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(54) **ARTIFICIAL INTELLIGENCE (AI) SUPPORTED GRAPH ENABLED METHOD TO MANAGE UPGRADES FOR APPLICATIONS**

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G06F 8/65	(2018.01)
G06N 20/00	(2019.01)

(52) **U.S. Cl.**
CPC ***G06F 8/65*** (2013.01); ***G06N 20/00*** (2019.01)

(58) **Field of Classification Search**
CPC G06F 8/65; G06F 8/85; G06F 3/1454; G06N 20/00
See application file for complete search history.

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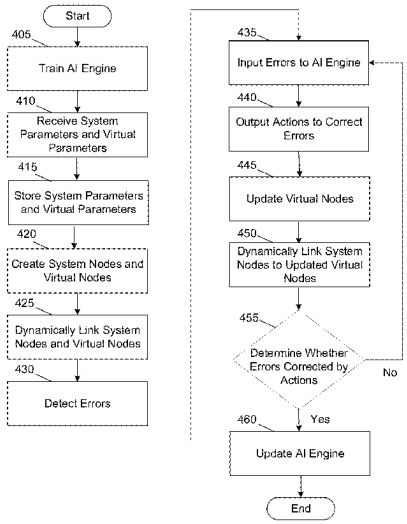
(57) **ABSTRACT**

Aspects of the disclosure relate to upgrading an application within a simulated version of an enterprise system to detect and correct potential errors as a result of the upgrade. A computing platform may create a simulated version of the enterprise system by receiving metadata associated with the enterprise system, and converting the metadata into system parameters. Virtual parameters may be created by the computing system based on upgrading an application within the simulated version of the enterprise system. The computing system may determine errors caused by the application upgrade within the simulated version of the enterprise system based on differences between the system parameters and the virtual parameters. The computing platform may determine actions to correct the errors and input the results and feedback into an AI engine to further refine the accuracy and reliability of the computing platform over time.

20 Claims, 12 Drawing Sheets



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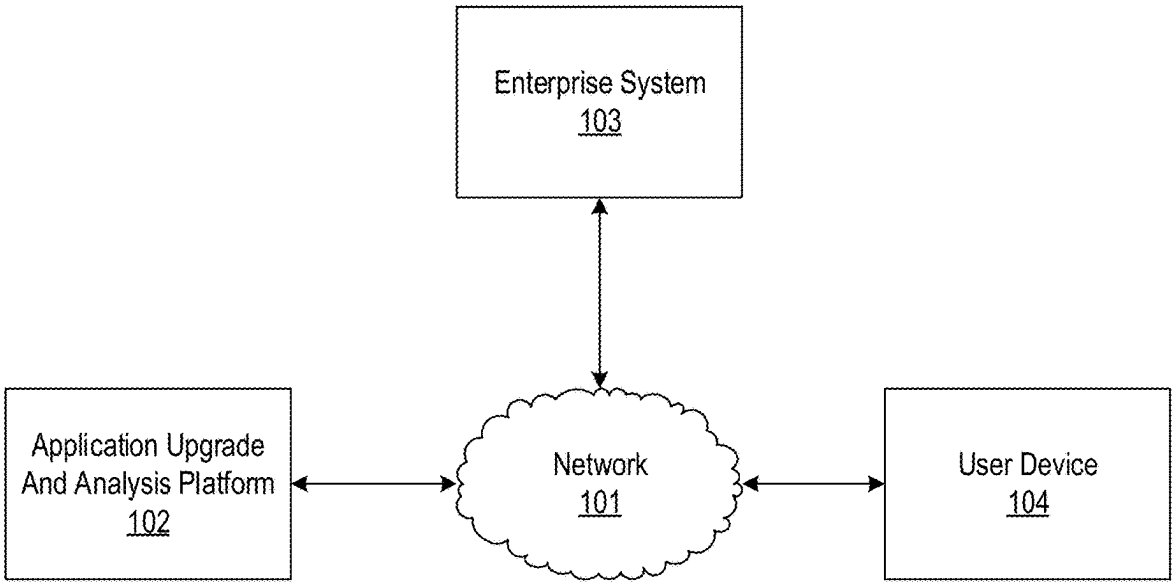
Enterprise System
103
Application Upgrade
And Analysis Platform
102
Network
101
User Device
104
100

FIG. 1A

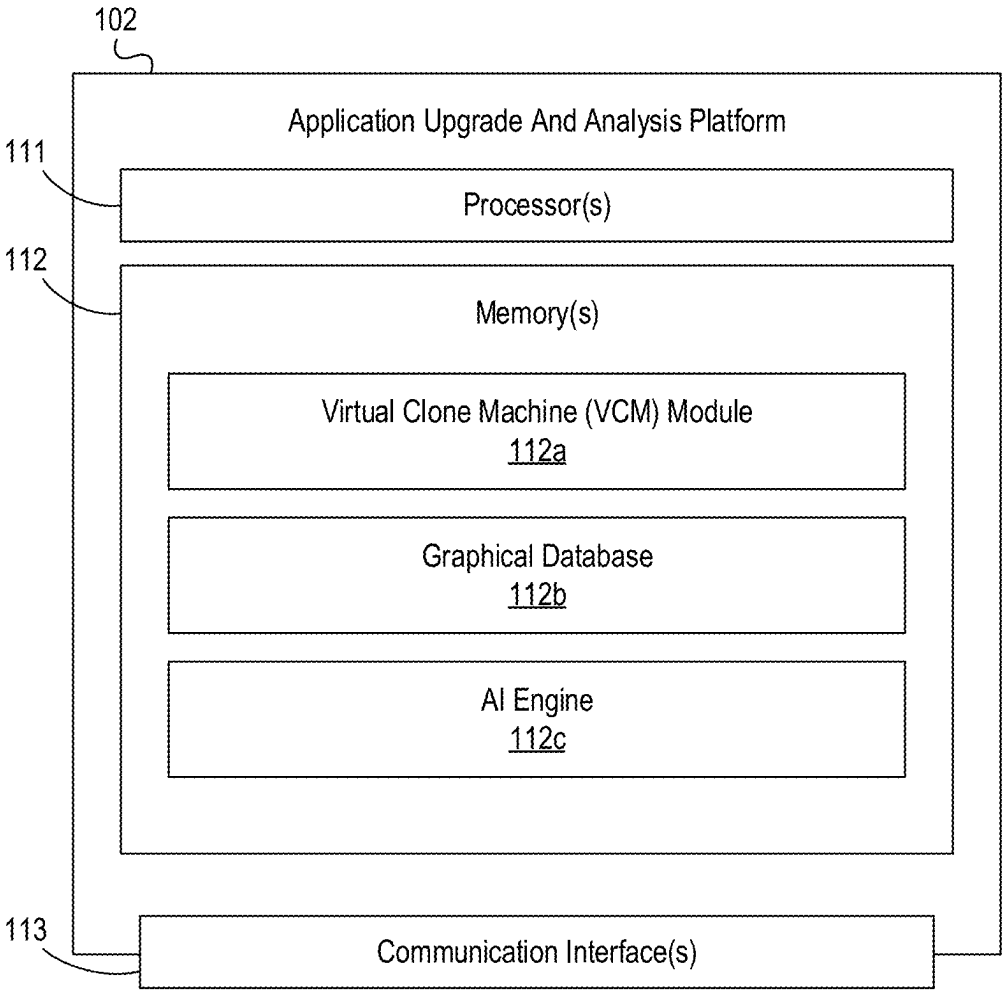
102
Application Upgrade And Analysis Platform
111
Processor(s)
112
Memory(s)
Virtual Clone Machine (VCM) Module
112a
Graphical Database
112b
AI Engine
112c
113
Communication Interface(s)

FIG. 1B

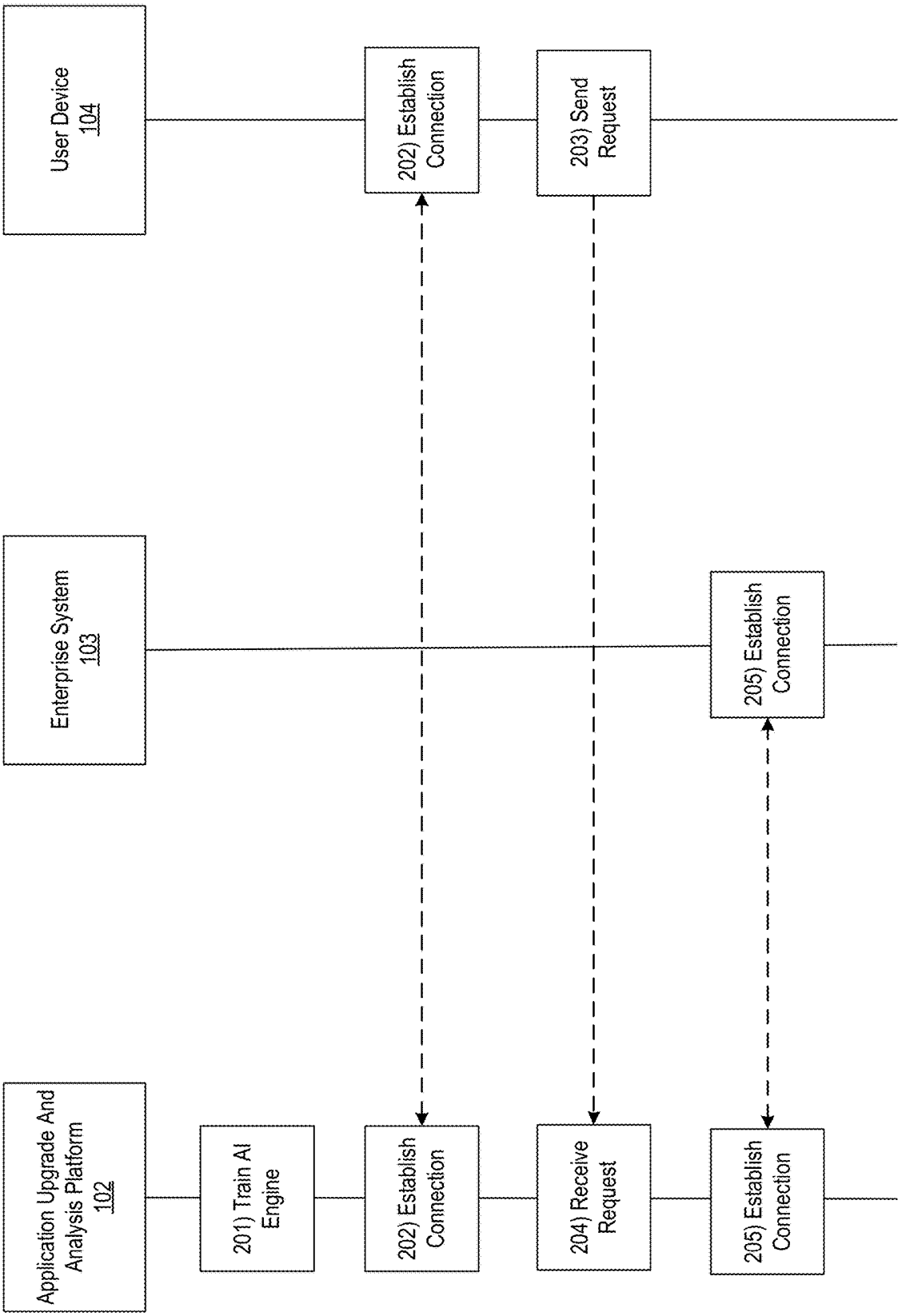
User Device 104
Enterprise System 103
Application Upgrade And Analysis Platform 102
202) Establish Connection
203) Send Request
205) Establish Connection
201) Train AI Engine
202) Establish Connection
204) Receive Request
205) Establish Connection

FIG. 2A

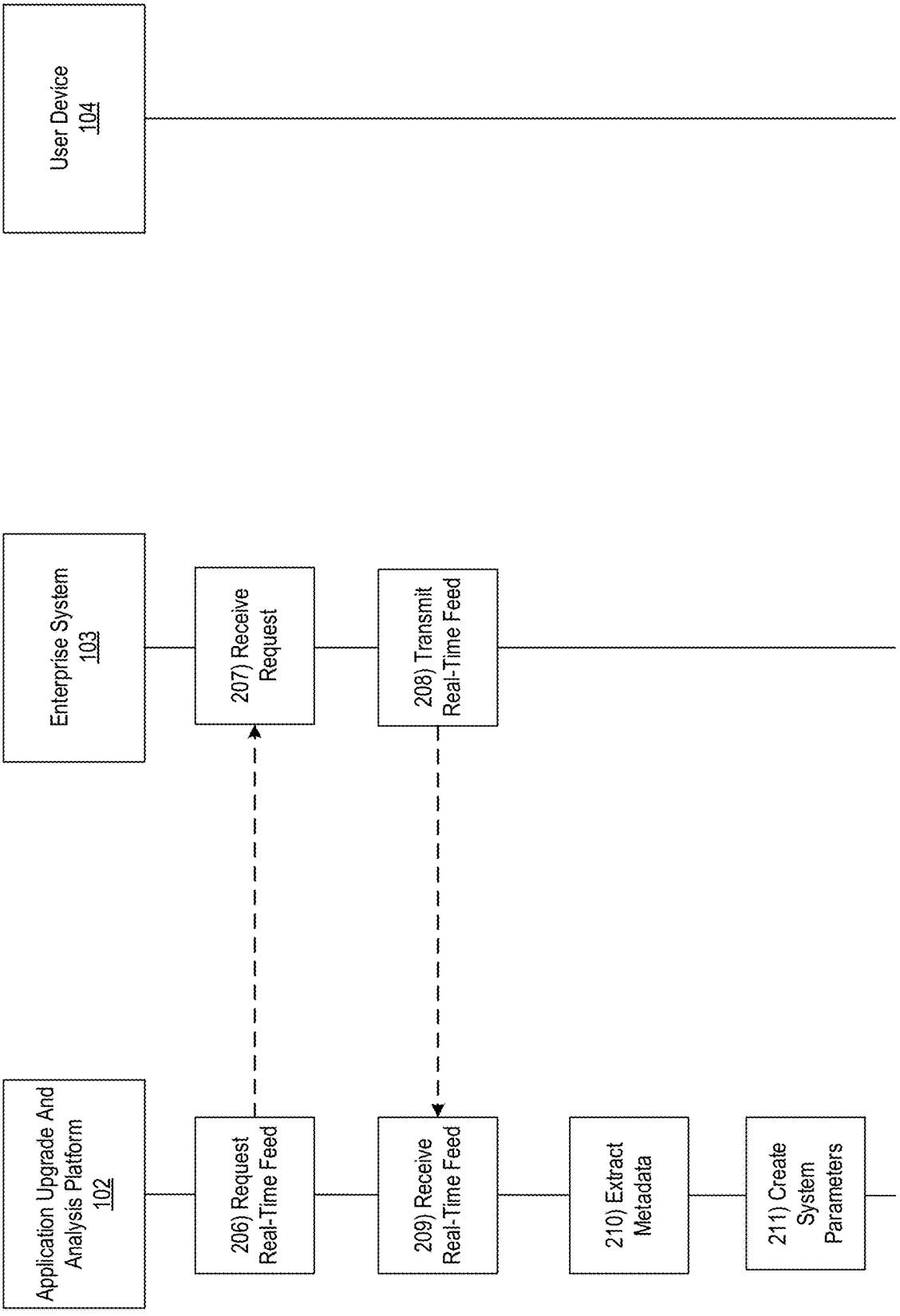
User Device
104
Enterprise System
103
207) Receive Request
208) Transmit Real-Time Feed
Application Upgrade And Analysis Platform
102
206) Request Real-Time Feed
209) Receive Real-Time Feed
210) Extract Metadata
211) Create System Parameters

FIG. 2B

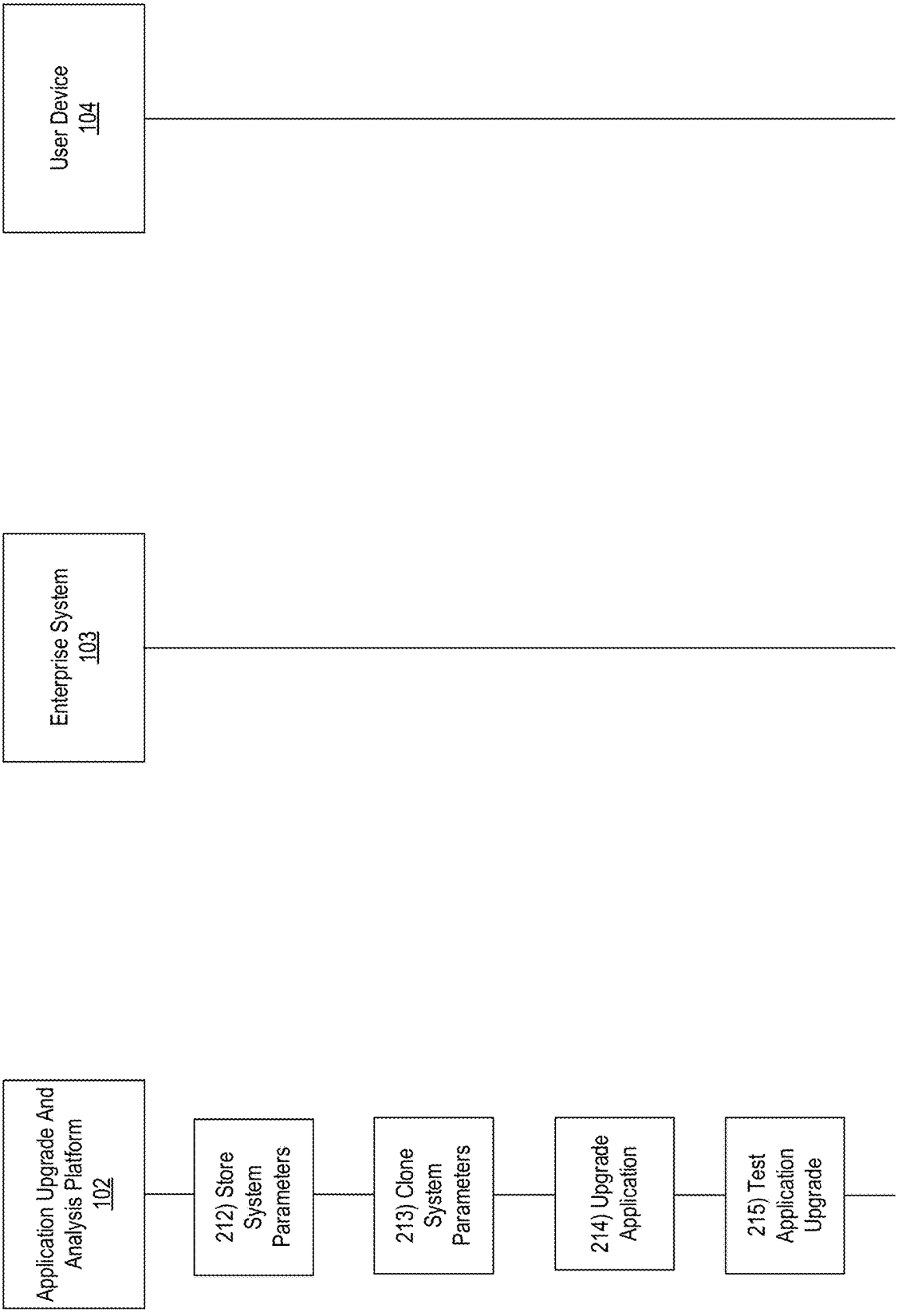
User Device
104
Enterprise System
103
Application Upgrade And Analysis Platform
102
212) Store System Parameters
213) Clone System Parameters
214) Upgrade Application
215) Test Application Upgrade

FIG. 2C

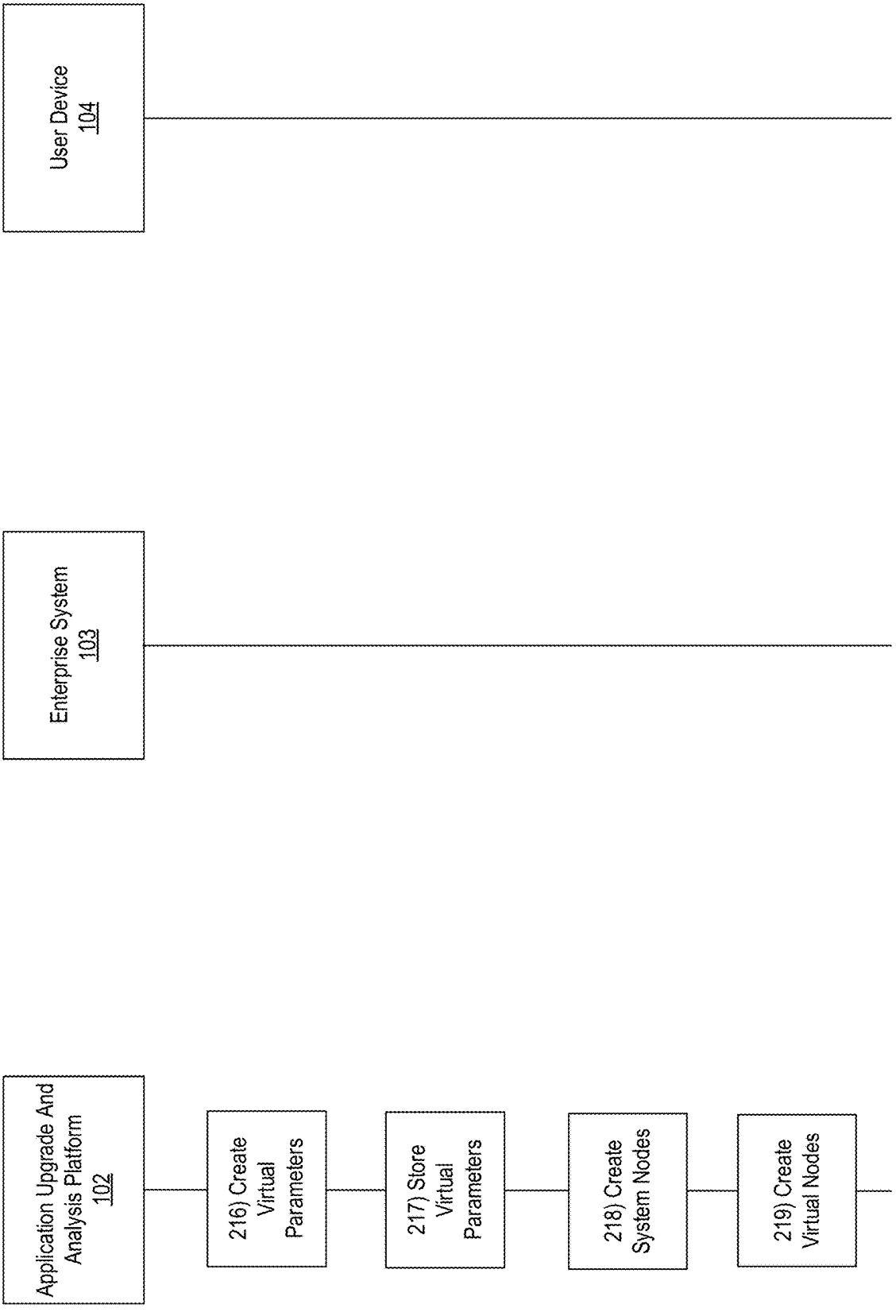
User Device
104
Enterprise System
103
Application Upgrade And Analysis Platform
102
216) Create Virtual Parameters
217) Store Virtual Parameters
218) Create System Nodes
219) Create Virtual Nodes

FIG. 2D

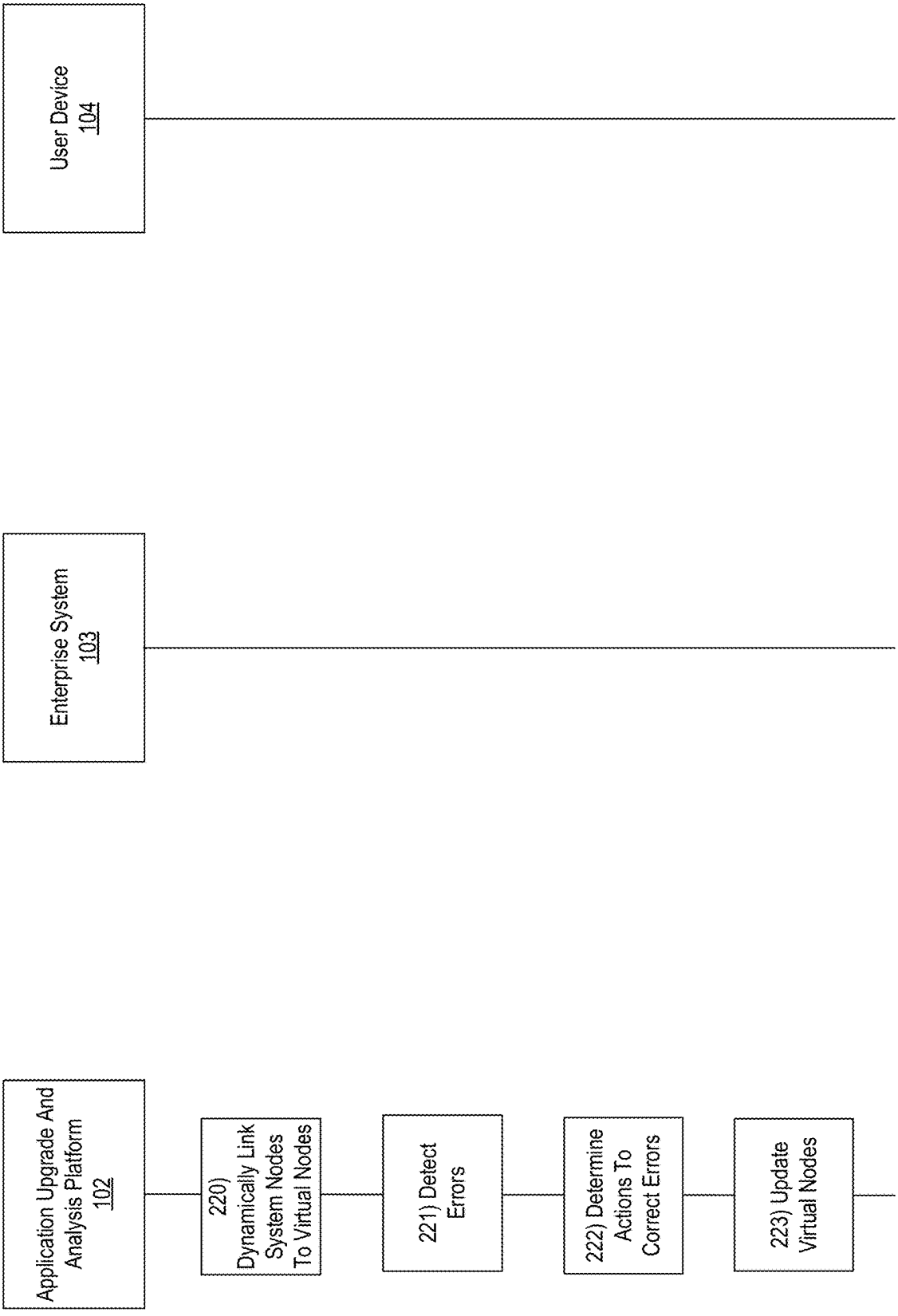
User Device
104
Enterprise System
103
Application Upgrade And Analysis Platform
102
220) Dynamically Link System Nodes To Virtual Nodes
221) Detect Errors
222) Determine Actions To Correct Errors
223) Update Virtual Nodes

FIG. 2E

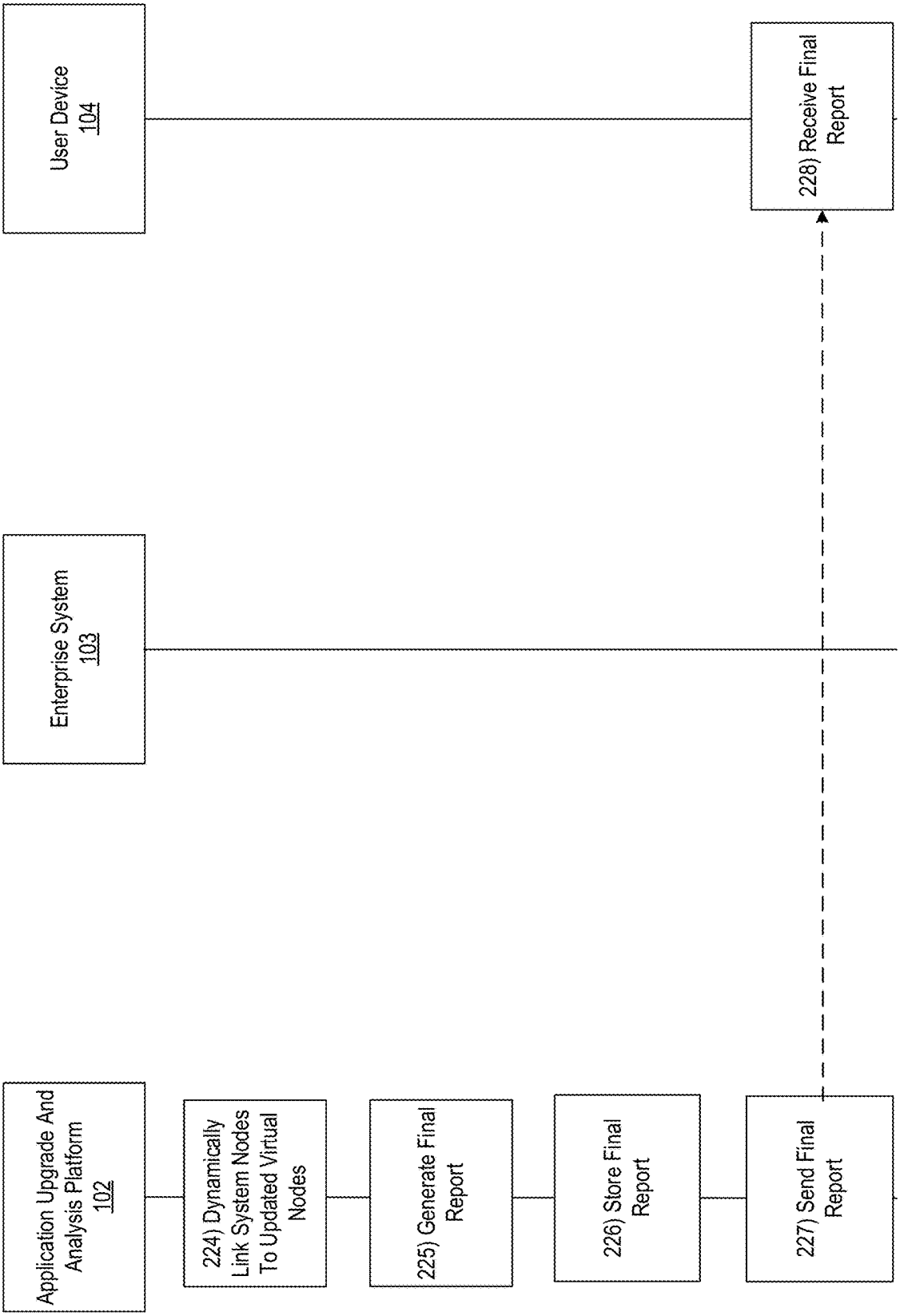
User Device
104
Enterprise System
103
Application Upgrade And Analysis Platform
102
224) Dynamically Link System Nodes To Updated Virtual Nodes
225) Generate Final Report
226) Store Final Report
227) Send Final Report
228) Receive Final Report

FIG. 2F

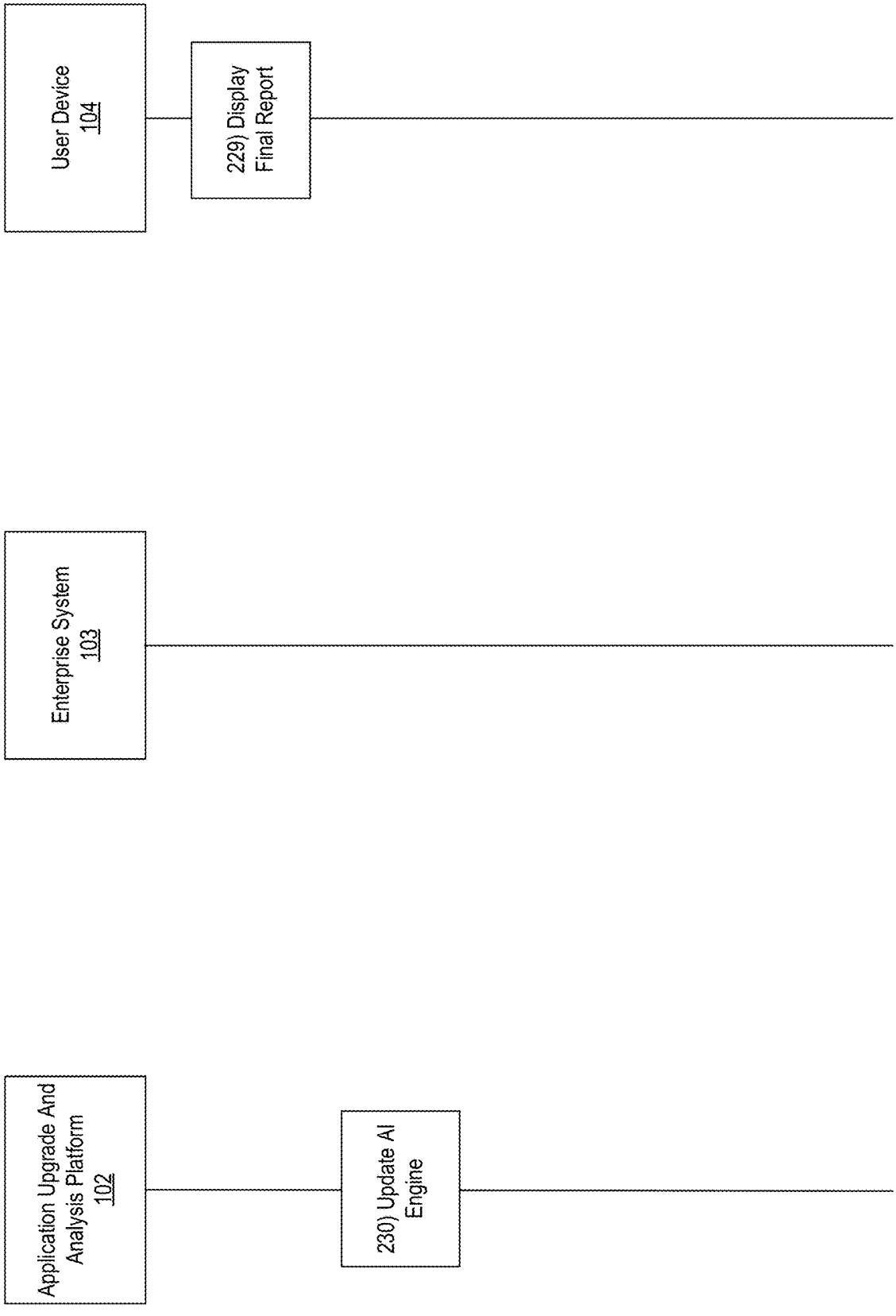
User Device
104
229) Display
Final Report
Enterprise System
103
Application Upgrade And
Analysis Platform
102
230) Update AI
Engine

FIG. 2G

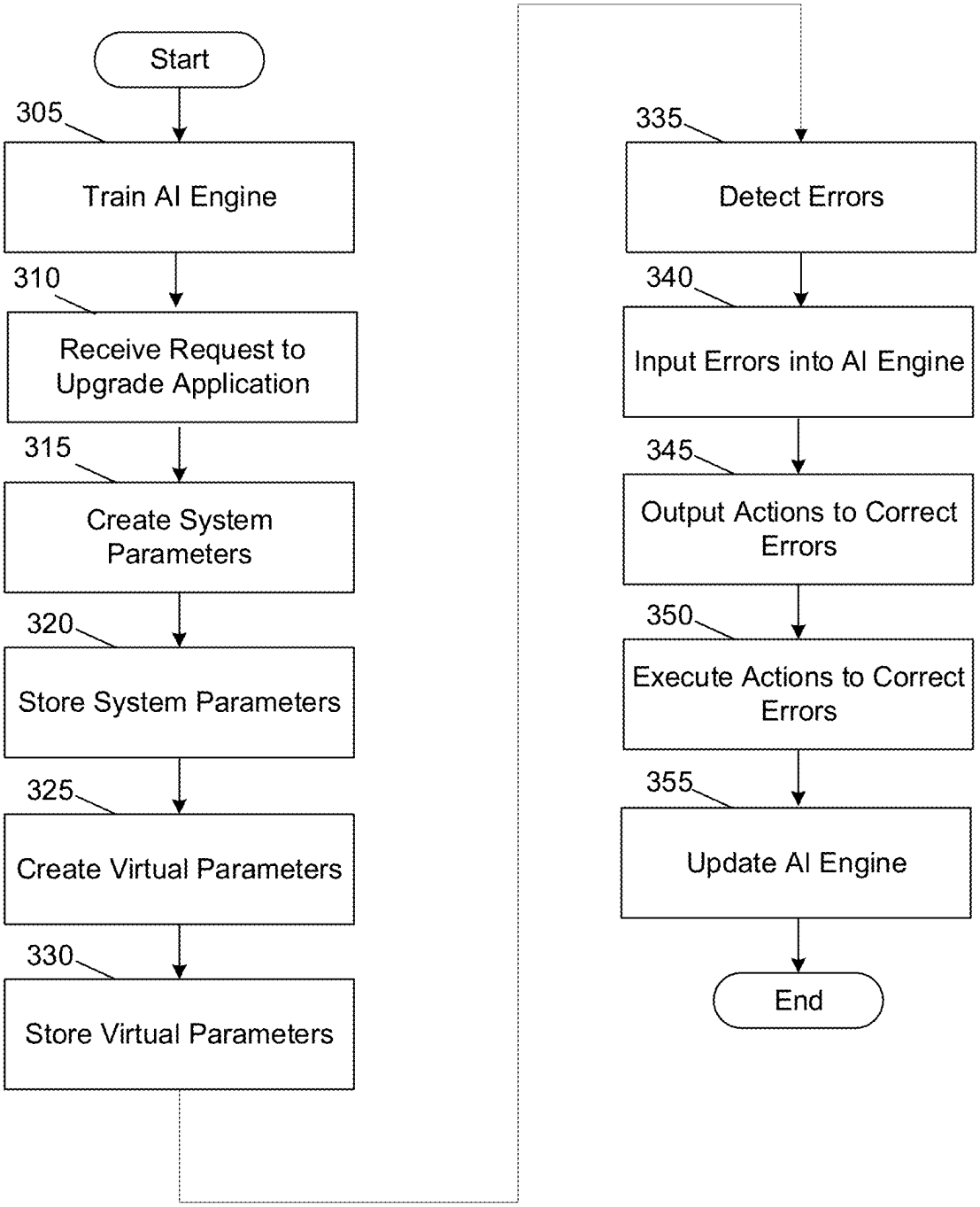
Start
305
Train AI Engine
310
Receive Request to Upgrade Application
315
Create System Parameters
320
Store System Parameters
325
Create Virtual Parameters
330
Store Virtual Parameters
335
Detect Errors
340
Input Errors into AI Engine
345
Output Actions to Correct Errors
350
Execute Actions to Correct Errors
355
Update AI Engine
End

FIG. 3

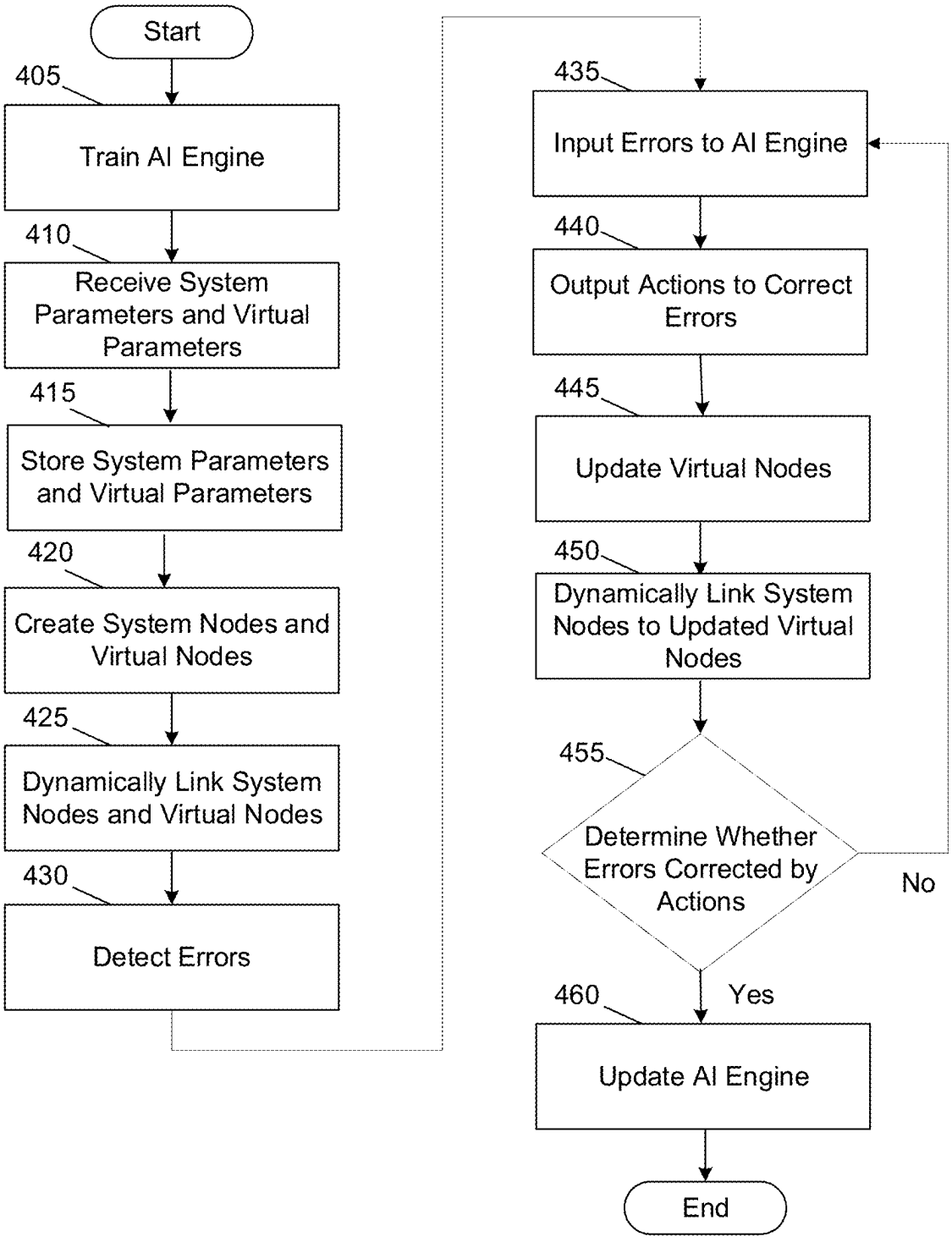
Start
405
Train AI Engine
410
Receive System Parameters and Virtual Parameters
415
Store System Parameters and Virtual Parameters
420
Create System Nodes and Virtual Nodes
425
Dynamically Link System Nodes and Virtual Nodes
430
Detect Errors
435
Input Errors to AI Engine
440
Output Actions to Correct Errors
445
Update Virtual Nodes
450
Dynamically Link System Nodes to Updated Virtual Nodes
455
Determine Whether Errors Corrected by Actions
No
Yes
460
Update AI Engine
End

FIG. 4

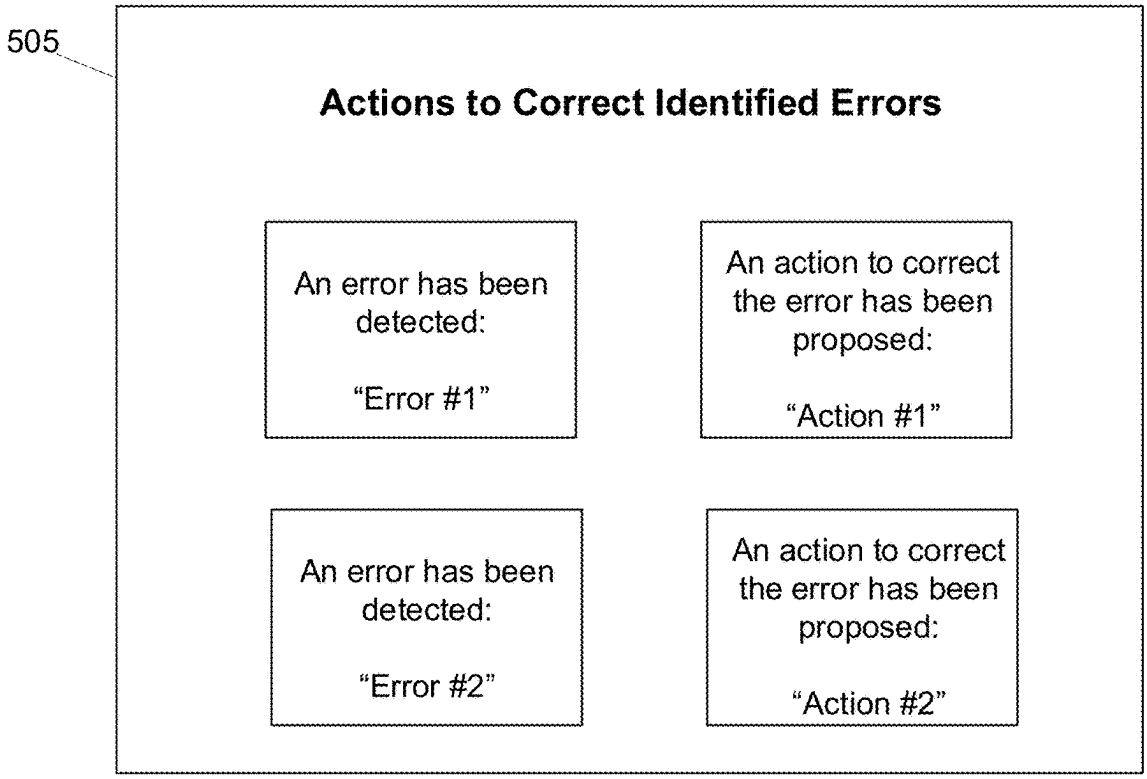
505
Actions to Correct Identified Errors
An error has been detected:
"Error #1"
An action to correct the error has been proposed:
"Action #1"
An error has been detected:
"Error #2"
An action to correct the error has been proposed:
"Action #2"

FIG. 5

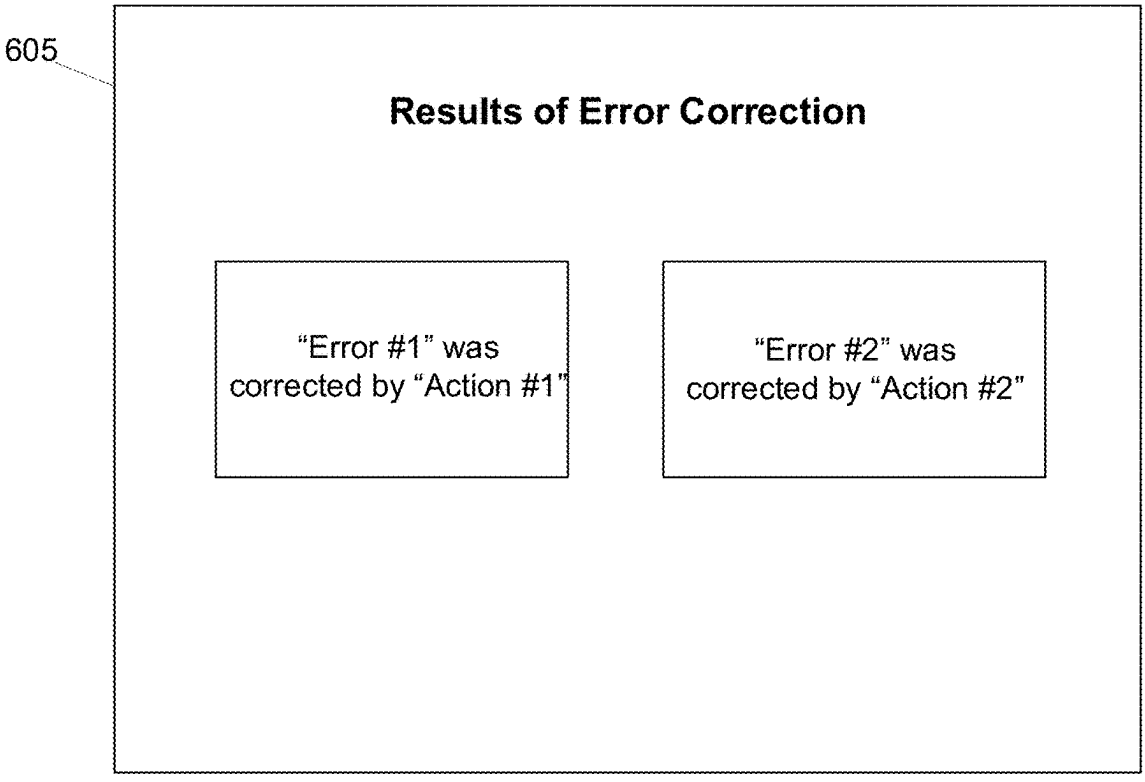
605
Results of Error Correction
"Error #1" was corrected by "Action #1"
"Error #2" was corrected by "Action #2"

FIG. 6

ARTIFICIAL INTELLIGENCE (AI) SUPPORTED GRAPH ENABLED METHOD TO MANAGE UPGRADES FOR APPLICATIONS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 17/972,711, filed Oct. 25, 2022, and entitled "Artificial Intelligence (AI) Supported Graph Enabled Method to Manage Upgrades for Applications," which is hereby incorporated herein by reference in its entirety.

BACKGROUND

Aspects of the disclosure relate to detecting and correcting errors as a result of an application upgrade. When an application is upgraded within a larger computing system, errors may be unknowingly introduced in the application or within the computing system. Errors may be due to, for example, an incorrect library version in the upgraded application. These errors may be detected and corrected by reviewing the upgraded application and/or the computing system. However, this process may be inefficient and time intensive, which may result in errors remaining undetected and uncorrected, thus negatively impacting the application and the computing system. Accordingly, it may be advantageous to identify efficient and accurate methods for analyzing and correcting errors when upgrading an application.

SUMMARY

Aspects of the disclosure provide effective, efficient, scalable, and convenient solutions that address and overcome the technical problems associated detecting and correcting errors as a result of an application upgrade. In accordance with one or more aspects of the disclosure, a computing platform with at least one processor, a communication interface communicatively coupled to the at least one processor, and memory storing computer-readable instructions may train, based on historical information, an artificial intelligence (AI) engine, where training the AI engine configures the AI engine to identify, based on the historical information, application upgrade errors and corresponding actions to correct the errors. The computing platform may receive, from a user device, a request to upgrade an application within an enterprise system. The computing platform may create a simulated enterprise system, where the simulated enterprise system comprises system parameters that represent characteristics of the enterprise system and is modified by upgrading a copy of the application within the simulated enterprise system. The computing platform may store the system parameters in a graphical database. The computing platform may create virtual parameters that represent characteristics of the simulated enterprise system that was modified by the upgrading and correspond to the system parameters, where each virtual parameter that represents a characteristic of the simulated enterprise system corresponds to a system parameter that represents a corresponding characteristic of the enterprise system, and differences between values of the virtual parameters and values of the corresponding system parameters represent differences between the characteristics of the simulated enterprise system and the corresponding characteristics of the enterprise system. The computing platform may store, by modifying the graphical database, the virtual parameters with the system parameters. The computing platform may detect, using the graphical database, at least one error, based on at least one difference between the system parameters and the corresponding virtual parameters. The computing platform may input the at least one error, into the AI engine, wherein inputting the at least one error into the AI engine causes the AI engine to output at least one action to correct the at least one error. The computing platform may execute the at least one action to correct the at least one error on the simulated enterprise system. The computing platform may send one or more commands directing the enterprise system to upgrade the application within the enterprise system and execute the at least one action to correct the at least one error on the enterprise system, where sending the one or more commands causes the enterprise system to upgrade the application within the enterprise system and execute the at least one action to correct the at least one error.

In one or more instances, the computing platform may send a report comprising the at least one error and the at least one action to correct the at least one error and one or more commands directing the user device to display the report, where sending the one or more commands directing the user device to display the report causes the user device to display the report. In one or more examples, the report may be a graphical representation of the system parameters, the virtual parameters, and the at least one difference between the system parameters and the corresponding virtual parameters.

In one or more examples, the computing platform may modify the graphical database by updating the virtual parameters based on the at least one action to correct the at least one error and determine, based on the modifying, whether or not the at least one action corrected the at least one error, wherein the determining identifies whether or not there is at least one difference between the system parameters and the updated virtual parameters. The computing platform may send, to the AI engine, a notification indicating whether or not the at least one action corrected the at least one error.

In one or more instances, the computing platform may cause the AI engine to store the at least one action to correct the at least one error, and the determining whether the at least one action corrected the at least one error. In one or more examples, the computing platform may refine the AI engine based on the system parameters, the corresponding virtual parameters, the at least one difference between the system parameters and the corresponding virtual parameters, updates made to the values of the virtual parameters based on the at least one action to correct the at least one error, and information indicating whether or not the at least one error corrected the at least one action.

In one or more examples, the historical information may include the system parameters, the corresponding virtual parameters, the at least one difference between the system parameters and the corresponding virtual parameters, updates made to the values of the virtual parameters based on the at least one action to correct the at least one error, and the information indicating whether or not the at least one error corrected the at least one action. In one or more instances, the graphical database may store the system parameters, the virtual parameters, the at least one difference between the system parameters and the corresponding virtual parameters, and the updated virtual parameters.

In one or more instances, the computing platform may monitor the enterprise system after the sending the one or more commands directing the enterprise system to upgrade the application within the enterprise system and execute the

at least one action to correct the at least one error on the enterprise system. In one or more examples, the computing platform may include a real-time state of the enterprise system that is transmitted to the computing platform using a communication link.

These features, along with many others, are discussed in greater detail below.

BRIEF DESCRIPTION OF THE DRAWINGS

The present disclosure is illustrated by way of example and not limited in the accompanying figures in which like reference numerals indicate similar elements and in which:

FIGS. **1**A-**1**B depict an illustrative computing environment for implementing an AI supported graph enabled method to manage an application upgrade in accordance with one or more example embodiments;

FIGS. **2**A-**2**G depict an illustrative event sequence for implementing an AI supported graph enabled method to manage an application upgrade in accordance with one or more example embodiments;

FIG. **3** depicts an illustrative method for implementing an AI supported graph enabled method to manage an application upgrade in accordance with one or more example embodiments;

FIG. **4** depicts another illustrative method for implementing an AI support graph enabled method to manage an application upgrade in accordance with one or more example embodiments; and

FIGS. **5** and **6** depict illustrative graphical user interfaces for implementing an AI supported graph enabled method to manage an application upgrade in accordance with one or more example embodiments.

DETAILED DESCRIPTION

In the following description of various illustrative embodiments, reference is made to the accompanying drawings, which form a part hereof, and in which is shown, by way of illustration, various embodiments in which aspects of the disclosure may be practiced. In some instances, other embodiments may be utilized, and structural and functional modifications may be made, without departing from the scope of the present disclosure.

It is noted that various connections between elements are discussed in the following description. It is noted that these connections are general and, unless specified otherwise, may be direct or indirect, wired or wireless, and that the specification is not intended to be limiting in this respect.

As a brief introduction to the concepts described further herein, one or more aspects of the disclosure relate to managing an application within a computing system using an artificial intelligence (AI) supported graph enabled method. An application may include a computer software package that performs a specific function (e.g., word processors, database programs, web browsers, deployment tools, image editors, communication platforms, and the like). All applications may depend on specific versions of libraries of underlying software. During an upgrade of an application, a version of a library on which the application depends may change, which may cause the application to halt. Further, the change may also affect the larger computing system that the application is a part of, such as the performance of the system. Searching through the changed libraries and taking action to determine the issue separately would be an inefficient and time-consuming task. When an application is not functioning properly, it may be necessary to back trace and analyze the libraries that are impacted. It might not be possible to know that the libraries' versions are changed until they are manually reviewed.

Accordingly, described herein is an AI supported graph enabled system, which may be used to determine impacted libraries that may be corrected by an AI engine. Additionally, the graph enabled system may create an auto clone with parallel capture and tracking of machine parameters and performance of an application within a larger computing system. In some instances, the cloned virtual machines may run the current and upgraded versions, with the system and application performance and parameter changes being compared without disturbing the current setup. Additionally, the graph based system relationships may make the comparison and library selection in real-time. In some instances, the graph nodes may be replicated in the virtual system to track and compare the actual system performance and functioning with the original and replicated nodes linked together with dynamic replication relation-links.

Accordingly, the AI engine may comprise of complex neural networks that may trace the node differences on a real-time basis and suggest fixes to remediate identified errors. In some instances, hashgraph nodes may dynamically update based on remediation actions suggested to fix gaps and also provide libraries/package difference evaluation for analysis. The AI engine may further track any product fixes available in the market for better decision making in real-time mode and may also track other internal connected applications with similar setup to trace the fixes.

FIGS. **1**A-**1**B depict an illustrative computing environment for implementing an AI supported graph enabled method to manage upgrades for applications in accordance with one or more example embodiments. Referring to FIG. **1**A, computing environment **100** may include one or more computer systems. For example, computing environment **100** may include an application upgrade and analysis platform **102**, an enterprise system **103**, and user device **104**.

As described further below, application upgrade and analysis platform **102** may be a computer system that includes one or more computing devices (e.g., servers, server blades, or the like) and/or other computer components (e.g., processors, memories, communication interfaces) that may be used to train, host, and/or otherwise refine an artificial intelligence (AI) engine, which may be used to detect and correct errors resulting from application upgrades within a simulated version of a computing system, such as enterprise system **103**.

Enterprise system **103** may be a computer system that includes one or more computing devices (e.g., servers, server blades, a laptop computer, desktop computer, smartphone, smartwatch, tablet, and/or other device) and/or other computer components (e.g., processors, memories, communication interfaces). The enterprise system **103** may further collect, store, host, and otherwise run functions such as applications that a business may utilize in order to provide for a cross-functional system that provides organization-wide coordination and integration of key business processes that helps in planning the resources of an organization.

User device **104** may be a laptop computer, desktop computer, mobile device, tablet, smartphone, and/or other device, which may host, run, or otherwise request that an application be upgraded. In some instances, such upgrades may cause the application to contain errors, or cause errors to proliferate within enterprise system **103**. In some instances, user device **104** may be a user computing device that is used by an individual. In some instances, user device **104** may be an enterprise computing device that is used by

an administrator to host, run, or otherwise execute an application on the user device **104**. In some instances, user device **104** may be configured to display one or more user interfaces (e.g., interfaces depicting a notification that an error has been automatically corrected, or the like). Although only a single user device **104** is depicted, this is for illustrative purposes only, and any number of user devices may be implemented in the environment **100** without departing from the scope of the disclosure.

Computing environment **100** also may include one or more networks, which may interconnect application upgrade and analysis platform **102**, enterprise system **103**, and user device **104**. For example, computing environment **100** may include a network **101** (which may interconnect, e.g., application upgrade and analysis platform **102**, enterprise system **103**, and user device **104**).

In one or more arrangements, application upgrade and analysis platform **102**, enterprise system **103**, and user device **104** may be any type of computing device capable of sending and/or receiving requests and processing the requests accordingly. For example, application upgrade and analysis platform **102**, enterprise system **103**, and user device **104**, and/or the other systems included in computing environment **100** may, in some instances, be and/or include server computers, desktop computers, laptop computers, tablet computers, smart phones, or the like that may include one or more processors, memories, communication interfaces, storage devices, and/or other components. As noted above, and as illustrated in greater detail below, any and/or all of application upgrade and analysis platform **102**, enterprise system **103**, and user device **104** may, in some instances, be special-purpose computing devices configured to perform specific functions.

Referring to FIG. **1**B, application upgrade and analysis platform **102** may include one or more processors **111**, memory **112**, and communication interface **113**. A data bus may interconnect processor **111**, memory **112**, and communication interface **113**. Communication interface **113** may be a network interface configured to support communication between application upgrade and analysis platform **102** and one or more networks (e.g., network **101**, or the like). Memory **112** may include one or more program modules having instructions that when executed by processor **111** cause application upgrade and analysis platform **102** to perform one or more functions described herein and/or one or more databases that may store and/or otherwise maintain information which may be used by such program modules and/or processor **111**. In some instances, the one or more program modules and/or databases may be stored by and/or maintained in different memory units of application upgrade and analysis platform **102** and/or by different computing devices that may form and/or otherwise make up application upgrade and analysis platform **102**. For example, memory **112** may have, host, store, and/or include virtual clone machine (VCM) module **112***a*, graphical database **112***b*, and/or AI engine **112***c*.

VCM module **112***a* may have instructions that direct and/or cause application upgrade and analysis platform **102** to upgrade an application within a simulated version of the enterprise system **103** in order to detect and correct potential errors as a result of the application upgrade, as discussed in greater detail below. Graphical database **112***b* may store information used by the VCM module **112***a* and/or application upgrade and analysis platform **102** in the graphical representation of a simulated version of the enterprise system **103** in which an application has been upgraded (e.g., in order to detect any potential errors associated with the application upgrade), and/or in performing other functions. AI Engine **112***c* may be used by application upgrade and analysis platform **102** and/or VCM module **112***a* to determine actions to correct errors that were identified by the graphical database **112***b*, and to refine and/or otherwise update methods for determining actions to correct errors that have been identified by the graphical database **112***b*, and/or other methods described herein.

FIGS. **2**A-**2**G depict an illustrative event sequence for implementing an AI supported graph enabled method to manage upgrades for applications in accordance with one or more example embodiments. Referring to FIG. **2**A, at step **201**, the application upgrade and analysis platform **102** may train and/or otherwise configure an AI engine, using historical information, to identify actions to correct previously identified errors based on an application that has been upgraded (or otherwise updated) within a simulated version of the enterprise system **103**. In some instances, the application upgrade and analysis platform **102** may collect historical information for the detection and correction of errors in a plurality of applications across a plurality of computing devices (which may, e.g., include the enterprise system **103** and user device **104**). In some instances, the historical information may include previous errors and corresponding actions that successfully corrected the previous errors, previous errors and corresponding actions that unsuccessfully corrected the previous errors, and/or other information. For example, if a previous error was a missing library that caused an application to function improperly, and the action that successfully corrected the error was installing the missing library, then the historical information may be used to determine the same or similar action for a future error that is the same or similar to the previous error. In some instances, the historical information may include information related to the enterprise system **103**, which is discussed further below.

In some instances, the AI engine may utilize supervised learning, in which labeled data sets may be input into the AI engine (e.g., information including errors, actions corresponding to the errors, the level of confidence that a given action may successfully correct an error, information related to the enterprise system **103**, and the like), which may be used to classify information and accurately predict outcomes with respect to error detection and correction. Using labeled inputs and outputs, the AI engine may measure its accuracy and learn over time. For example, supervised learning techniques such as linear regression, classification, neural networking, and/or other supervised learning techniques may be used.

Additionally or alternatively, the AI engine may utilize unsupervised learning, in which unlabeled data may be input into the AI engine. For example, unsupervised learning techniques such as k-means, gaussian mixture models, frequent pattern growth, and/or other unsupervised learning techniques may be used. In some instances, the AI engine may be a combination of supervised and unsupervised learning. In doing so, the application upgrade and analysis platform **102** may dynamically and continuously update and/or otherwise refine the AI engine so as to increase accuracy of the AI engine over time.

Although step **201** is described with regard to historical information, the application upgrade and analysis platform **102** may, in some instances, additionally or alternatively use real-time information (similar to the historical information) at any point throughout the illustrative event sequence without departing from the scope of the disclosure. For example, real-time information may be sent from one or

more data sources, which may, e.g., include user computing devices, and/or other data sources.

At step **202**, the user device **104** may establish a connection with the application upgrade and analysis platform **102**. For example, the user device **104** may establish a first wireless data connection with the application upgrade and analysis platform **102** to link the user device **104** to the application upgrade and analysis platform **102** (e.g., in preparation for sending a request to upgrade an application). In some instances, the user device **104** may identify whether or not a connection is established with the application upgrade and analysis platform **102**. If a connection is already established with the application upgrade and analysis platform **102**, the user device **104** might not re-establish the connection. If a connection is not yet established with the application upgrade and analysis platform **102**, the user device **104** may establish the first wireless data connection as described herein.

At step **203**, the user device **104** may send a request to upgrade an application to the application upgrade and analysis platform **102**. For example, the user device **104** may send the request to upgrade an application to the application upgrade and analysis platform **102** while the first wireless data connection is established. The request to upgrade an application may include information that, when received by the application upgrade and analysis correction platform **102**, may identify the particular application to be upgraded.

At step **204**, the application upgrade and analysis platform **102** may receive the request to upgrade an application. In some instances, the application upgrade and analysis platform **102** may receive the application upgrade request via the communication interface **113** and while the first wireless data connection is established. In some instances, (e.g., if the application is stored locally on the user device **104**) the request may include a copy of the application. In some instances, the application upgrade and analysis platform **102** may, in response to receiving the request, send one or more commands to the user device **104**, directing the user device **104** to transfer a copy of the application from the user device **104** to the application upgrade and analysis platform **102**. In some instances, a copy of the application may be stored on the application upgrade and analysis platform **102**. In some examples, the request may contain a location in which the application upgrade and analysis platform **102** may access the application. In some arrangements, the application may be stored on the enterprise system **103**, and the application upgrade and analysis platform **102** may, in response to receiving the request, send one or more commands to the enterprise system **103**, directing the enterprise system **103** to transfer a copy of the application from the enterprise system **103** to the application upgrade and analysis platform **102**.

Although the transmission and receipt of the application upgrade request and other information are described at steps **203** and **204**, additional information may also be sent to and/or received by the application upgrade and analysis platform **102** without departing from the scope of the disclosure (e.g., a request to upgrade a plurality of applications rather than a single application). In some instances, information may be sent by the user device **104**, enterprise system **103**, and/or one or more other computing devices.

At step **205**, the application upgrade and analysis platform **102** may establish a connection with the enterprise system **103**. For example, the enterprise system **103** may establish a second wireless data connection with the application upgrade and analysis platform **102** to link the enterprise system **103** to the application upgrade and analysis platform **102** (e.g., in preparation for sending a real-time feed of the enterprise system **103**). In some instances, the enterprise system **103** may identify whether or not a connection is established with the application upgrade and analysis platform **102**. If a connection is already established with the application upgrade and analysis platform **102**, the enterprise system **103** might not re-establish the connection. If a connection is not yet established with the application upgrade and analysis platform **102**, the enterprise system **103** may establish the second wireless data connection as described herein.

Referring to FIG. **2**B, at step **206**, application upgrade and analysis platform **102** may request a real-time feed from the enterprise system **103**. In some instances, the real-time feed may include information relating to the status or operation of the enterprise system **103**, metadata relating to the enterprise system **103**, and/or the like (e.g., application-specific parameters, CPU utilization, available computing power, performance, memory, and/or other information). For example, application upgrade and analysis platform **102** may send the request to the enterprise system **103** while the second wireless data connection is established. The request may include information that, when received by the enterprise system **103**, directs the enterprise system to send a real-time feed to the application upgrade and analysis platform **102**.

At step **207**, the enterprise system **103** may receive the request. For example, the enterprise system **103** may receive the request via the communication interface **113** and while the second wireless data connection is established. In some instances, in receiving the request, the enterprise system **103** may be directed by the application upgrade and analysis platform **102** to transmit a real-time feed of the enterprise system **103** to the application upgrade and analysis platform **102**.

At step **208**, the enterprise system **103** may transmit a real-time feed of the enterprise system **103** to the application upgrade and analysis platform **102**. For example, enterprise system **103** may transmit the real-time feed while the second wireless data connection is established. In some instances, the enterprise system **103** may continuously transmit the real-time feed throughout any of the below steps without departing from the scope of the disclosure.

At step **209**, the application upgrade and analysis platform **102** may receive the real-time feed of the enterprise system **103**. For example, application upgrade and analysis platform **102** may receive the real-time feed while the second wireless data connection is established. In some instances, a virtual control machine (VCM) module **112***a*, that may include a first virtual control machine (VCM), may receive the real-time feed of the enterprise system **103**.

Although the below steps are described sequentially, they may be performed in parallel by the application upgrade and analysis platform **102** without departing from the scope of the disclosure.

At step **210**, the application upgrade and analysis platform **102** may extract metadata from the real-time feed of the enterprise system **103**. In some instances, the metadata extraction may be performed by the first VCM. Additionally or alternatively, the metadata may be extracted by a root process automation (RPA) bot. In some instances, extracting the metadata may include extracting information relating to the enterprise system **103**, such as the identity, version, related libraries, hardware, and software of the enterprise system **103**. In some instances, the metadata may include the underlying aspects or characteristics of the enterprise system **103**, such as the performance of the enterprise system **103**, memory associated with the enterprise system **103**, the central processing unit (CPU) utilization of the enterprise

system **103**, and/or the like. In some instances, the metadata may include information about particular applications within the enterprise system **103**, and may further include the underlying libraries and dependencies of the applications. In some instances, the metadata may include information regarding the relations between the applications within the enterprise system **103**, the performance of the enterprise system **103**, the memory of the enterprise system **103**, the CPU utilization of the enterprise system **103**, and/or the like.

At step **211**, the application upgrade and analysis platform **102** may create system parameters based on the metadata that was extracted in step **210**. In some instances, the first VCM may create the system parameters. For example, a particular system parameter may be an entity that represents a particular characteristic that was extracted from the metadata of the enterprise system **103**, such as the performance of the enterprise system **103**, memory associated with the enterprise system **103**, the CPU utilization of the enterprise system **103**, and/or the like. In some instances, a system parameter may represent information about a particular application within the enterprise system. In some instances, system parameters may include information relating to the underlying libraries of an application. In some instances, the system parameters may include information about the relations between the applications within the enterprise system **103**, the performance of the enterprise system **103**, the memory of the enterprise system **103**, the CPU utilization of the enterprise system **103**, and/or the like.

Referring to FIG. **2**C, at step **212**, application upgrade and analysis platform **102** may store the system parameters. In some instances, the system parameters may be stored in a graphical database.

At step **213**, the application upgrade and analysis platform **102** may clone the system parameters. In some instances, the first VCM may clone the system parameters. For example, the cloned system parameters may be replicas of the various system parameters that were created in step **211**, such as the performance of the enterprise system **103**, memory associated with the enterprise system **103**, the CPU utilization of the enterprise system **103**, and/or the like. In some instances, the cloned system parameters may be replicas of system parameters such as particular applications within the enterprise system **103**, that may further include the underlying libraries of the applications. In some instances, the cloned system parameters may be modified based on upgrading an application, which is discussed further below.

In cloning the system parameters at step **213**, the application upgrade and analysis platform **102** may create a simulated version of the enterprise system **103**. In some instances, the simulated version of the enterprise system **103** may continuously track the enterprise system **103** in real-time due to the real-time feed received in step **210**.

At step **214**, the application upgrade and analysis platform **102** may upgrade an application within the simulated version of the enterprise system **103**. For example, a second VCM of the VCM module **112***a* may upgrade the application within the simulated version of the enterprise system **103**. In some instances, the second VCM may perform the application upgrade using a copy of the application. In this way, the application upgrade that was requested by the user device **104** may be performed in a simulated, or virtual environment, within the application upgrade and analysis platform **102** without affecting the functioning of the enterprise system **103**. In some instances, the application upgrade and analysis platform **102** may modify the cloned system parameters based on the application upgrade. For example, a cloned system parameter representing the application-to-be-upgraded may be replaced with the upgraded application. As a result, the application upgrade and analysis platform **102** may upgrade the application within the simulated version of the enterprise system **103**.

At step **215**, the application upgrade and analysis platform **102** may test the application upgrade. For example, the application upgrade and analysis platform **102** may use the second VCM to test how the upgraded application may have affected the simulated version of the enterprise system **103**. Additionally or alternatively, an RPA bot may test the application upgrade. In some instances, the testing performed at step **216** may determine how the enterprise system **103** would have been affected had the application upgrade occurred within the enterprise system **103** rather than the simulated version of the enterprise system **103**.

Additionally or alternatively, the application upgrade and analysis platform **102** may initialize executable instructions configured to test the application upgrade. In some instances, the instructions may be stored at the application upgrade and analysis platform **102**, such as in memory **112**. In some instances, the instructions may be stored at a computing device (i.e., enterprise system, user device **104**), which the application upgrade and analysis platform **102** may access, using, for example, the first and/or second wireless data connection. The instructions, when executed, may direct the application upgrade and analysis platform **102** to test the application upgrade that has been requested by the user device **104**.

In some instances, testing may refer to executing a plurality of test scenarios, or permutations, that may be performed by the application upgrade and analysis platform **102**, in order to determine how the application upgrade may have affected other aspects of the simulated version of the enterprise system **103**, such as the performance of the simulated version of enterprise system **103**, memory associated with the simulated version of enterprise system **103**, the CPU utilization of the simulated version of enterprise system **103**, and/or the like.

Referring to FIG. **2**D, at step **216**, the application upgrade and analysis platform **102** may create virtual parameters. For example, a particular virtual parameter may be an entity, feature, object, and/or other information that represents a particular aspect or characteristic of the simulated version of the enterprise system **103**, such as the performance of the simulated version of the enterprise system **103**, memory associated with simulated version of the enterprise system **103**, the CPU utilization of the simulated version of the enterprise system **103**, and/or the like. In some instances, a virtual parameter may represent information about particular applications within the simulated version of the enterprise system **103**, such as the upgraded application. In some instances, virtual parameters may include information relating to the underlying libraries of the applications within the simulated version of the enterprise system **103**. In some instances, the virtual parameters may include information about the relations between the applications within the simulated version of the enterprise system **103**, the performance of the simulated version of the enterprise system **103**, the memory of the simulated version of the enterprise system **103**, the CPU utilization of the simulated version of the enterprise system **103**, and/or the like.

In some instances, virtual parameters may correspond to the system parameters, such as a virtual parameter representing the performance of the simulated version of the enterprise system **103** after the application has been upgraded within the simulated version of the enterprise

system **103**, and a corresponding system performance parameter that represents the performance of the enterprise system **103** without the application upgrade. The comparison between the value of the virtual performance parameter and the value of the system performance parameter may, for example, represent a difference in the performance of the simulated version of the enterprise system **103** after the application upgrade, and the enterprise system **103** without the application upgrade. In this way, the application upgrade and analysis platform **102** may simulate how the application upgrade would have affected the performance of the enterprise system **103** had the application been upgraded within the enterprise system **103** rather than the simulated version of the enterprise system **103**. Various corresponding parameters, such as memory, CPU utilization, application-to-be-upgraded/upgrade application, and/or the like may be simulated in a similar manner. In this way, issues relating to the application upgrade may be simulated in a controlled environment rather than the enterprise system **103** itself.

At step **217**, the application upgrade and analysis platform **102** may store the virtual parameters. For example, the virtual parameters may be stored in a graphical database. In some instances, the graphical database may be modified to store the virtual parameters with the system parameters that were previously stored in step **212**. Because virtual parameters may have corresponding system parameters, a preexisting relationship may exist between the virtual parameters and the system parameters that may be graphically represented by the graphical database as a collection of system nodes and virtual nodes, which is discussed in greater detail below.

At step **218**, the application upgrade and analysis platform **102** may create system nodes. For example, the graphical database may be configured to convert each of the system parameters that were previously stored into system nodes, such as an application node, a performance node, a memory node, a CPU utilization node, and/or the like. In some instances, a system node may be a graphical representation of a particular system parameter, and may be, for example, a hexadecimal entity including a static component, representing, i.e., the node's identity, such as the node being a performance node, and a dynamic component, such as the value of the performance node at a particular time. In some instances, the graphical database may link the system nodes together based on pre-existing relations between the system parameters.

At step **219**, the application upgrade and analysis platform **102** may create virtual nodes. For example, the graphical database may be configured to convert each of the system virtual parameters that were previously stored into virtual nodes, such as a virtual application node, a virtual performance node, a virtual memory node, a virtual CPU utilization node, and/or the like. In some instances, a virtual node may be a graphical representation of a particular virtual parameter, and may be, for example, a hexadecimal entity including a static component, representing, i.e., the node's identity, such as the node being a virtual performance node, and a dynamic component, such as the value of the virtual performance node at a particular time. In some instances, the graphical database may link the virtual nodes together based on pre-existing relations between the virtual parameters.

Referring to FIG. **2**E, at step **220**, the application upgrade and analysis platform **102** may dynamically link the system nodes to the virtual nodes. For example, the graphical database may dynamically link a particular system node to a virtual node based on the correspondence between the system parameters and the virtual parameters, such as an application-to-be-upgraded node and a corresponding virtual upgraded application node, a performance node and a corresponding virtual performance node, a memory node and a corresponding virtual memory node, a CPU utilization node and a corresponding virtual CPU utilization node, and/or the like. In this way, the dynamic linking between the system nodes and the virtual nodes may detect any differences or changes relating to the application upgrade that was performed within the simulated version of the enterprise system **103** as compared to the enterprise system **103**.

At step **221**, the application upgrade and analysis platform **102** may detect errors based on the dynamic linking performed in step **220**. For example, a dynamic link between a performance node and a virtual performance node may represent the difference between the performance of the simulated version of the enterprise system **103** after the application upgrade and the performance of the enterprise system **103** in which the application has not been upgraded. In this way, an error or issue with respect to the performance of the simulated version of the enterprise system **103** may be detected by the graphical database. Similar errors may be detected with respect to memory, CPU utilization, and/or the like.

For example, a dynamic link between an application-to-be-upgraded node and the upgraded application node may represent the difference between the application-to-be-upgraded running on the enterprise system **103** and the upgraded application running on the simulated version of the enterprise system **103**. For example, the dynamic link may include a value corresponding to the discrepancy between its two connecting nodes, such as the application-to-be-upgraded node and the upgraded application node. In some instances, in upgrading the application, an error may be caused by, for example, a missing or incorrect version of a library that the upgraded application depends on, which may be detected by the graphical database.

At step **222**, the application upgrade and analysis platform **102** may determine actions to correct the errors that were detected in step **221**. For example, a third VCM of the VCM module **112***a* may send the errors from the graphical database to an AI engine to determine actions to correct the errors. Additionally or alternatively, an RPA bot may send the errors to the AI engine. In some instances, the third VCM may send information relating to the discrepancy between two nodes connected by a dynamic link, such as the application-to-be-upgraded node and the upgraded application node, which may be input into the AI engine in order to determine an action to correct an error that was identified by the graphical database. In some instances, the application upgrade and analysis platform **102** may configure the AI engine to identify and/or otherwise compute a confidence score, which may represent a level of confidence that a particular action will correct an identified error. In some instances, the confidence score may be a numerical value (e.g., 0.9). In some instances, the confidence score may be a percentage (e.g., 90%).

In some instances, the application upgrade and analysis platform **102** may display a graphical user interface similar to graphical user interface **505**, which is illustrated in FIG. **5**. For example, the application upgrade and analysis platform **102** may display information related to errors that were detected and proposed actions to correct the errors. For example, if the error was due to a missing library within the upgraded application, the AI engine may determine which particular library is missing and determine the particular missing library as the action to correct the error. Additionally or alternatively, if the error was due to a drop in performance

after the application upgrade, the AI engine may determine that an incorrect or previous version of a library within the upgraded application to be the cause of the performance drop, and determine the correct or most recent version of the library as the action to correct the error. The AI engine may determine similar actions to correct identified errors relating to memory, CPU utilization, and/or the like.

At step **223**, the application upgrade and analysis platform **102** may update the virtual nodes based on the actions that were identified by the AI engine. In some instances, actions that were previously determined by the AI engine in step **222** may be passed to the graphical database by the third VCM and used by the graphical database to modify the virtual nodes based on the actions. For example, a new library may be used to modify a virtual node that represents the upgraded application with the new library in place of the incorrect version. Additionally or alternatively, the virtual parameters may be updated to reflect similar changes.

Although the VCM Module **112***a* was described as having a first VCM, a second VCM, and a third VCM, the VCM Module **112***a* may be configured with more or less than three VCMs without departing from the scope of the present disclosure. Having multiple VCMs within a VCM module **112***a* may be advantageous due to the benefit of load balancing within the VCM module **112***a*, as well as efficiently allocating computing resources within the application upgrade and analysis platform **102**.

Referring to FIG. **2**F, at step **224**, the application upgrade and analysis platform **102** may dynamically link the system nodes to the updated virtual nodes. In some instances, the graphical database may determine if the previously identified errors were corrected by the actions based on the dynamic linking between the system nodes and the updated virtual nodes. This represents, for example, if the change to the simulated version of the enterprise system **103** fixes the errors based on the actions that were determined by the AI engine. For example, the application upgrade and analysis platform **102** may identify whether all discrepancies between the system nodes and the virtual nodes have been eliminated. In some instances, the graphical database may send a notification to the AI engine based on whether the actions corrected the errors. In some instances, if errors continue to persist, the application upgrade and analysis platform may return to step **222** to determine one or more additional actions to correct errors.

At step **225**, the application upgrade and analysis platform **102** may generate a final report. In some instances, in generating the final report, the application upgrade and analysis platform **102** may include information about the error, the action that corrected the error, and/or other information. In some instances, in generating the final report, the application upgrade and analysis platform **102** may further include information about the application that was upgraded, the system parameters, the virtual parameters, the system nodes, the virtual nodes, the updated virtual nodes, the dynamic links between the system nodes and the virtual noes, and the dynamic links between the system nodes and the updated virtual nodes. In some instances, in generating the final report, the application upgrade and analysis platform **102** may further include information explaining in more detail any of the previously mentioned details. In some instances, in generating the final report, the application upgrade and analysis platform **102** may further include a graphical representation of the previously mentioned details.

At step **226**, the application upgrade and analysis platform **102** may store the final report. In some instances, the final report may be stored in the AI engine. In some instances, the final report may be stored in the graphical database. In some instances, the application upgrade and analysis platform **102** may store the final report in memory associated with the application upgrade and analysis platform **102**.

At step **227**, the application upgrade and analysis platform **102** may send the final report to the user device **104**. In some instances, application upgrade and analysis platform **102** may send the final report to the user device **104** via the communication interface **113** and while the first wireless data connection is established. Additionally or alternatively, an RPA bot may send the final report to the user device **104** via the communication interface **113** and while the second first wireless data is established. At step **228**, the user device **104** may receive the final report. The final report may include one or more commands, that, when received by the user device **104**, directs the user device **104** to display the final report.

In some instances, the user device **104** may determine whether to direct the application upgrade and analysis platform **102** to execute the application upgrade on the enterprise system **103** as well as send instructions causing the enterprise system **103** to execute the actions to correct the errors. In some instances, the enterprise system **103** may automatically upgrade the application and execute the actions to correct the errors within the enterprise system **103** without prior approval from the user device **104**. In some instances, the application upgrade and analysis platform **102** may monitor the enterprise system **103** after the application upgrade and execution of the actions using, for example, the second wireless connection.

Referring to FIG. **2**G, at step **229**, based on or in response to the one or more commands directing the user device **104** to display the final report, the user device **104** may display the final report received at step **228**. In some instances, the user device **104** may display a graphical user interface similar to graphical user interface **605**, which is illustrated in FIG. **6**. For example, the user device **104** may display that the errors that were previously detected have been corrected by the proposed actions with the application upgrade and analysis platform **102**.

At step **230**, the application upgrade and analysis platform **102** may update the AI engine. For example, the AI engine may be updated based on the outputs of steps **211**, **215**, **216**, **218**-**224**, and/or feedback received from the user device **104** and/or enterprise system **103**. In doing so, the application upgrade and analysis platform **102** may dynamically and continuously update and/or otherwise refine the AI engine so as to increase accuracy of the AI engine over time. In some instances, the historical information used to train the AI engine in step **201** may further include the system parameters, the virtual parameters, the system nodes, the virtual nodes, the dynamic links between the system nodes and the virtual nodes, the dynamic links between the system nodes and the updated virtual nodes, the actions to correct the identified errors, and the determination whether the actions corrected the identified errors.

In some instances, the application upgrade and analysis platform **102** may update the AI engine using information that may include the identified errors, the actions to correct the identified errors, the level of confidence that a given action may successfully correct an error, and/or other information. In some instances, application upgrade and analysis platform **102** may update the AI engine based on the percentage of times actions successfully corrected corresponding errors with respect to a particular confidence score (e.g., 95% success rate at a confidence score of 0.9). Additionally or alternatively, the application upgrade and

analysis platform **102** may update the AI engine based on the percentage of times actions unsuccessfully corrected corresponding errors with respect to a particular confidence score (e.g., 15% failure rate at a confidence score of 0.7). In some instances, the confidence score may be compared to an accuracy threshold, above which the AI engine may be updated, and below which, the AI engine may not be updated, in order to increase the accuracy of the AI engine over time, while taking into account the processing costs associated with updating the AI engine.

FIG. **3** depicts an illustrative method for implementing an AI supported graph enabled method to manage upgrades for applications in accordance with one or more example embodiments. At step **305**, a computing platform having at least one processor, a communication interface, and memory may train an AI engine using historical information. At step **310**, the computing platform may receive a request to upgrade an application.

At step **315**, the computing platform may create system parameters associated with the enterprise system **103**. At step **320**, the computing platform may store the system parameters in a graphical database. At step **325**, the computing platform may create virtual parameters based on the upgrading of the application within a simulated version of the enterprise system **103**. At step **330**, the computing platform may store the virtual parameters.

At step **335**, the computing platform may detect errors. At step **340**, the computing system may input errors into an AI engine. At step **345**, the AI engine may output actions to correct the errors. At step **350**, the computing system may execute the actions to correct the errors. At step **355**, the computing platform may update the AI engine.

FIG. **4** depicts another illustrative method for implementing an AI supported graph enabled method to manage upgrades for applications in accordance with one or more example embodiments. At step **405**, a computing platform having at least one processor, a communication interface, and memory may train an AI engine using historical information. At step **410**, the computing platform may receive system parameters associated with the enterprise system **103** and virtual parameters based on the upgrading of the application within a simulated version of the enterprise system **103**. At step **415**, the computing platform may store the system parameters and the virtual parameters in a graphical database.

At step **420**, the computing platform may create system nodes and virtual nodes based on the system parameters and the virtual parameters. At step **425**, the computing platform may dynamically link the system nodes and the virtual nodes. At step **430**, the computing platform may detect errors based on the dynamic linking performed in step **425**.

At step **435**, the computing system may input errors into an AI engine. At step **440**, the AI engine may output actions to correct the errors. At step **445**, the computing system may update the virtual nodes based on the actions to correct the errors. At step **450**, the graphical database may dynamically link the system nodes to the updated virtual nodes. At step **455**, the computing system may determine whether the errors were corrected by the actions. If the actions did not correct the errors or if new errors are detected, the computing system may proceed to step **435**. If the actions corrected the errors and new errors are not detected, the computing system may proceed to step **460**. At step **460**, the computing platform may update the AI engine.

One or more aspects of the disclosure may be embodied in computer-usable data or computer-executable instructions, such as in one or more program modules, executed by one or more computers or other devices to perform the operations described herein. Generally, program modules include routines, programs, objects, components, data structures, and the like that perform particular tasks or implement particular abstract data types when executed by one or more processors in a computer or other data processing device. The computer-executable instructions may be stored as computer-readable instructions on a computer-readable medium such as a hard disk, optical disk, removable storage media, solid-state memory, RAM, and the like. The functionality of the program modules may be combined or distributed as desired in various embodiments. In addition, the functionality may be embodied in whole or in part in firmware or hardware equivalents, such as integrated circuits, application-specific integrated circuits (ASICs), field programmable gate arrays (FPGA), and the like. Particular data structures may be used to more effectively implement one or more aspects of the disclosure, and such data structures are contemplated to be within the scope of computer executable instructions and computer-usable data described herein.

Various aspects described herein may be embodied as a method, an apparatus, or as one or more computer-readable media storing computer-executable instructions. Accordingly, those aspects may take the form of an entirely hardware embodiment, an entirely software embodiment, an entirely firmware embodiment, or an embodiment combining software, hardware, and firmware aspects in any combination. In addition, various signals representing data or events as described herein may be transferred between a source and a destination in the form of light or electromagnetic waves traveling through signal-conducting media such as metal wires, optical fibers, or wireless transmission media (e.g., air or space). In general, the one or more computer-readable media may be and/or include one or more non-transitory computer-readable media.

As described herein, the various methods and acts may be operative across one or more computing servers and one or more networks. The functionality may be distributed in any manner, or may be located in a single computing device (e.g., a server, a client computer, and the like). For example, in alternative embodiments, one or more of the computing platforms discussed above may be combined into a single computing platform, and the various functions of each computing platform may be performed by the single computing platform. In such arrangements, any and/or all of the above-discussed communications between computing platforms may correspond to data being accessed, moved, modified, updated, and/or otherwise used by the single computing platform. Additionally or alternatively, one or more of the computing platforms discussed above may be implemented in one or more virtual machines that are provided by one or more physical computing devices. In such arrangements, the various functions of each computing platform may be performed by the one or more virtual machines, and any and/or all of the above-discussed communications between computing platforms may correspond to data being accessed, moved, modified, updated, and/or otherwise used by the one or more virtual machines.

Aspects of the disclosure have been described in terms of illustrative embodiments thereof. Numerous other embodiments, modifications, and variations within the scope and spirit of the appended claims will occur to persons of ordinary skill in the art from a review of this disclosure. For example, one or more of the steps depicted in the illustrative figures may be performed in other than the recited order, and

one or more depicted steps may be optional in accordance with aspects of the disclosure.

What is claimed is:

1. A computing platform comprising:

at least one processor;

a communication interface communicatively coupled to the at least one processor; and

memory storing computer-readable instructions that, when executed by the at least one processor, cause the computing platform to:

train, based on historical information, an artificial intelligence (AI) engine to identify, based on the historical information, application upgrade errors and corresponding actions to correct the errors;

create a simulated enterprise system, wherein the simulated enterprise system comprises system parameters that represent characteristics of an enterprise system and is modified by upgrading a copy of an application within the simulated enterprise system;

create virtual parameters that represent characteristics of the simulated enterprise system that was modified by the upgrading and correspond to the system parameters, wherein:

each virtual parameter that represents a characteristic of the simulated enterprise system corresponds to a system parameter that represents a corresponding characteristic of the enterprise system; and

differences between values of the virtual parameters and values of the corresponding system parameters represent differences between the characteristics of the simulated enterprise system and the corresponding characteristics of the enterprise system;

create system nodes based on the system parameters and virtual nodes based on the virtual parameters, wherein the system nodes are linked together based on relationships between the system parameters, and the virtual nodes are linked together based on relationships between the virtual parameters;

dynamically link the system nodes to the virtual nodes based on the correspondence between the system parameters and the virtual parameters;

detect at least one error, wherein detecting the at least one error comprises identifying that at least one dynamic link indicates a discrepancy between a system node and a corresponding virtual node;

input the at least one error, into the AI engine, wherein inputting the at least one error into the AI engine causes the AI engine to output at least one action to correct the at least one error;

execute the at least one action to correct the at least one error on the simulated enterprise system; and

send one or more commands directing the enterprise system to upgrade the application within the enterprise system and execute the at least one action to correct the at least one error on the enterprise system, wherein sending the one or more commands causes the enterprise system to upgrade the application within the enterprise system and execute the at least one action to correct the at least one error.

2. The computing platform of claim 1, wherein the memory stores additional computer-readable instructions that, when executed by the at least one processor, cause the computing platform to send a report comprising the at least one error and the at least one action to correct the at least one error and the one or more commands directing a user device to display the report, wherein sending the one or more commands directing the user device to display the report causes the user device to display the report.

3. The computing platform of claim 2, wherein the report further comprises a graphical representation of the system parameters, the virtual parameters, and the at least one difference between the system parameters and the corresponding virtual parameters.

4. The computing platform of claim 1, wherein the memory stores additional computer-readable instructions that, when executed by the at least one processor, cause the computing platform to:

store the system parameters in a graphical database; and

store, by modifying the graphical database, the virtual parameters with the system parameters.

5. The computing platform of claim 4, wherein the memory stores additional computer-readable instructions that, when executed by the at least one processor, cause the computing platform to:

modify the graphical database by updating the values of the virtual parameters based on the at least one action to correct the at least one error;

determine, based on the modifying, whether or not the at least one action corrected the at least one error, wherein the determining identifies whether or not there is at least one difference between the system parameters and the updated virtual parameters; and

send, to the AI engine, a notification indicating whether or not the at least one action corrected the at least one error.

6. The computing platform of claim 5, wherein the memory stores additional computer-readable instructions that, when executed by the at least one processor, cause the AI engine to store the at least one action to correct the at least one error, and the notification indicating whether or not the at least one action corrected the at least one error.

7. The computing platform of claim 5, further comprising refining the AI engine based on:

the system parameters, the corresponding virtual parameters, and the at least one difference between the system parameters and the corresponding virtual parameters;

the updates made to the values of the virtual parameters based on the at least one action to correct the at least one error; and

information indicating whether or not the at least one error corrected the at least one action.

8. The computing platform of claim 5, wherein the historical information comprises:

the system parameters, the corresponding virtual parameters, and the at least one difference between the system parameters and the corresponding virtual parameters;

the updates made to the values of the virtual parameters based on the at least one action to correct the at least one error; and

the information indicating whether or not the at least one error corrected the at least one action.

9. The computing platform of claim 5, wherein the graphical database stores the system parameters, the virtual parameters, the at least one difference between the system parameters and the corresponding virtual parameters, and the updated virtual parameters.

10. The computing platform of claim 1, wherein the memory stores additional computer-readable instructions that, when executed by the at least one processor, cause the computing platform to monitor the enterprise system after the sending the one or more commands directing the enterprise system to upgrade the application within the enterprise

system and execute the at least one action to correct the at least one error on the enterprise system.

11. The computing platform of claim **1**, wherein a real-time state of the enterprise system is transmitted to the computing platform using a communication link.

12. The computing platform of claim **1**, wherein the memory stores additional computer-readable instructions that, when executed by the at least one processor, cause the computing platform to:

receive, from a user device, a request to upgrade the application within the enterprise system.

13. A method comprising:

at a computing platform comprising at least one processor, a communication interface, and memory:

training, based on historical information, an artificial intelligence (AI) engine to identify, based on the historical information, application upgrade errors and corresponding actions to correct the errors;

creating a simulated enterprise system, wherein the simulated enterprise system comprises system parameters that represent characteristics of an enterprise system and is modified by upgrading a copy of an application within the simulated enterprise system;

creating virtual parameters that represent characteristics of the simulated enterprise system and correspond to the system parameters, wherein:

each virtual parameter that represents a characteristic of the simulated enterprise system corresponds to a system parameter that represents a corresponding characteristic of the enterprise system; and

differences between values of the virtual parameters and values of the corresponding system parameters represent differences between the characteristics of the simulated enterprise system and the corresponding characteristics of the enterprise system;

creating system nodes based on the system parameters and virtual nodes based on the virtual parameters, wherein the system nodes are linked together based on relationships between the system parameters, and the virtual nodes are linked together based on relationships between the virtual parameters;

dynamically linking the system nodes to the virtual nodes based on the correspondence between the system parameters and the virtual parameters;

detecting at least one error, wherein detecting the at least one error comprises identifying that at least one dynamic link indicates a discrepancy between a system node and a corresponding virtual node;

inputting the at least one error, into the AI engine, wherein inputting the at least one error into the AI engine causes the AI engine to output at least one action to correct the at least one error;

executing the at least one action to correct the at least one error on the simulated enterprise system; and

sending one or more commands directing the enterprise system to upgrade the application within the enterprise system and execute the at least one action to correct the at least one error on the enterprise system, wherein sending the one or more commands causes the enterprise system to upgrade the application within the enterprise system and execute the at least one action to correct the at least one error.

14. The method of claim **13**, further comprising sending a report comprising the at least one error and the at least one action to correct the at least one error and one or more commands directing a user device to display the report, wherein sending the one or more commands directing the user device to display the report causes the user device to display the report.

15. The method of claim **14**, wherein the sending the report further comprises sending a graphical representation of the system parameters, the virtual parameters, and the at least one difference between the system parameters and the corresponding virtual parameters.

16. The method of claim **13**, further comprising:

modifying a graphical database by updating the values of the virtual parameters based on the at least one action to correct the at least one error;

determining, based on the modifying, whether or not the at least one action corrected the at least one error, wherein the determining identifies whether or not there is at least one difference between the system parameters and the updated virtual parameters; and

sending, to the AI engine, a notification indicating whether or not the at least one action corrected the at least one error.

17. The method of claim **16**, further comprising, storing, in the AI engine, the at least one action to correct the at least one error, and the notification indicating whether or not the at least one action corrected the at least one error.

18. The method of claim **13**, further comprising:

receiving, from a user device, a request to upgrade the application within the enterprise system.

19. The method of claim **16**, further comprising refining the AI engine based on:

the system parameters, the corresponding virtual parameters, and the at least one difference between the system parameters and the corresponding virtual parameters;

the updates to the values of the virtual parameters based on the at least one action to correct the at least one error; and

information indicating whether or not the at least one error corrected the at least one action.

20. One or more non-transitory computer-readable media storing instructions that, when executed by a computing platform comprising at least one processor, a communication interface, and memory, cause the computing platform to:

train, based on historical information, an artificial intelligence (AI) engine to identify, based on the historical information, application upgrade errors and corresponding actions to correct the errors;

create a simulated enterprise system, wherein the simulated enterprise system comprises system parameters that represent characteristics of an enterprise system and is modified by upgrading a copy of an application within the simulated enterprise system;

create virtual parameters that represent characteristics of the simulated enterprise system that was modified by the upgrading and correspond to the system parameters, wherein:

each virtual parameter that represents a characteristic of the simulated enterprise system corresponds to a system parameter that represents a corresponding characteristic of the enterprise system; and

differences between values of the virtual parameters and values of the corresponding system parameters represent differences between the characteristics of the simulated enterprise system and the corresponding characteristics of the enterprise system;

create system nodes based on the system parameters and virtual nodes based on the virtual parameters, wherein the system nodes are linked together based on relation-

ships between the system parameters, and the virtual nodes are linked together based on relationships between the virtual parameters;

dynamically link the system nodes to the virtual nodes based on the correspondence between the system parameters and the virtual parameters;

detect at least one error, wherein detecting the at least one error comprises identifying that at least one dynamic link indicates a discrepancy between a system node and a corresponding virtual node;

input the at least one error, into an artificial intelligence (AI) engine, wherein inputting the at least one error into the AI engine causes the AI engine to output at least one action to correct the at least one error;

execute the at least one action to correct the at least one error on the simulated enterprise system; and

send one or more commands directing the enterprise system to upgrade the application within the enterprise system and execute the at least one action to correct the at least one error on the enterprise system, wherein sending the one or more commands causes the enterprise system to upgrade the application within the enterprise system and execute the at least one action to correct the at least one error.

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