in the art that can support data communications using any of a variety of commercially-available protocols, including without limitation Session Initiation Protocol (SIP), Transmission Control Protocol/Internet Protocol (TCP/IP), Systems Network Architecture (SNA), Internetwork Packet Exchange (IPX), AppleTalk, and the like. Merely by way of example, the network **110** maybe a Local Area Network (LAN), such as an Ethernet network, a Token-Ring network and/or the like; a wide-area network; a virtual network, including without limitation a Virtual Private Network (VPN); the Internet; an intranet; an extranet; a Public Switched Telephone Network (PSTN); an infra-red network; a wireless network (e.g., a network operating under any of the IEEE 802.9 suite of protocols, the Bluetooth® protocol known in the art, and/or any other wireless protocol); and/or any combination of these and/or other networks.

[0043] The system may also include one or more servers **114**, **116**. In this example, server **114** is shown as a web server and server **116** is shown as an application server. The web server **114**, which may be used to process requests for web pages or other electronic documents from computing devices **104**, **108**, **112**. The web server **114** can be running an operating system including any of those discussed above, as well as any commercially-available server operating systems. The web server **114** can also run a variety of server applications, including SIP servers, HyperText Transfer Protocol (secure) (HTTP(s)) servers, FTP servers, CGI servers, database servers, Java servers, and the like. In some instances, the web server **114** may publish operations available operations as one or more web services.

[0044] The environment **100** may also include one or more file and or/application servers **116**, which can, in addition to an operating system, include one or more applications accessible by a client running on one or more of the computing devices **104**, **108**, **112**. The server(s) **116** and/or **114** may be one or more general purpose computers capable of executing programs or scripts in response to the computing devices **104**, **108**, **112**. As one example, the server **116**, **114** may execute one or more web applications. The web application may be implemented as one or more scripts or programs written in any programming language, such as Java™, C, C#®, or C++, and/or any scripting language, such as Perl, Python, or Tool Command Language (TCL), as well as combinations of any programming/scripting languages. The application server(s) **116** may also include database servers, including without limitation those commercially available from Oracle®, Microsoft®, Sybase®, IBM® and the like, which can process requests from database clients running on a computing device **104**, **108**, **112**.

[0045] The web pages created by the server **114** and/or **116** may be forwarded to a computing device **104**, **108**, **112** via a web (file) server **114**, **116**. Similarly, the web server **114** may be able to receive web page requests, web services invocations, and/or input data from a computing device **104**, **108**, **112** (e.g., a user computer, etc.) and can forward the web page requests and/or input data to the web (application) server **116**. In further embodiments, the server **116** may function as a file server. Although for ease of description, FIG. **1** illustrates a separate web server **114** and file/application server **116**, those skilled in the art will recognize that the functions described with respect to servers **114**, **116** may be performed by a single server and/or a plurality of specialized servers, depending on implementation-specific needs and parameters. The computer systems **104**, **108**, **112**, web (file) server **114** and/or web (application) server **116** may function as the system, devices, or components described herein.

[0046] The environment **100** may also include a database **118**. The database **118** may reside in a variety of locations. By way of example, database **118** may reside on a storage medium local to (and/or resident in) one or more of the computers **104**, **108**, **112**, **114**, **116**. Alternatively, it may be remote from any or all of the computers **104**, **108**, **112**, **114**, **116**, and in communication (e.g., via the network **110**) with one or more of these. The database **118** may reside in a Storage-Area Network (SAN) familiar to those skilled in the art. Similarly, any necessary files for performing the functions attributed to the computers **104**, **108**, **112**, **114**, **116** may be stored locally on the respective computer and/or remotely, as appropriate. The database **118** may be a relational database, such as Oracle 20i®, that is adapted to store, update, and retrieve data in response to Structured Query Language (SQL) formatted commands.

[0047] FIG. **2** is a block diagram illustrating elements of an exemplary computing device in which embodiments of the present disclosure may be implemented. More specifically, this example illustrates one embodiment of a computer system **200** upon which the servers, user computers, computing devices, or other systems or components described above may be deployed or executed. The computer system **200** is shown comprising hardware elements that may be electrically coupled via a bus **204**. The hardware elements may include one or more Central Processing Units (CPUs) **208**; one or more input devices **212** (e.g., a mouse, a keyboard, etc.); and one or more output devices **216** (e.g., a display device, a printer, etc.). The computer system **200** may also include one or more storage devices **220**. By way of example, storage device(s) **220** may be disk drives, optical storage devices, solid-state storage devices such as a Random-Access Memory (RAM) and/or a Read-Only Memory (ROM), which can be programmable, flash-updateable and/or the like.

[0048] The computer system **200** may additionally include a computer-readable storage media reader **224**; a communications system **228** (e.g., a modem, a network card (wireless or wired), an infra-red communication device, etc.); and working memory **236**, which may include RAM and ROM devices as described above. The computer system **200** may also include a processing acceleration unit **232**, which can include a Digital Signal Processor (DSP), a special-purpose processor, and/or the like.

[0049] The computer-readable storage media reader **224** can further be connected to a computer-readable storage medium, together (and, optionally, in combination with storage device(s) **220**) comprehensively representing remote, local, fixed, and/or removable storage devices plus storage media for temporarily and/or more permanently containing computer-readable information. The communications system **228** may permit data to be exchanged with a network and/or any other computer described above with respect to the computer environments described herein. Moreover, as disclosed herein, the term “storage medium” may represent one or more devices for storing data, including ROM, RAM, magnetic RAM, core memory, magnetic disk storage mediums, optical storage mediums, flash memory devices and/or other machine-readable mediums for storing information.

[0050] The computer system **200** may also comprise software elements, shown as being currently located within a working memory **236**, including an operating system **240** and/or other code **244**. It should be appreciated that alternate embodiments of a computer system **200** may have numerous variations from that described above. For example, customized hardware might also be used and/or particular elements might be implemented in hardware, software (including portable software, such as applets), or both. Further, connection to other computing devices such as network input/output devices may be employed.

[0051] Examples of the processors **208** as described herein may include, but are not limited to, at least one of Qualcomm® Snapdragon® 800 and 801, Qualcomm® Snapdragon® 620 and 615 with 4G LTE Integration and 64-bit computing, Apple® A7 processor with 64-bit architecture, Apple® M7 motion coprocessors, Samsung® Exynos® series, the Intel® Core™ family of processors, the Intel® Xeon® family of processors, the Intel® Atom™ family of processors, the Intel Itanium® family of processors, Intel®

Core® i5-4670K and i7-4770K 22 nm Haswell, Intel® Core® i5-3570K 22 nm Ivy Bridge, the AMD® FX™ family of processors, AMD® FX-4300, FX-6300, and FX-8350 32 nm Vishera, AMD® Kaveri processors, Texas Instruments® Jacinto C6000™ automotive infotainment processors, Texas Instruments® OMAP™ automotive-grade mobile processors, ARM® Cortex™-M processors, ARM® Cortex-A and ARM926EJ-S™ processors, other industry-equivalent processors, and may perform computational functions using any known or future-developed standard, instruction set, libraries, and/or architecture.

[0052] FIG. **3** is a block diagram illustrating elements of an exemplary environment in which domain-wide authentication and authorization may be implemented according to one embodiment of the present disclosure. As illustrated in this example, a cloud-based environment **300** can comprise a cloud-based storage system **305**. The cloud-based storage system can be implemented on any one or more servers and/or other computing devices as described above. The cloud-based storage system **305** can be communicatively coupled with any one or more wired and/or wireless communications networks **310** also as described above. One or more third-party services **315**A-**315**C can also be communicatively coupled with the communications network **310**.

[0053] Generally speaking, users of the third-party services **315**A-**315**C can access those services by logging in through an authentication and authorization process **320**A-**320**C provided by each of the services **315**A-**315**C. Additionally, the users of the third-party services **315**A-**315**C can access services **325** of the cloud-based storage system **305**. Typically, the users would have an account with the cloud-based storage system **305** and, after logging into a third-party service **315**A, would then log into the cloud-based storage system **305** through a login process provided by an authorization service **330** of the cloud-based storage system **305**.

[0054] According to one embodiment, the cloud-based environment **300** can further include a domain-wide authentication and authorization service **335** implemented on any one or more servers and/or other computing devices as described above. Generally speaking, the domain-wide authentication and authorization service **335** can perform authentication and authorization for accessing the services **325** of the cloud-based storage system **305** to users of the third-party services **315**A-**315**C. More specifically, the domain-wide authentication and authorization service **335** perform domain-wide authentication and authorization in a cloud-based environment **300** by receiving, from a third-party service **315**A, a request to perform authentication and authorization of a user of the third-party service **315**A. The domain-wide authentication and authorization service **335** can execute a mapping process that can expose an Application Program Interface (API) (not shown here) to the third-party service **315**A through which information identifying the user can be submitted. The mapping process **340** can use that information to identify the user of the third-party service **315**A and map that user to a user account of the cloud-based storage system **305**.

[0055] The domain-wide authentication and authorization service **335** can also execute a token generation process **345** that can obtain one or more tokens for the user of the third-party service **315**A. For example, based on the mapping of the user to the user account of the cloud-based storage system **305**, the token generation process can request tokens from the authorization services **330** of the cloud-based storage system **305**. The tokens can be used by the third-party service **315**A to provide access to services **325** of the cloud-based storage system **305**. The token generation process can provide the tokens to the third-party service **315**A and notify the user that they have been granted access to the services **325** of the cloud-based storage system **305**, i.e., that authorization has been completed.

[0056] The domain-wide authentication and authorization service **335** can also execute a backfilling process. Generally speaking, the backfilling process **350** can perform domain-wide authentication and authorization for a group of users of a third-party service **315**A. For example, the backfilling process **350** can onboard a group of users of a third-party service **315**A to domain-wide authentication and authorization when an administrator of the third-party service **315**A and/or the cloud-based storage system **305** first enables domain-wide authentication and authorization for those users. In another example, when a new group of users are added to or provisioned for a third-party service **315**A, those users can be onboarded by the backfilling process **350** utilizing the mapping process **340** and token generation process **345** in a way similar to described above. Additional details of processes as may be performed by the domain-wide authentication and authorization service **335** will be described below with reference to FIGS. **4**-**7**.

[0057] FIG. **4** is a flowchart illustrating an exemplary process for performing domain-wide authentication and authorization according to one embodiment of the present disclosure. As illustrated in this example, performing domain-wide authentication and authorization in a cloud-based environment **300** such as described above can comprise receiving **405**, from a third-party service **315**A of the cloud-based environment **300**, a request to perform authentication and authorization of a user of the third-party service **315**A for accessing a cloud-based storage system **305** of the cloud-based environment **300**. A determination **410** can be made as to whether the user of the third-party service **315**A is eligible for domain-wide authentication and authorization. This determination **410** can be based on whether the third-party service **315**A is eligible for domain-wide authentication and authorization and/or whether domain-wide authentication and authorization is enabled in the cloud based storage system **305** for the third-party service **315**A. Additionally, or alternatively, this determination **410** can be based on a user profile for the user, an entity which the user is associated with, the service through which the request is made, etc.

[0058] In response to determining **410** the user of the third-party service **315**A is eligible for domain-wide authentication and authorization, the user of the third-party service **315**A can be mapped **415** to a user account of the cloud-based storage system **305** and one or more tokens for the user of the third-party service **315**A can be generated **420** based on the mapping of the user of the third-party service **315**A to the user account of the cloud-based storage system **305**. Additional details of an exemplary process for mapping **415** the user to the user account of the cloud-based storage system **305** will be described below with reference to FIG. **5**. Additional details of an exemplary process for generating **420** tokens will be described below with reference to FIG. **6**. The one or more tokens can provide access to services of the cloud-based storage system **305** and services **325** thereof. The one or more tokens can then be provided **425** to the third-party service **315**A and used by the third-party service **315**A when the user accesses services **325** of the cloud-based storage system **305**.

[0059] FIG. **5** is a flowchart illustrating an exemplary process for performing user mapping according to one embodiment of the present disclosure. As illustrated in this example, generating the mapping of the user of the third-party service to the user account of the cloud-based storage system can comprise receiving **505**, from the third-party service **315**A, user information for the user of the third-party service **315**A and searching **510** a set of user information of the cloud-based storage system **305** based on the received user information for the user of the third-party service **315**A. A determination **515** can be made as to whether the user information for the user of the third-party service **315**A matches any user information in the set of user information of the cloud-based storage system **305**, i.e., whether the user has a user account with the cloud-based storage system **305**. For example, this information can include, but is not limited to, an email address for the user, a user IDentifier (ID), Personal Identifiable Information (PII), a Single Sign-On (SSO) integration, etc.

[0060] In some cases, in response to determining **515** the user information for the user of the third-party service **315**A matches user information in the set of user information of the cloud-based storage system **305** one or more other determinations can be made. For example, a determination **520** can be made as to whether the user of the third-party service **315**A, e.g., based on the user, an entity the user is associated with, etc., is eligible for domain-wide authentication and authorization. Additionally, or alternatively, a determination **525** can be made as to whether the user of the third-party service has opted out of domain-wide authentication and authorization, e.g., based on a user profile for the user.

[0061] In response to any of determining **515** the user information for the user of the third-party service **315**A does not match user information in the set of user information of the cloud-based storage system **305**, determining **520** the user is not eligible for domain-wide authentication and authorization, or determining **525** that the user has opted out of domain-wide authentication and authorization, an error message can be returned **530** to the third-party service **315**A. In response to determining **515** the user information for the user of the third-party service matches user information in the set of user information of the cloud-based storage system and, in some cases, determining **520** the user is eligible for domain-wide authentication and authorization, or determining **525** that the user has not opted out of domain-wide authentication and authorization, mapping **535** of the user of the third-party service to the user account of the cloud-based storage system can be performed.

[0062] FIG. **6** is a flowchart illustrating an exemplary process for performing token generation according to one embodiment of the present disclosure. As illustrated in this example, generating the one or more tokens for the user of the third-party service **315**A based on the mapping of the user of the third-party service **315**A to the user account of the cloud-based storage system **305** can comprise receiving **605**, from the cloud-based storage system **305**, information indicating a scope for authorization of the user of the third-party system and obtaining **610** the one or more tokens for the user of the third-party service **315**A from the cloud-based storage system **305** based on the information indicating the scope for authorization of the user of the third-party system **315**A. The one or more tokens for the user of the third-party service **315**A can then be provided **615** to the third-party service **315**A and the user of the third-party service **315**A can be notified **620** of authorization completion.

[0063] FIG. **7** is a flowchart illustrating an exemplary process for performing backfilling according to one embodiment of the present disclosure. As noted above, a backfill process performing domain-wide authentication and authorization automatically for a group of one or more users of the third-party service **315**A. This backfilling process can be initiated periodically, on demand, or automatically in response to the occurrence of some event such as when an administrator of the third-party service **315**A and/or the cloud-based storage system **305** first enables domain-wide authentication and authorization for those users, when a new group of users are added to or provisioned for a third-party service **315**A, etc. These users may be associated or affiliated with an entity, e.g., same company, group, educational or other institution, etc.

[0064] As illustrated in this example, the backfill process can comprise adding **705** an initiation message for the backfill process to a backfill queue. The initiation message can identify the entity for which the backfill process is performed. At a later point in time, the initiation message for the backfill process can be read **710** from the backfill queue, user information for a set of one or more users can be retrieved **715** based on the entity identified in the initiation message, the set of users can be assigned **720** to a group, i.e., sub-group, of users for the backfill process, a fanout job can be created **725** for the group of users, and the fanout job can be added **730** to a job queue.

[0065] At a later point in time, the fanout job can be read **735** from the job queue and each user of the third-party service **315**A can be mapped **740** to a user account of the cloud-based storage system such as described above with reference to FIG. **5**. One or more tokens for the user of the third-party service **315**A can be generated **745** based on the mapping of the user of the set of users of the third-party service **315**A to the user account of the cloud-based storage system and as described above with reference to FIG. **6**. The one or more tokens for the user of the set of users of the third-party service **315**A can be provided **750** to the third-party service **315**A and the user of the third-party service **315**A can be notified **755** of authorization completion.

[0066] The present disclosure, in various aspects, embodiments, and/or configurations, includes components, methods, processes, systems, and/or apparatus substantially as depicted and described herein, including various aspects, embodiments, configurations embodiments, sub-combinations, and/or subsets thereof. Those of skill in the art will understand how to make and use the disclosed aspects, embodiments, and/or configurations after understanding the present disclosure. The present disclosure, in various aspects, embodiments, and/or configurations, includes providing devices and processes in the absence of items not depicted and/or described herein or in various aspects, embodiments, and/or configurations hereof, including in the absence of such items as may have been used in previous devices or processes, e.g., for improving performance, achieving ease and/or reducing cost of implementation.

[0067] The foregoing discussion has been presented for purposes of illustration and description. The foregoing is not intended to limit the disclosure to the form or forms disclosed herein. In the foregoing Detailed Description for example, various features of the disclosure are grouped together in one or more aspects, embodiments, and/or configurations for the purpose of streamlining the disclosure. The features of the aspects, embodiments, and/or configurations of the disclosure may be combined in alternate aspects, embodiments, and/or configurations other than those discussed above. This method of disclosure is not to be interpreted as reflecting an intention that the claims require more features than are expressly recited in each claim. Rather, as the following claims reflect, inventive aspects lie in less than all features of a single foregoing disclosed aspect, embodiment, and/or configuration. Thus, the following claims are hereby incorporated into this Detailed Description, with each claim standing on its own as a separate preferred embodiment of the disclosure.

[0068] Moreover, though the description has included description of one or more aspects, embodiments, and/or configurations and certain variations and modifications, other variations, combinations, and modifications are within the scope of the disclosure, e.g., as may be within the skill and knowledge of those in the art, after understanding the present disclosure. It is intended to obtain rights which include alternative aspects, embodiments, and/or configurations to the extent permitted, including alternate, interchangeable and/or equivalent structures, functions, ranges or steps to those claimed, whether or not such alternate, interchangeable and/or equivalent structures, functions, ranges or steps are disclosed herein, and without intending to publicly dedicate any patentable subject matter.

What is claimed is:

1. A method for performing domain-wide authentication and authorization in a cloud-based environment, the method comprising:

receiving, by a domain-wide authorization system, from a third-party service of the cloud-based environment, a request to perform authentication and authorization of a user of the third-party service for accessing a cloud-based storage system of the cloud-based environment;

generating, by the domain-wide authorization system, a mapping of the user of the third-party service to a user account of the cloud-based storage system;

generating, by the domain-wide authorization system, one or more tokens for the user of the third-party service based on the mapping of the user of the third-party service to the user account of the cloud-based storage system, wherein the one or more tokens provide access to services of the cloud-based storage system; and

providing, by the domain-wide authorization system, the one or more tokens to the third-party service.

2. The method of claim **1**, further comprising, prior to generating the mapping of the user of the third-party service to the user account of the cloud-based storage system, determining, by the domain-wide authorization system, whether the user of the third-party service is eligible for domain-wide authentication and authorization and wherein generating the mapping of the user of the third-party service to the user account of the cloud-based storage system, generating the one or more tokens for the user of the third-party service, and providing the one or more tokens to the third-party service are performed in response to determining the user of the third-party service is eligible for domain-wide authentication and authorization.

3. The method of claim **1**, wherein generating the mapping of the user of the third-party service to the user account of the cloud-based storage system comprises:

receiving, by the domain-wide authorization system, from the third-party service, user information for the user of the third-party service;

searching, by the domain-wide authorization system, a set of user information of the cloud-based storage system based on the received user information for the user of the third-party service; and

determining, by the domain-wide authorization service, whether the user information for the user of the third-party service matches any user information in the set of user information of the cloud-based storage system, wherein mapping of the user of the third-party service to the user account of the cloud-based storage system is performed in response to determining the user information for the user of the third-party service matches user information in the set of user information of the cloud-based storage system.

4. The method of claim **3**, wherein generating the mapping of the user of the third-party service to the user account of the cloud-based storage system further comprises determining, by the domain-wide authorization system, whether the user of the third-party service is eligible for domain-wide authentication and authorization, wherein mapping of the user of the third-party service to the user account of the cloud-based storage system is performed in response to determining the user of the third-party service is eligible for domain-wide authentication and authorization.

5. The method of claim **3**, wherein generating the mapping of the user of the third-party service to the user account of the cloud-based storage system further comprises determining, by the domain-wide authorization system, whether the user of the third-party service has opted out of domain-wide authentication and authorization, wherein mapping of the user of the third-party service to the user account of the cloud-based storage system is performed in response to determining the user of the third-party service has not opted out of domain-wide authentication and authorization.

6. The method of claim **1**, wherein generating the one or more tokens for the user of the third-party service based on the mapping of the user of the third-party service to the user account of the cloud-based storage system comprises:

receiving, by the domain-wide authorization system, from the cloud-based storage system, information indicating a scope for authorization of the user of the third-party system;

obtaining, by the domain-wide authorization system, the one or more tokens for the user of the third-party service based on the information indicating the scope for authorization of the user of the third-party system;

providing, by the domain-wide authorization system, the one or more tokens for the user of the third-party service to the third-party service; and

notifying, by the domain-wide authorization system, the user of the third-party service of authorization completion.

7. The method of claim **1**, further comprising initiating, by the domain-wide authorization system, a backfill process performing domain-wide authentication and authorization for a set of users of the third-party service.

8. The method of claim **7**, wherein the backfill process comprises:

adding, by the domain-wide authorization system, an initiation message for the backfill process to a backfill queue, the initiation message identifying an entity for which the backfill process is performed, wherein the user and the set of users are associated with the entity;

reading, by the domain-wide authorization system, the initiation message for the backfill process from the backfill queue;

retrieving, by the domain-wide authorization system, user information for the set of users based on the entity identified in the initiation message;

assigning, by the domain-wide authorization system, the set of users to a group of users for the backfill process;

creating, by the domain-wide authorization system, a fanout job for the group of users;

adding, by the domain-wide authorization system, the fanout job to a job queue;

reading, by the domain-wide authorization system, the fanout job from the job queue;

mapping, by the domain-wide authorization system, the set of users of the third-party service to a set of users account of the cloud-based storage system;

generating, by the domain-wide authorization system, one or more tokens for the set of users of the third-party service based on the mapping of the set of users of the third-party service to the set of users account of the cloud-based storage system;

providing, by the domain-wide authorization system, the one or more tokens for the set of users of the third-party service to the third-party service; and

notifying, by the domain-wide authorization system, the set of users of the third-party service of authorization completion.

9. A system comprising:

a processor; and

a memory coupled with and readable by the processor and storing therein a set of instructions which, when executed by the processor, causes the processor to perform domain-wide authentication and authorization in a cloud-based environment by:

receiving, from a third-party service of the cloud-based environment, a request to perform authentication and authorization of a user of the third-party service for accessing a cloud-based storage system of the cloud-based environment;

generating a mapping of the user of the third-party service to a user account of the cloud-based storage system;

generating one or more tokens for the user of the third-party service based on the mapping of the user of the third-party service to the user account of the cloud-based storage system, wherein the one or more tokens provide access to services of the cloud-based storage system; and

providing the one or more tokens to the third-party service.

10. The system of claim **9**, wherein generating the mapping of the user of the third-party service to the user account of the cloud-based storage system comprises:

receiving, from the third-party service, user information for the user of the third-party service;

searching a set of user information of the cloud-based storage system based on the received user information for the user of the third-party service; and

determining whether the user information for the user of the third-party service matches any user information in the set of user information of the cloud-based storage system, wherein mapping of the user of the third-party service to the user account of the cloud-based storage system is performed in response to determining the user information for the user of the third-party service matches user information in the set of user information of the cloud-based storage system.

11. The system of claim **10**, wherein generating the mapping of the user of the third-party service to the user account of the cloud-based storage system further comprises determining whether the user of the third-party service is eligible for domain-wide authentication and authorization, wherein mapping of the user of the third-party service to the user account of the cloud-based storage system is performed in response to determining the user of the third-party service is eligible for domain-wide authentication and authorization.

12. The system of claim **10**, wherein generating the mapping of the user of the third-party service to the user account of the cloud-based storage system further comprises determining whether the user of the third-party service has opted out of domain-wide authentication and authorization, wherein mapping of the user of the third-party service to the user account of the cloud-based storage system is performed in response to determining the user of the third-party service has not opted out of domain-wide authentication and authorization.

13. The system of claim **9**, wherein generating the one or more tokens for the user of the third-party service based on the mapping of the user of the third-party service to the user account of the cloud-based storage system comprises:

receiving, from the cloud-based storage system, information indicating a scope for authorization of the user of the third-party system;

obtaining the one or more tokens for the user of the third-party service based on the information indicating the scope for authorization of the user of the third-party system;

providing the one or more tokens for the user of the third-party service to the third-party service; and

notifying the user of the third-party service of authorization completion.

14. The system of claim **9**, wherein the instructions further cause the processor to initiate a backfill process performing domain-wide authentication and authorization automatically for a set of users of the third-party service, wherein the backfill process comprises:

adding an initiation message for the backfill process to a backfill queue, the initiation message identifying an entity for which the backfill process is performed, wherein the user and the set of users are associated with the entity;

reading the initiation message for the backfill process from the backfill queue;

retrieving user information for the set of users based on the entity identified in the initiation message;

assigning the set of users to a group of users for the backfill process;

creating a fanout job for the group of users;

adding the fanout job to a job queue;

reading the fanout job from the job queue;

mapping the set of users of the third-party service to a set of users account of the cloud-based storage system;

generating one or more tokens for the set of users of the third-party service based on the mapping of the set of users of the third-party service to the set of users account of the cloud-based storage system;

providing the one or more tokens for the set of users of the third-party service to the third-party service; and

notifying the set of users of the third-party service of authorization completion.

15. A non-transitory, computer-readable medium comprising a set of instructions stored therein which, when executed by a processor, causes the processor to perform domain-wide authentication and authorization in a cloud-based environment by:

receiving, from a third-party service of the cloud-based environment, a request to perform authentication and authorization of a user of the third-party service for accessing a cloud-based storage system of the cloud-based environment;

generating a mapping of the user of the third-party service to a user account of the cloud-based storage system;

generating one or more tokens for the user of the third-party service based on the mapping of the user of the third-party service to the user account of the cloud-based storage system, wherein the one or more tokens provide access to services of the cloud-based storage system; and

providing the one or more tokens to the third-party service.

16. The non-transitory, computer-readable medium of claim **15**, wherein generating the mapping of the user of the third-party service to the user account of the cloud-based storage system comprises:

receiving, from the third-party service, user information for the user of the third-party service;

searching a set of user information of the cloud-based storage system based on the received user information for the user of the third-party service; and

determining whether the user information for the user of the third-party service matches any user information in the set of user information of the cloud-based storage system, wherein mapping of the user of the third-party service to the user account of the cloud-based storage system is performed in response to determining the user information for the user of the third-party service matches user information in the set of user information of the cloud-based storage system.

17. The non-transitory, computer-readable medium of claim **16**, wherein generating the mapping of the user of the third-party service to the user account of the cloud-based storage system further comprises determining whether the user of the third-party service is eligible for domain-wide authentication and authorization, wherein mapping of the user of the third-party service to the user account of the cloud-based storage system is performed in response to determining the user of the third-party service is eligible for domain-wide authentication and authorization.

18. The non-transitory, computer-readable medium of claim **16**, wherein generating the mapping of the user of the third-party service to the user account of the cloud-based storage system further comprises determining whether the user of the third-party service has opted out of domain-wide authentication and authorization, wherein mapping of the user of the third-party service to the user account of the cloud-based storage system is performed in response to determining the user of the third-party service has not opted out of domain-wide authentication and authorization.

19. The non-transitory, computer-readable medium of claim **15**, wherein generating the one or more tokens for the user of the third-party service based on the mapping of the user of the third-party service to the user account of the cloud-based storage system comprises:

receiving, from the cloud-based storage system, information indicating a scope for authorization of the user of the third-party system;

obtaining the one or more tokens for the user of the third-party service based on the information indicating the scope for authorization of the user of the third-party system;

providing the one or more tokens for the user of the third-party service to the third-party service; and

notifying the user of the third-party service of authorization completion.

20. The non-transitory, computer-readable medium of claim **15**, wherein the instructions further cause the processor to initiate a backfill process performing domain-wide authentication and authorization automatically for a set of users of the third-party service, wherein the backfill process comprises:

adding an initiation message for the backfill process to a backfill queue, the initiation message identifying an entity for which the backfill process is performed, wherein the user and the set of users are associated with the entity;

reading the initiation message for the backfill process from the backfill queue;

retrieving user information for the set of users based on the entity identified in the initiation message;

assigning the set of users to a group of users for the backfill process;

creating a fanout job for the group of users;

adding the fanout job to a job queue;

reading the fanout job from the job queue;

mapping the set of users of the third-party service to a set of users account of the cloud-based storage system;

generating one or more tokens for the set of users of the third-party service based on the mapping of the set of users of the third-party service to the set of users account of the cloud-based storage system;

providing the one or more tokens for the set of users of the third-party service to the third-party service; and

notifying the set of users of the third-party service of authorization completion.

* * * * *