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(54) Title: SYSTEM AND METHOD FOR RECEIVING AND WRITING INCOMING DATA WRITES BASED ON DATA WRITE LATENCY

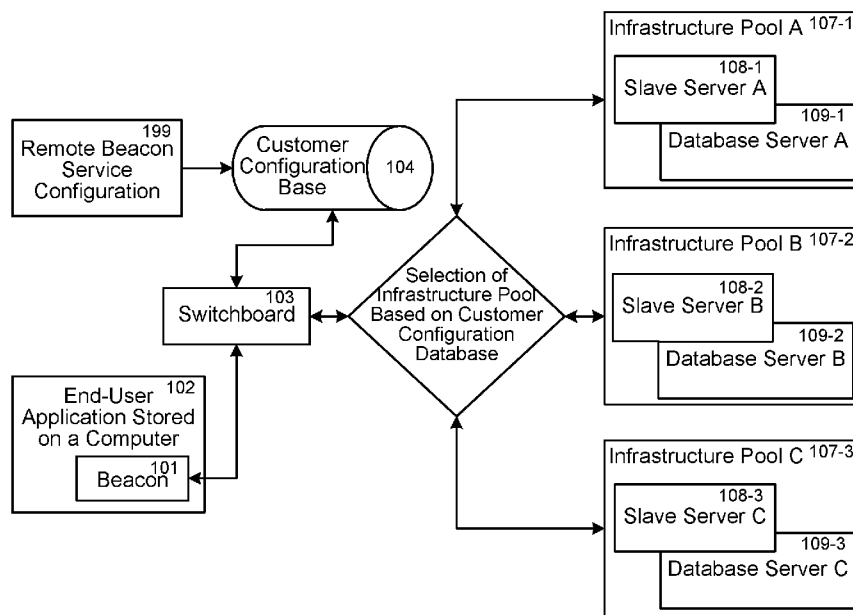


FIGURE 1

(57) Abstract: A system and method for retrieving and writing data based on data write latency. The system may include a switchboard configured to connect to a beacon integrated into an end user application stored on a computer, a customer configuration database, and one of a plurality of infrastructure pools chosen based on the customer configuration database. The switchboard receives extracted data from the beacon and writes the extracted data to the chosen infrastructure pool. The method may include receiving a connection from a beacon, connecting to and retrieving customer configuration data from a customer configuration database, transpiling a data retrieval code based on the retrieved customer configuration data; transmitting the data retrieval code to the beacon, connecting to one of a plurality of infrastructure pools, receiving extracted data from the beacon and writing the extracted data to the infrastructure pool.



MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,
OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,
SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN,
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SYSTEM AND METHOD FOR RECEIVING AND WRITING INCOMING DATA WRITES BASED ON DATA WRITE LATENCY

Cross Reference to Related Applications

[0001] This application claims priority from U.S. Provisional Application No. 62/423,525, filed November 17, 2016, U.S. Provisional Application No. 62/431,011, filed December 7, 2016, and U.S. Provisional Application No. 62/548,192, filed August 21, 2017, the entirety of each of which is incorporated by reference herein.

Brief Description of the Drawings

[0002] Figure 1 is a system diagram showing generally a possible arrangement of components for use in a system for receiving and distributing extracted data writes based on extracted data write latency.

[0003] Figure 2 is a method flowchart showing generally a method for receiving and distributing data writes based on data write latency by extracting data from a beacon, transmitting the extracted data to a switchboard, and having the switchboard write the extracted data to a chosen database server.

[0004] Figure 3 is a method flowchart showing generally a method for receiving and distributing data writes based on data write latency by extracting data and having a beacon write the extracted data to a database server, the switchboard connecting the beacon to the chosen database pool.

[0005] Figure 4 is a method flowchart showing generally a method for receiving and distributing data writes based on data write latency by extracting data and having a beacon write the extracted data to a database server, the switchboard connecting the beacon to the chosen database pool and terminating the connection between the switchboard and the beacon while maintaining the connection between the beacon and the infrastructure pool.

Detailed Description of the Invention

[0006] The present disclosure generally relates to a system and a method for distributing incoming extracted data writes.

[0007] Broadly, the system includes a beacon which collects data from a piece of software or hardware, the beacon being installed thereon, a customer configuration database storing customer configuration data, a plurality of infrastructure pools, each of the infrastructure pools being configured to be recognized as to receive extracted data writes based on configuration parameters, one of which being extracted data write latency, and a Switchboard that coordinates interactions between the beacon, customer configuration database, infrastructure pools, and switchboard.

[0008] Broadly, the method includes the switchboard retrieving customer configuration from the customer configuration database in response to instantiation of the beacon when the piece of software or hardware upon which the beacon is stored is instantiated. The switchboard compiles a beacon retrieval code from the customer configuration database, and transmits the beacon retrieval code to the beacon which is configured to integrate the beacon retrieval code. The switchboard establishes a connection to an infrastructure pool; the infrastructure pool being chosen from the plurality of infrastructure pools to meet requirements set forth in the retrieved customer configuration data. The switchboard moderates writing of data extracted by the beacon and facilitates writing of the extracted data to the chosen infrastructure pool.

[0009] By creating such a system and method, it is possible to mediate data writes for data extracted from end user applications by using one of the plurality of infrastructure pools which is tailored to receive writes within given parameters. Writes of extracted data are then directed towards appropriate infrastructure pool to meet the cost and performance needs of a customer needing to extract data from the beacon and store and retrieve the extracted data on a database server. Thus, data extracted at a higher frequency may be directed to an infrastructure pool configured to write data at a faster rate, whereas data extracted at a lower frequency may be diverted to an infrastructure pool unable to write data at a faster rate.

[0010] FIG. 1 illustrates a general overview of an embodiment of a system for receiving and distributing data writes based on data write latency **100**.

[0011] Beacon **101** is integrated into an end user application **102** stored on computer, piece of hardware, etc. such as a media player, editing application, etc. The beacon **101** may correspond to a customer, an application, or both. Upon activation of the end user application **102** the beacon **101** reaches out the switchboard **103**.

[0012] Switchboard **103** may be a computer, piece of hardware, software, virtual machine, networking equipment etc., or plurality or combination thereof.

[0013] The switchboard **103** identifies the beacon **101** against a customer configuration database **104**. The customer configuration database **104** may contain a list of customers and corresponding customer configuration data (also referred to as the CCD in the drawings), or a list of applications and corresponding application configuration data. The customer configuration data contains at least one parameter related to the retrieval of data from the end user application **102**, with at least one parameter being data write latency. The customer configuration data may include, but is not limited to, amongst its possible parameters: latency of data writes, maximum number of beacon connections, maximum number of writes, maximum acceptable size of any write, maximum acceptable size of all writes, maximum throughput, maximum acceptable latency, frequency of data collection from the beacon, frequency of data writes, or maximum acceptable buffer size or any combination thereof. If necessary, a customer may utilize remote beacon Service **199** to adjust the customer configuration data parameter(s) in the customer configuration database **104**.

[0014] Customer configuration database **104** may also contain specific information about each infrastructure pool in a plurality of infrastructure pools **107**. Alternatively, this specific information about each infrastructure pool in the plurality of infrastructure pools **107** may be part of switchboard **103**.

[0015] Upon identifying corresponding customer configuration data or application configuration data stored in the customer configuration database **104**, the switchboard **103** retrieves the customer configuration data. The switchboard **103**

transpiles a beacon retrieval code based on the retrieved customer configuration data.

[0016] Beacon retrieval code is transmitted to the beacon **101**. The beacon integrates the beacon retrieval code, to configure beacon **101** to extract data from the end user application **102**.

[0017] Switchboard **103** chooses an infrastructure pool **107-1** from the plurality of infrastructure pools **107** based on the customer configuration data **105** and specific information about each infrastructure pool in the plurality of infrastructure pools **107**, and connects to the chosen infrastructure pool **107-1**.

[0018] Each of the infrastructure pools **107** may be a physical computer, piece of hardware, software, virtual machine, networking equipment etc. or plurality or combination thereof. An infrastructure pool **107** may be a general database server configured to receive extracted data writes based on parameter consistent with at least one parameter contained within the customer configuration data.

[0019] Alternatively, each of the infrastructure pools **107** may comprise a slave server **108** and a database server **109**.

[0020] A slave server **108** may be configured to be identified by switchboard **103** when the switchboard is choosing an infrastructure pool from the plurality of infrastructure pools **107**. The slave server may be configured to accept incoming extracted data from a beacon **101** or a switchboard **103** and write extracted data to a database server **109**. Slave server **108** may be configured to establish a connection between either a beacon **101** or a switchboard **103** and a database server **109**. Slave server **108** exists as a physical computer, piece of hardware, software, or virtual machine, etc. or plurality of combination thereof, and one or more of slave servers **108** may exist in a given infrastructure pool **107**. Each infrastructure pool **107** may have a different number or no slave servers **108** as compared to another infrastructure pool **107**.

[0021] A database server **109** in a given infrastructure pool **107** stores incoming extracted data by allowing a beacon **101**, switchboard **103**, or slave server **108** to write to it, and allows retrieval of extracted data by a user. A database server **109** in a given infrastructure pool **107** exists as a physical computer, piece of hardware,

software, or virtual machine, etc. or plurality of combination thereof, and one or more database servers **109** may exist in a given infrastructure pool **107**. Each infrastructure pool **107** comprises at least one of a database server **109**, and given infrastructure pool may have may have a different number of database servers **109** than another infrastructure pool in the plurality of infrastructure pools **107**.

[0022] Alternatively, any given infrastructure pool **107**, slave server **108**, or database server **109** may be characterized by multiple dimensions as set forth in the customer configuration data.

[0023] Beacon **101** may extract data rates at rates controlled by the customer configuration data. Different infrastructure pools **107** may be able to accept extracted data at different rates. A fast infrastructure pool **107**, typically using higher performance components, may be configured to accept extracted data at a high rate. Comparatively, a slower infrastructure pool **107**, typically comprising lower cost components, may be configured to accept and be acceptable for data extracted at a lower rate. The rate at which beacon **101** extracts data may be configured by the beacon retrieval code. Switchboard 103 selects an appropriate infrastructure pool **107** based on data extraction rates and the data write rate of a given infrastructure pool **107**.

[0024] In possible variations on the system set forth in the preceding paragraphs, the following changes may or may not be included and in any combination:

[0025] In a first possible variation on the preceding embodiment switchboard **103** may directly connect the beacon **101** to infrastructure pool **107-1**, slave server **108-1**, or database server **109-1**.

[0026] In a second possible variation on the preceding embodiment the beacon **101** may be configured to receive customer configuration data **105**, transpile customer configuration data **105** into beacon retrieval code, and integrate beacon retrieval code.

[0027] In a third possible variation on the preceding embodiment the beacon retrieval code **106** may be configured by a service other than and external to switchboard **103**. In this variant embodiment the external beacon retrieval code configuration service is configured to retrieve customer configuration data **105** from customer

configuration database **104** based on direction from beacon **101**. Alternatively, direction as to which customer configuration data to retrieve may be directed by switchboard **103** or another system configured to identify the identity of beacon **101** and correlate it with its corresponding customer configuration data **105**. The external beacon retrieval code configuration service upon receiving customer configuration data **104** will transpile customer configuration data into beacon retrieval code **106**. The external beacon retrieval code configuration service will then transmit the beacon retrieval code **106** to switchboard. The external beacon retrieval code configuration service upon receiving customer configuration data **104** will transpile customer configuration data into beacon retrieval code **103**. The external beacon retrieval code configuration service may exist as a physical computer, piece of hardware, software, or virtual machine, etc. or plurality of combination thereof.

[0028] FIG. 2 illustrates generally shown an embodiment of a method for receiving and distributing extracted data writes based on data write latency **200**.

[0029] When an end user instantiates an application **201** having an integrated beacon **101**, the beacon **101** is activated **202** causing beacon **101** to establish a connection **203** to switchboard **103**.

[0030] Switchboard **103** queries **204** customer configuration database **104** for customer configuration data. Switchboard **103** retrieves **204** the corresponding customer configuration.

[0031] Switchboard **103** transpiles **205** a beacon retrieval code based on the customer configuration data. Switchboard **103** transmits **206** the beacon retrieval code to beacon **101**. Beacon **101** integrates **207** the beacon retrieval code in anticipation of extracting and transmitting extracted data to be ultimately written to a database server **109**, the retrieval code informing the beacon as to the parameters of data to be extracted, such as but not limited to data type, retrieval interval, etc.

[0032] Before, during, or after preceding steps **205** through **207** switchboard queries **209** the plurality of infrastructure pools **107** to identify from the plurality of infrastructure pools **107** an infrastructure Pool **107-1** which is configured to receive extracted data consistent with the parameters set forth in customer configuration data.

[0033] Upon locating an infrastructure pool **107-1** consistent with the parameters set forth in the customer configuration data, switchboard **103** connects **210** to the infrastructure pool **107-1**. Switchboard **103** connects **211** to slave server **108-1** of the infrastructure pool **107-1**, and the slave server **108-1** connects **212** the switchboard **103** to the database server of infrastructure pool **109-1**.

[0034] Beacon **101** extracts **208** data from end user application **102** based on the beacon retrieval code **106** and transmits the extracted data to the switchboard **103**.

[0035] Switchboard **103** writes **213** the extracted data received from beacon **101** in step **208** to database server **109-1** of infrastructure pool **107-1** the switchboard **103** connected to in step **210**. The extraction **208** and write events **213** may occur a single time, or may continue and occur multiple times over the course of operation of end user application **102**.

[0036] In first possible variation on the preceding embodiment an external beacon retrieval code configuration service may transpile a beacon retrieval code based on customer configuration data **205**. The external beacon retrieval code configuration service may then transmit the beacon retrieval code to Switchboard **103**.

Switchboard **103** transmits **206** the beacon retrieval code **106** to beacon **101**.

Alternatively, the external beacon retrieval code configuration service may directly transmit beacon retrieval code **106** directly to beacon **101**.

[0037] FIG. 3 illustrates a general overview of a second embodiment of a method for receiving and distributing extracted data writes based on data write latency **300**.

[0038] Steps **301** through **307** and **309** through **312** generally parallel the steps as outlined in FIG. 2 of the Drawings.

[0039] After switchboard **103** is connects **312** to the chosen infrastructure database server **109-1** slaver server **108-1** terminates **314** its connection to switchboard **103** while the connection between switchboard **103** and database server **109-1** of infrastructure pool **107-1** is maintained. Step **314** is possible in the embodiment shown in FIG. 2 after step **312** and is not necessary for performing the method embodied in either FIG. 2 or FIG. 3.

[0040] Switchboard **103** connects **315** beacon **101** to database server **109-1** of chosen infrastructure Pool **107-1**. Beacon **101** extracts **316** data from end user application **102** based on the beacon retrieval code and writes **316** the extracted data directly to the database Server **109-1** of the chosen infrastructure Pool **107-1**. Extraction and write events **316** may occur a single time, or may continue and occur multiple times over the course of operation of end user application **102**.

[0041] FIG. 4 illustrates a general overview of a third embodiment of a method for receiving and distributing extracted data writes based on data write latency **400**.

[0042] Steps **401** through **407**, **409** through **412**, and **414** through **416** generally parallel the steps as outlined in FIG. 2 of the Drawings.

[0043] After beacon **101** is connected **415** to chosen infrastructure database server **109-1** switchboard **103** terminates **417** its connection to beacon **101**, chosen infrastructure pool **107-1**, slaver server **108-1**, database server **109-1**, or any or all of said elements to which the beacon **101** is connected to while the connection between beacon **101** and database server **109-1** of chosen infrastructure pool **107-1** is maintained. This step is a possible variation on the embodiment shown in FIG. 3 after step **315** and is not necessary for carrying the method embodied in FIG. 3.

[0044] Thus, an embodiment of a system for receiving and distributing data writes based on data write latency and several variations thereof have been described. Several embodiments for method of receiving and distributing data writes based on data write latency and variations thereof have been provided. It is understood that the embodiments and variations thereof disclosed herein may be understood by a person of ordinary skill in the art to allow practice of the invention in way other than the embodiments and variations disclosed herein, and that the examples provided are not for the purposes of limitation.

CLAIMS

1. A system for retrieving and writing data based on data write latency comprising:
 - a switchboard configured to:
 - connect to a beacon integrated into an end user application stored on a computer;
 - connect to a customer configuration database;
 - connect to one of a plurality of infrastructure pools, the chosen infrastructure pool based on the customer configuration database; and
 - receive extracted data from the beacon and write the extracted data to the chosen infrastructure pool.
2. The system for retrieving and writing data based on data write latency in claim 1, wherein the chosen infrastructure pool further comprises: a slave server and a database server.
3. The system for retrieving and writing data based on data write latency in claim 1, wherein the switchboard is further configured to retrieve customer configuration data from the customer configuration database, wherein the customer configuration data includes at least a data write latency parameter.
4. The system for retrieving and writing data based on data write latency in claim 2, wherein the switchboard is further configured to connect to the database server of the chosen infrastructure pool.
5. The system for retrieving and writing data based on data write latency in claim 2, wherein the switchboard is further configured to write the received extracted data to the database server of the chosen infrastructure pool.
6. The system for retrieving and writing data based on data write latency in claim 1, wherein the switchboard is further configured to transpile a beacon retrieval code based on the retrieved customer configuration data.

7. The system for retrieving and writing data based on data write latency in claim 6, wherein the switchboard is further configured to transmit the beacon retrieval code to the beacon.

8. The system for retrieving and writing data based on data write latency in claim 1, wherein the switchboard is further configured to:
receive extracted data from the beacon; and
write extracted data retrieved by the beacon to the infrastructure pool.

9. The system for retrieving and writing data based on data write latency in claim 8, wherein the switchboard receives extracted data writes from the beacon in response to events.

10. The system for retrieving and writing data based on data write latency in claim 9 wherein the switchboard receives extracted data writes from the beacon in response to events dictated by the beacon retrieval code.

11. The system for retrieving and writing data based on data write latency in claim 8, wherein the switchboard receives extracted data writes from the beacon periodically.

12. The system for retrieving and writing data based on data write latency in claim 11, wherein the switchboard receives extracted data writes from the beacon periodically as dictated by the beacon retrieval code.

13. The system for retrieving and writing data based on data write latency in claim 1, wherein the switchboard is further configured to receive a beacon retrieval code based on the retrieved customer configuration data transpiled by an external beacon retrieval code service.

14. A method for retrieving and writing data based on data write latency comprising:
a switchboard receiving a connection from a beacon integrated into an end-user application executed on a computer;

retrieving customer configuration data from a customer configuration database, wherein the customer configuration data includes at least a data write latency parameter;

transpiling a data retrieval code based on the retrieved customer configuration data;

transmitting the data retrieval code to the beacon, wherein the beacon integrates the data retrieval code;

the switchboard connecting to one of a plurality of infrastructure pools, the infrastructure pool being chosen based on the customer configuration data;

the switchboard receiving extracted data from the beacon based on the beacon retrieval code; and

the switchboard writing the extracted data to the infrastructure pool.

15. The method for retrieving and writing data based on data write latency in claim 14, wherein the switchboard connecting to one of the plurality of infrastructure pools is chosen based on the data write latency parameter.

16. The method for retrieving and writing data based on data write latency in claim 14, wherein the infrastructure pool the switchboard connects to comprises a slave server and a database server; and the switchboard writes the extracted data to the database server.

17. The method for retrieving and writing data based on data write latency in claim 14, wherein the writing includes the beacon writing to a slave server in the chosen infrastructure pool which writes to a database server in the chosen infrastructure pool.

18. The method for retrieving and writing data based on data write latency in claim 14, wherein the switchboard receives data from the beacon at periodic intervals.

19. The method for retrieving and writing data based on data write latency in claim 14, wherein the switchboard receives data from the beacon at predefined events.

20. The method of claim 14, wherein the switchboard performs the retrieving, transpiling, and transmitting

21. A method for retrieving and writing data based on data write latency comprising:

a switchboard receiving a connection from a beacon integrated into an end-user application executed on a computer;

retrieving customer configuration data from a customer configuration database, wherein the customer configuration data includes at least a data write latency parameter;

the switchboard connecting to one of a plurality of infrastructure pools, the infrastructure pool being chosen based on the customer configuration data

the switchboard connecting the beacon to the chosen infrastructure pool; enabling the beacon to write extracted data from the beacon based on the beacon retrieval code to the infrastructure pool.

22. The method for retrieving and writing data based on data write latency in claim 21, wherein in the switchboard connecting the beacon to the chosen infrastructure pool the switchboard further connects the beacon to database server comprising the chosen infrastructure pool enabling the beacon to write extracted data to the database server.

23. The method for retrieving and writing data based on data write latency in claim 21, wherein the switchboard connecting the beacon to the chosen infrastructure pool enables the beacon to write extracted data from the beacon based on the beacon retrieval code to the infrastructure pool at predefined events based on the beacon retrieval code.

24. The method for retrieving and writing data based on data write latency in claim 21, wherein the switchboard connecting the beacon to the chosen infrastructure pool enables the beacon to write extracted data from the beacon based on the beacon retrieval code to the infrastructure pool at periodic intervals.

25. The method for retrieving and writing data based on data write latency in claim 21, further comprising:

the switchboard transpiling a data retrieval code based on the retrieved customer configuration data; and,

the switchboard transmitting the data retrieval code to the beacon, the beacon being configured to integrate the data retrieval code.

26. The method for retrieving and writing data based on data write latency in claim 21, further comprising:

the switchboard transmitting the retrieved customer configuration data to an external beacon retrieval code configuration service;

the external retrieval code configuration service transpiling a beacon retrieval code based on the customer configuration data; and,

the external retrieval code configuration service transmitting the beacon retrieval code to the beacon, the beacon being configured to integrate the data retrieval code.

27. The method of claim 21, wherein the switchboard performs retrieving.

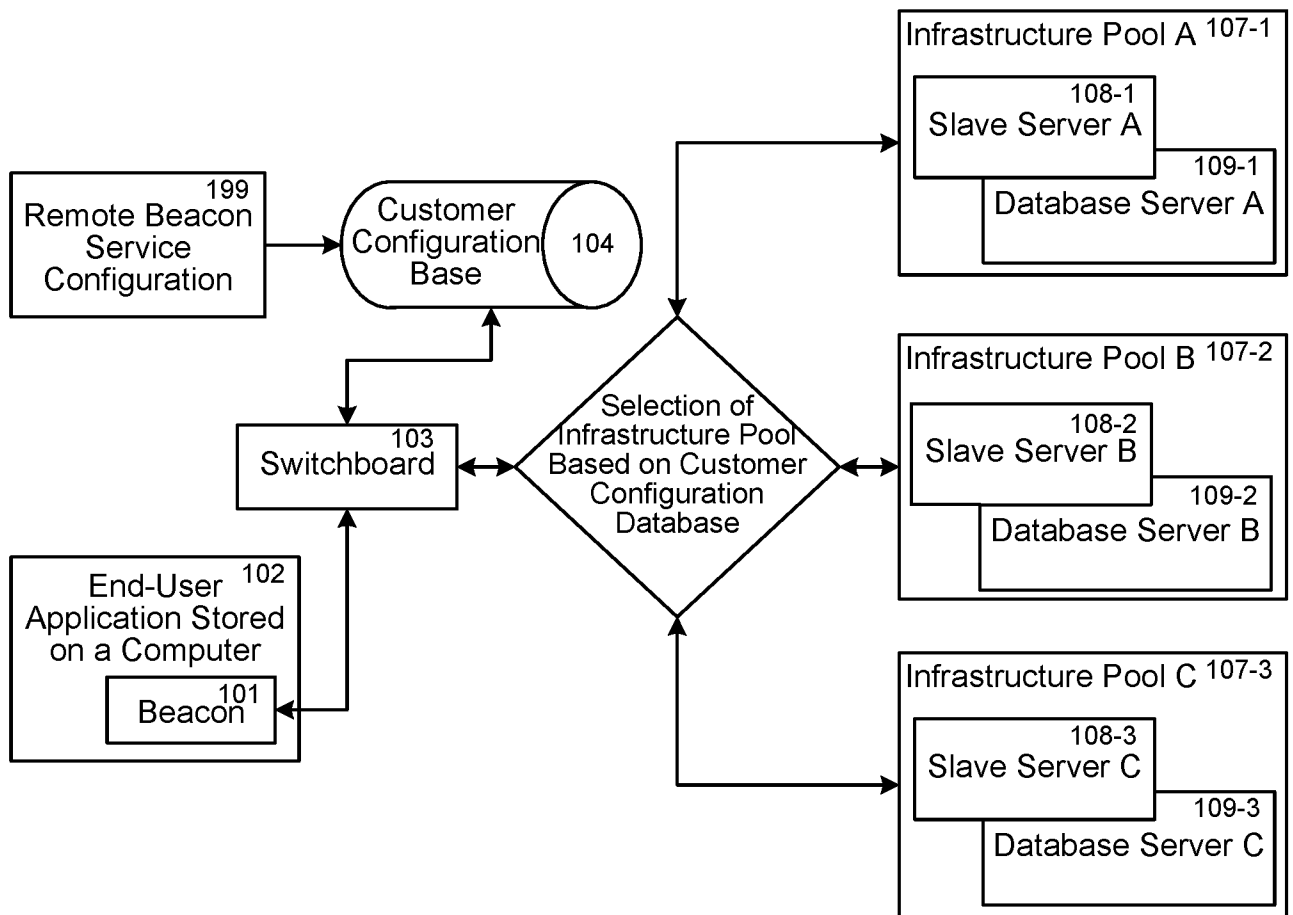


FIGURE 1
SUBSTITUTE SHEET (RULE 26)

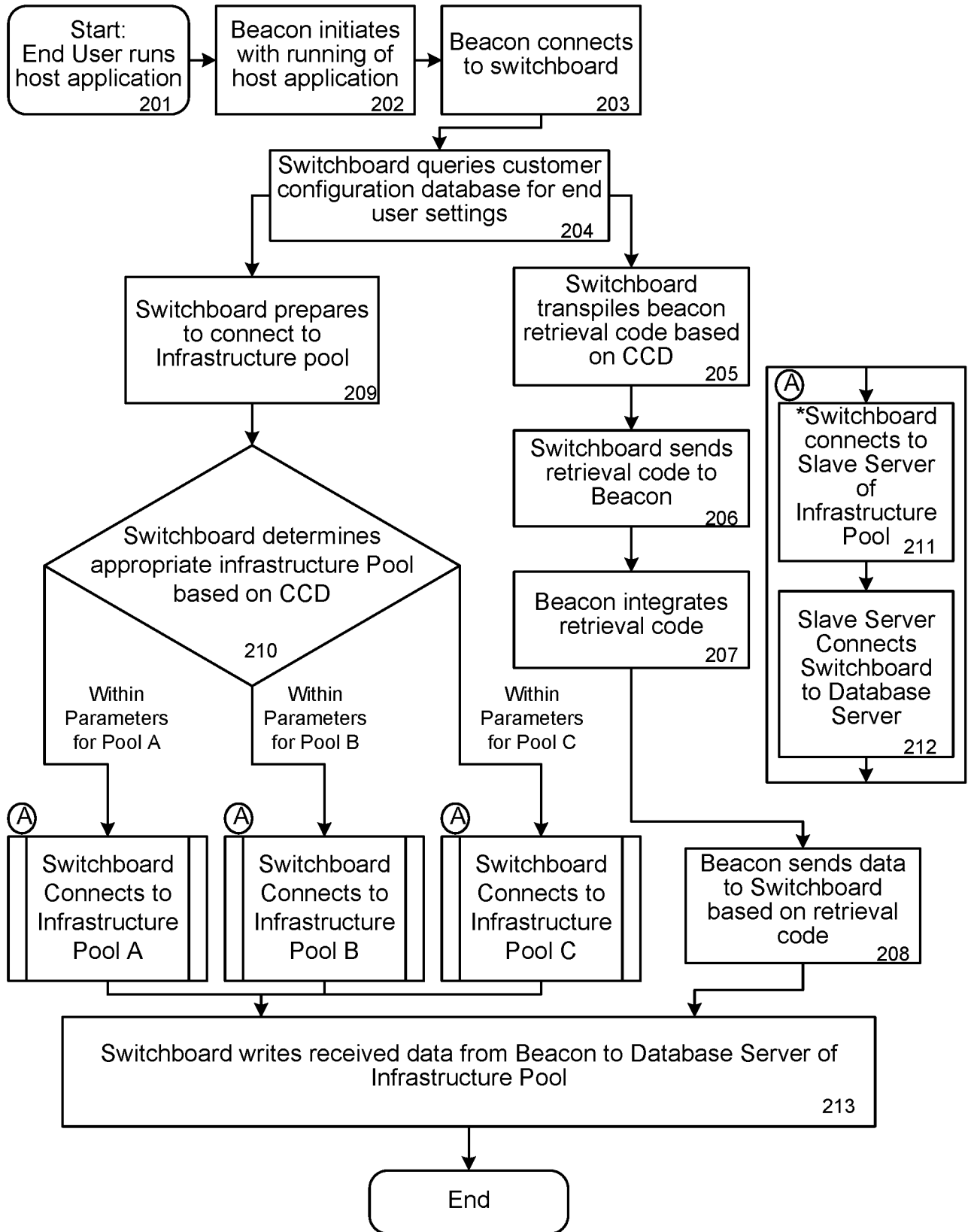


FIGURE 2

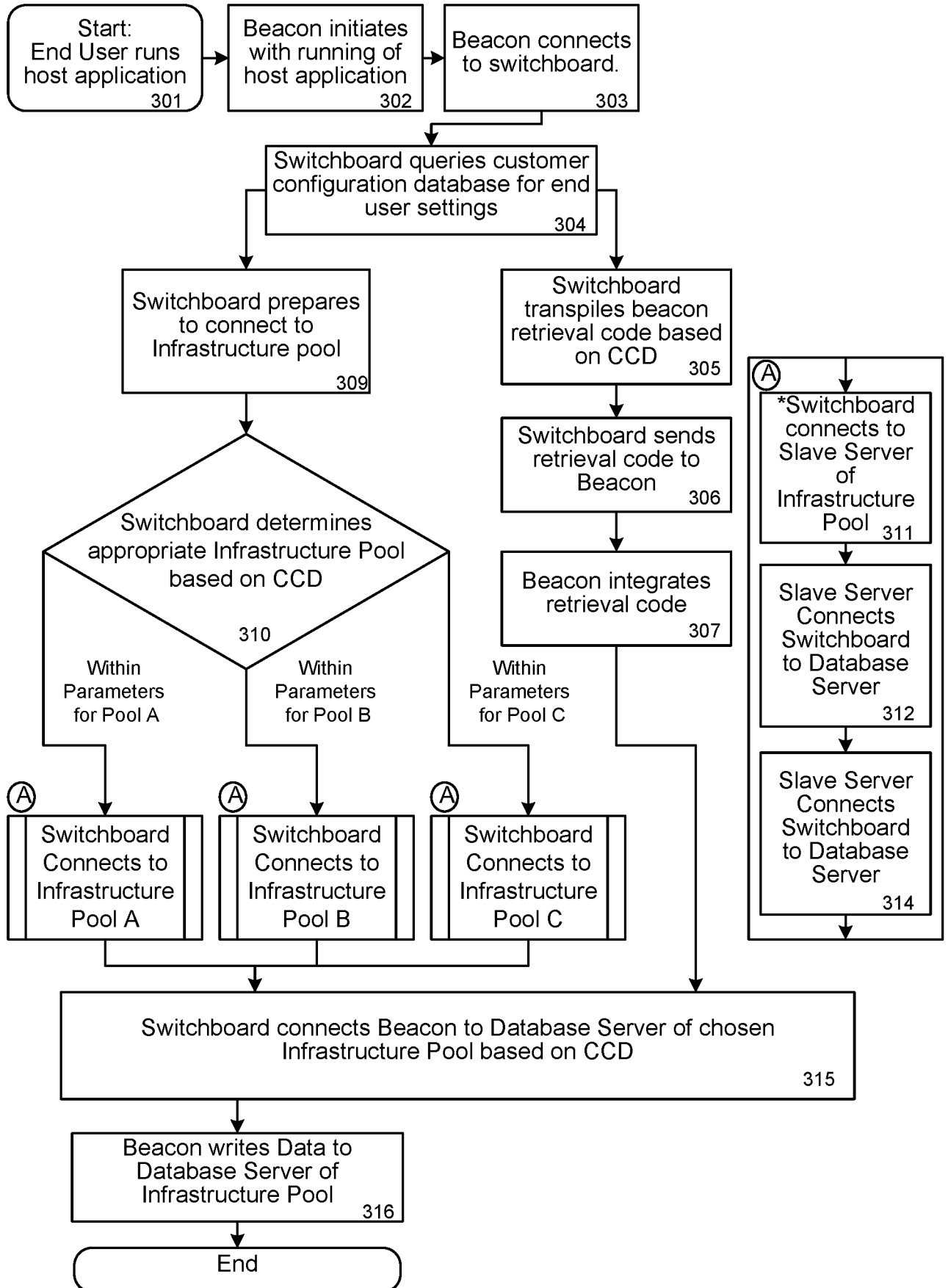


FIGURE 3

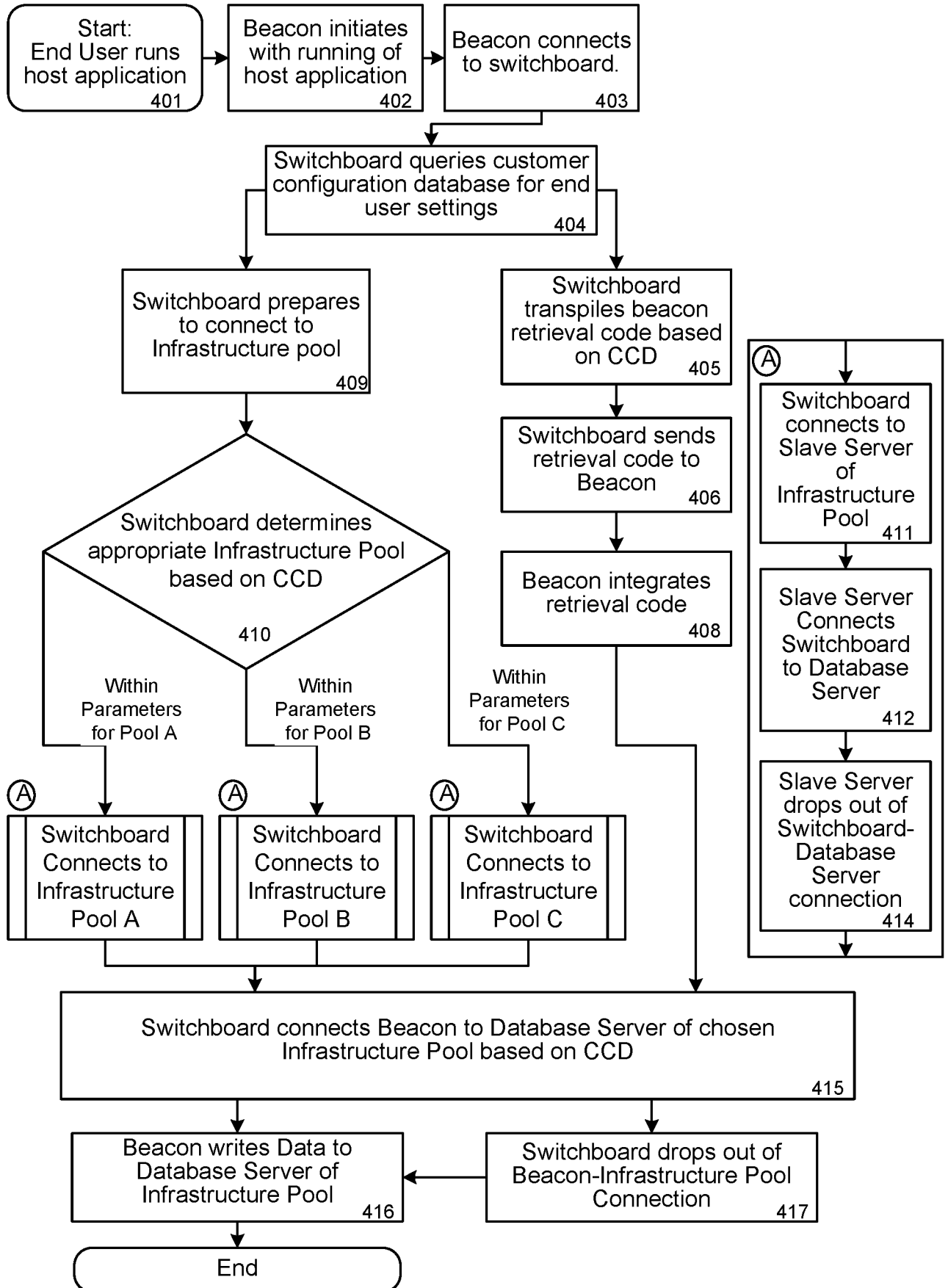


FIGURE 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 17/62004

A. CLASSIFICATION OF SUBJECT MATTER
 IPC(8) - G06F 13/00, G06F 13/14, G06F 13/38 (2018.01)
 CPC - G06F 13/1673, G06F 2212/7203, G06F 13/161, G06F 12/0238

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

See Search History Document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

See Search History Document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

See Search History Document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2014/0337472 A1 (Level 3 Communications, LLC) 13 November 2014 (13.11.2014); entire document, especially, FIG. 4A, 5E, 32A, para [0239], [0862], [0912], [2002],	1-27
A	US 2011/0289268 A1 (Patel et al.) 24 November 2011 (24.11.2011); entire document, especially, FIG. 1, para [0011], [0020]	1-27
A	US 2009/0125796 A1 (Day et al.) 14 May 2009 (14.05.2009); entire document,	1-27
A	US 2015/0256583 A1 (Elemental Technologies, Inc) 10 September 2015 (10.09.2015); entire document	1-27

Further documents are listed in the continuation of Box C.

See patent family annex.

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Date of the actual completion of the international search

18 January 2018

Date of mailing of the international search report

08 FEB 2018

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