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APPLICATION NUMBER	FILING OR 371(c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/682,426	03/06/2007	Asaf Wexler	BHVE 5

CONFIRMATION NO. 9081

61650
MYERS WOLIN, LLC
100 HEADQUARTERS PLAZA
North Tower, 6th Floor
MORRISTOWN, NJ07960-6834

Title: Service Level Management System

Publication No. US-2007-0208843-A1
Publication Date: 09/06/2007

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11/682,426	03/06/2007	2157	1250	BHVE 5	49	4

CONFIRMATION NO. 9081

FILING RECEIPT

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100 HEADQUARTERS PLAZA
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MORRISTOWN, NJ07960-6834

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Applicant(s)

Asaf Wexler, Raanana, ISRAEL;
Yoav Dembak, Petah Tikwa, ISRAEL;

Assignment For Published Patent Application

B-HIVE NETWORKS, INC., San Mateo, CA

Power of Attorney: The patent practitioners associated with Customer Number 61650

Domestic Priority data as claimed by applicant

This appln claims benefit of 60/779,706 03/06/2006

Foreign Applications

If Required, Foreign Filing License Granted: 03/19/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US11/682,426**

Projected Publication Date: 09/06/2007

Non-Publication Request: No

Early Publication Request: No

** SMALL ENTITY **

Title

Service Level Management System

Preliminary Class

709

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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	BHVE 5
First Inventor	Asaf Wexler
Title	Service Level Management System
Express Mail Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☐ **Fee Transmittal Form** (e.g., PTO/SB/17)
   (Submit an original and a duplicate for fee processing)
2. ☑ **Applicant claims small entity status.**
   See 37 CFR 1.27.
3. ☑ **Specification** [*Total Pages* 24]
   Both the claims and abstract must start on a new page
   (For information on the preferred arrangement, see MPEP 608.01(a))
4. ☑ **Drawing(s)** (*35 U.S.C. 113*) [*Total Sheets* 5]
5. **Oath or Declaration** [*Total Sheets* 1]
   a. ☑ Newly executed (original or copy)
   b. ☐ A copy from a prior application (37 CFR 1.63(d))
   (for continuation/divisional with Box 18 completed)
   i. ☐ DELETION OF INVENTOR(S)
   Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. ☑ **Application Data Sheet.** See 37 CFR 1.76
7. ☐ **CD-ROM or CD-R** in duplicate, large table or Computer Program *(Appendix)*
   ☐ Landscape Table on CD
8. **Nucleotide and/or Amino Acid Sequence Submission**
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9. ☐ **Assignment Papers** (cover sheet & document(s))
   Name of Assignee_____
10. ☐ **37 CFR 3.73(b) Statement** *(when there is an assignee)* ☐ **Power of Attorney**
11. ☐ **English Translation Document** *(if applicable)*
12. ☑ **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
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13. ☐ **Preliminary Amendment**
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Prior application information: *Examiner* _____ *Art Unit:* _____

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Name					
Address					
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Signature	/Harris A. Wolin/		Date	March 6, 2007	
Name (Print/Type)	Harris A. Wolin			Registration No. (Attorney/Agent)	39432

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A SERVICE LEVEL MANAGEMENT SYSTEM

Cross Reference to Related Applications

[0001] This application claims priority from a US provisional application 60/779,706 filed on March 06, 2006 which is hereby incorporated for all that it contains.

Technical Field

[0002] The present invention relates generally to controlling and managing the performance of web applications.

Background of the Invention

[0003] Enterprises and organizations expose their business information and functionality on the web through software applications, usually referred to as "web applications." Web applications provide great opportunities for an organization. Web applications use the Internet technologies and infrastructures. These applications are generally event-driven software programs which react to hyper text transfer protocol (HTTP) requests from the client. The applications are generally executed on application servers, constructed according to N-tier architecture, in which presentation, business logic, and data access layers are kept separate. Recently, web applications have evolved into large-scale applications that demand more sophisticated computing services.

[0004] Fig. 1 shows an exemplary network system 100 that is utilized for executing web applications. System 100 includes clients 110-1 through 110-N, web servers 120-1 through 120-M, application servers 130-1 through 130-Q, back-end systems 150, a load balancer 160, and a network 170. Clients 110 submit requests (e.g.,

HTTP requests) to web servers 120 through network 170. Load balancer 160 distributes the requests among the servers 120 to balance the load between servers 120 and 130. Each of web servers 120 dynamically generates presentation, for example, using servlets, or extensible markup language (XML), extensible style-sheet language (XSL), and the likes. Application servers 130 are often responsible for deploying and running the business logic layer and for interacting with and integrating various enterprise-wide resources, such as web servers 120, and back-end systems 150. The back-end system 150 may include, for example, a database and a legacy system.

[0005] Workload may be distributed across a cluster of application servers 130 in different ways. For example, application code may be replicated across multiple application servers in the cluster, enabling a given request to be processed by any of these multiple application servers 130. Also, application code may be logically partitioned over multiple application servers 130, e.g., so that a particular server 130 is responsible for performing particular types of operations. This type of application partitioning may improve the application performance. For example, data-intensive application logic may be configured to run on an application server that is closest to a data source, in order to reduce the latencies associated with accessing remotely located data.

[0006] As the web and application servers 120 and 130 become busier with handling more and more requests, the quality and level of service sharply decrease. With existing load balancing capabilities, once the servers are saturated, the quality of service drops drastically for all clients accessing a web site. Currently, a standard tool that automatically monitors, manages, and controls the operation and load of applications and servers is not found in the related art. The management and control of web applications

mostly relies on technical personnel. This results with many drawbacks including unpredictable level of service and uncontrolled user experience as well as costly maintenance of applications. Additionally, the application management is static, i.e., the ability to detect problems and solve them in real-time is not feasible. Another major drawback is the inability to deliver services according to predefined service level agreements (SLAs), as the ability to provide committed services increasingly becomes a competitive requirement. Yet another major drawback is the inability to balance the load differently per application in servers that are installed with multiple applications.

[0007] It would be therefore advantageous to provide a network solution for automatically managing and controlling web applications that overcome the drawbacks mentioned in the prior art.

Summary of the Invention

[0008] The present invention includes a service level management (SLM) system in a network with a plurality of clients and a plurality of web servers. The SLM system includes a traffic processor for processing data traffic sent from a the plurality of clients and from a the plurality of web servers; an application learner for identifying transactions sent from the plurality of clients; a monitor for monitoring and generating statistics respective of the operation of the web servers and their respective web applications; and a controller for performing corrective actions according to a plurality of predefined policies.

[0009] The present invention also includes a method for controlling and maintaining a level of service of web applications. The method includes generating a

context for each request sent from a client to a web server and for each reply sent from a web server to a client; determining whether the context belongs to an identified web application; gathering statistics respective of the identified web application; determining whether at least one policy predefined for the identified application is violated; and performing a plurality of corrective actions if at least one policy is determined to be violated.

[00010] The present invention also includes a computer program product including a computer-readable medium comprising software instructions operable to enable a computer to perform a method for controlling and maintaining a level of service of web applications The program product causes a computer to execute the processes of generating a context for each request sent from a client to a web server and for each reply sent from a web server to a client; determining whether the context belongs to an identified web application; gathering statistics respective of the identified web application; determining whether at least one policy predefined for the identified application is violated; and performing a plurality of corrective actions if at least one policy is determined to be violated.

Brief Description of the Drawings

[00011] Figure 1 – is a non-limiting network system utilized for executing web applications (prior art);

[00012] Figure 2 – is a diagram of a network system constructed in accordance with an exemplary embodiment of the present invention;

[00013] Figure 3 – is a block diagram of the SLM system disclosed in accordance with an embodiment of the present invention;

[00014] Figure 4 – is a flowchart describing the operation of the SLM system in accordance with an embodiment of the present invention; and

[00015] Figure 5 – is an exemplary diagram of a site tree.

Detailed Description of the Invention

[00016] Fig. 2 shows a non-limiting and exemplary diagram of a network system 200 constructed in accordance with one embodiment of the present invention. System 200 includes clients 210-1 through 210-N, web servers 220-1 through 220-M, application servers 230-1 through 230-Q connected to backend systems 250, a load balancer 260, and a network 270. System 200 further includes a service level management (SLM) system 280 that allows the maintaining of a consistent level of service of web applications. Web servers 220 process requests sent from clients and responds with the processing result. Application servers 230 execute the business logic of the web applications and communicate with back-end systems 250, which implement the data layer of the applications. In some configurations, a web server and a web application may act as a single entity, e.g., web application 230-Q. Load balancer 260 mainly distributes incoming

requests to servers 220 and 230 that run the applications to which the requests are targeted.

[00017] SLM system 280 controls and manages applications executed by servers 220 and 230 in real-time, and thus ensures a committed level of service. The level of service may be defined by a service level agreement (SLA) and be different for each application. With this aim, SLM system 280 learns the structure of a web-application, monitors the operation of the application, and controls the processing of incoming requests to achieve optimal performance and level of service. In an exemplary embodiment shown in Fig. 2 SLM system 280 is configured to operate in the line of traffic, i.e., traffic passing directly through system 280 to web servers 220.

[00018] Fig. 3 shows a non-limiting block diagram of SLM system 280 disclosed in accordance with an embodiment of the present invention. SLM system 280 comprises a traffic processor 310, an application learner 320, a monitor 330, and a controller 340 connected to a common bus 350. SLM system 280 further includes databases 360 and 370 coupled to application learner 320 and a database 380 coupled to monitor 330 and controller 340. In other embodiments, SLM system 280 includes a single database commonly coupled to application learner 320, monitor 330, and controller 340.

[00019] Traffic processor 310 receives HTTP requests submitted by clients 210 as well as replies sent from servers 220 and 230 (see also Fig. 2). Specifically, once a session is established with a client 210 a client connection handler (not shown) is allocated. The client connection handler waits for data, i.e., a HTTP request submitted by a client 210, and once received, the data is sent to a parser (not shown). Both the parser and the client connection handler are part of the traffic processor 310. While processing

the request, the parser returns a context of the request. A context is a joined HTTP request-reply entity. The context fields include, but are not limited to, a site name, a HTTP method, a URL, request parameters, HTTP cookies, a HTTP status code, a HTTP server, a HTTP content type, a HTTP content length, a HTML title field, and the like. The context is sent to application learner 320, monitor 330, and controller 340. The incoming request is forwarded to one of web servers 220.

[00020] When load-balance or SLM schemes are utilized by controller 340, requests may be stalled or dropped. When a reply, i.e., HTTP response is sent from a web server 230, a web server (WS) connection handler (not shown), in the traffic processor, is allocated. The WS connection handler waits until the header of the response arrives, and then forwards the header to the parser, which sends the context to application learner 320, monitor 330, and controller 340. In addition, the incoming response is sent to a client 210 through the respective client connection handler, i.e., the response is sent to the client that initiated the request.

[00021] Application learner 320 identifies web applications their transactions and modules and registers the learnt information in a classify data structure (CDS). The CDS includes a list of identified sites, for each site a list of its applications, and for each application a list transactions and modules that construct the application. A module is a group of transactions. Application learner 320 further generates for display purposes a site tree, which includes all discovered applications that belong to a designated site. The CDS is used in real-time to classify incoming requests to applications. The site tree and the CDS are saved in database 370.

[00022] Fig. 5 provides an example for a site tree. A web site 500 has two applications: a healthcare 510 and finance 520. Healthcare application 510 is composed of two applications, a patient 511 and a physician 512. Patient application 511 includes the transactions Login 511-1, Logout 511-2, View Medical Record 511-3, and Edit Profile 511-4. Physician application 512-1 includes the transactions: Login 512-1, Logout 512-2, and Edit Medical Record 512-3. Finance application 520 includes only the transactions GetQuote 520-1 and ListStocks 520-1.

[00023] Application learner 320 performs at least three tasks that include classifying, learning, and collecting. The classification includes determining, on-the-fly, for each context (i.e., parsed request) whether the incoming request belongs to a previously discovered application, and if so an application identification (ID) number is assigned to the context. Unidentified context messages may be further processed for the purpose of learning new applications and their transactions and modules. The collection task is invoked upon a reply message and it decides if the context should be collected. A context to be collected is saved, in a chronologic order, in database 360. The learning task is invoked every predefined period of time or whenever the number of collected contexts is above a predefined threshold. The learning task processes data stored in database 360 and attempts to discover a new application using a plurality of application definers and correlation processes. The application definers include conditions that are checked against context data in database 360. An example for application definers are a path of a cookie, the name of the parameter name, and so on. If one of the application definers is satisfied, then a new application is found and inserted to the CDS in an entry of the relevant site. That is, a new entry is created and the application ID together with the URL

are added to the entry. In one embodiment of the present invention, the learning of applications can also be performed by correlating a plurality of saved contexts that share a common property, such URL and parameter.

[00024] Monitor 330 executes all activities related to the generation of statistics respective of the operation of the web servers and their respective applications. The statistics include, but are not limited to, measuring throughput, response time, number of errors, and so on. The statistics are kept in database 380 on a per server basis, on a per application basis, and on a per application/server combination basis. In accordance with an embodiment of the disclosed invention, a plurality of reports are produced based on the gathered statistics. These reports can be presented by means of a graphical user interface (GUI) and/or sent to a system administrator by email.

[00025] Controller 340 executes tasks that optimize the performance of each web application executed by the web and application servers. These tasks include, but are not limited to, scheduling requests to reduce response time, shaping traffic to balance the load, recovery actions when one of the servers fails, redirecting of requests, and so on. The controller's 340 tasks are performed according to a set of policies predetermined for each server, application, transaction, and module in an application. Generally, a policy defines an allowed value range for each status parameter and the actions to be taken if a status parameter is not within its range. Each policy is assigned with a priority and the time periods that the policy should be activated and the users it is relevant for. For example, a policy may define a maximum allowable latency value that is for an application and a threshold from which corrective actions should be taken. The corrective action may be, but is not limited to, the transfer of requests to a less busy server. As

another example, a policy may define the minimum allowable throughput for an application and the corrective action may be stalling traffic directed to the server that executes the application. It should be noted that if a policy includes two or more corrective actions, then each of the actions may be assigned with a different priority.

[00026] Fig. 4 shows a non-limiting and exemplary flowchart 400 describing the operation of SLM system 280, in accordance with one embodiment of the present invention. At S410, an HTTP request sent from a client 210 is received at the SLM system 280. At S420, the HTTP request is parsed to generate a context of the request. At S430, the request is classified to determine whether the request belongs to a known or unknown application. This is performed by matching the context against the CDS and a plurality of classification filters and if the filtering result with an application ID, the incoming request belongs to a known (learnt) application. At S440, a check takes place to determine if an application ID was detected, and if so execution continues with S460; otherwise, executions proceeds to S445 where the context is saved in database 360. Subsequently, the context is sent to a web server 220. At S450, application learner 320 discovers the applications and preferably applications' transactions and modules related to the context. The learnt information is kept, at S455, in a CDS format in database 370.

[00027] At S460, statistics respective of the application are gathered. That is, at least the status parameters: throughput, response time, hits per second, latency and number of returned errors are measured and saved in database 380. At S470, it is checked if at least one of the policies defined for the application is violated. Namely, it is determined if the measured status parameters are within the allowed range, and if so execution proceeds to S490 where the request is sent to a web server 220; otherwise,

execution continues with S480 where one or more corrective actions, as defined in the violated policy, are taken. Examples for such actions are discussed in greater detail above. The method described herein can be further utilized for processing HTTP replies sent from web servers or application servers.

[00028] The SLM system 280 and method described herein further implement a feedback mechanism. Specifically, after a corrective action is taken, SLM system 280 monitors the result of the action, i.e., whether the monitored parameters values improved due to the corrective action or actions. Accordingly, SLM system 280 updates controller 340 with the next corrective actions to activate. For example, if an action has not made a difference, this action would be less likely to be activated when subsequent request is received.

[00029] In accordance with an embodiment of the present invention, SLM system 280 tracks transactions and actual users that access the web applications in servers 220 and 230. Tracking users is performed by: a) adding a token (e.g., a cookie) to the HTTP traffic; b) identifying existing cookies that are used by existing user-management mechanisms; c) tracking SSL sessions; or d) any combination thereof. The ability to track user activity allows for identifying transactions. Specifically, SLM system 280 detects navigation routes of users, i.e., how users move between applications' transactions; compares between the detected routes; and deduces from the collected information which parts of the routes comprise independent transactions. It should be noted that not all navigation routes are considered as transactions or identified as such.

[00030] It should be noted that various modifications, combinations, sub-combinations and alterations of the above-described embodiments may occur, as

required, insofar as they are within the scope of the appended claims or the equivalents thereof.

[00031] The principles of the present invention may be implemented as a combination of hardware and software. The software may be implemented as an application program tangibly embodied on a program storage unit or computer readable medium. The application program may be uploaded to, and executed by, a machine comprising any suitable architecture, for example a computer platform having hardware such as one or more central processing units ("CPU"), a random access memory ("RAM"), and input/output ("I/O") interfaces. The computer platform may also include an operating system and microinstruction code. The various processes and functions described herein may be either part of the microinstruction code or part of the application program, or any combination thereof, which may be executed by a CPU, whether or not such computer or processor is explicitly shown.

[00032] It is to be further understood that, because some of the constituent system components and methods depicted in the accompanying drawings are preferably implemented in software, the actual connections between the system components or the process function blocks may differ depending upon the manner in which the present invention is programmed. Given the teachings herein, one of ordinary skill in the pertinent art will be able to contemplate these and similar implementations or configurations of the present invention. All examples and conditional language recited herein are intended for pedagogical purposes to aid the reader in understanding the principles of the invention and the concepts contributed by the inventors to furthering the

art, and are to be construed as being without limitation to such specifically recited examples and conditions.

[00033] All statements herein reciting principles, aspects, and embodiments of the invention, as well as specific examples thereof, are intended to encompass both structural and functional equivalents thereof. It is intended that such equivalents include both currently known equivalents as well as equivalents developed in the future, i.e., any elements developed that perform the same function, regardless of structure. Other hardware, conventional and/or custom, may also be included. Similarly, any switches shown in the figures are conceptual only. Their function may be carried out through the operation of program logic, through dedicated logic, through the interaction of program control and dedicated logic, or even manually, the particular technique being selectable by the implementer as more specifically understood from the context.

[00034] In the claims hereof, any element expressed as a means for performing a specified function is intended to encompass any way of performing that function including, for example, a) a combination of circuit elements that performs that function or b) software in any form, including, therefore, firmware, microcode or the like, combined with appropriate circuitry for executing that software to perform the function. The invention as defined by such claims resides in the fact that the functionalities provided by the various recited means are combined and brought together in the manner which the claims call for. Applicants thus regards any means that can provide those functionalities as equivalent to those shown herein.

What is Claimed is:

1. A service level management (SLM) system in a network with a plurality of clients and a plurality of web servers, the SLM system comprising:

a traffic processor for processing data traffic sent from the plurality of clients and from the plurality of web servers;

an application learner for identifying transactions sent from the plurality of clients;

a monitor for monitoring and generating statistics respective of the operation of the web servers and their respective web applications; and

a controller for performing corrective actions according to a plurality of predefined policies.

2. The SLM system of claim 1, further comprising a common bus for providing a communication medium between the traffic processor, the application learner, the monitor, and the controller.

3. The SLM system of claim 1, wherein the traffic sent from the clients including at least hypertext transfer protocol (HTTP) requests.

4. The SLM system of claim 3, wherein the traffic sent from the plurality of web servers including at least HTTP replies.

5. The SLM system of claim 5, wherein the application learner further including:

discovering transactions executed by the plurality of web servers;

classifying incoming requests to discovered web applications;

collecting non-classified incoming requests; and

generating a site tree.

6. The SLM system of claim 5, wherein the site tree includes all identified applications, transactions and modules that belong to a designate web site.

7. The SLM system of claim 5, wherein the collected incoming requests are saved in a first database coupled to the application learner.

8. The SLM system of claim 7, wherein discovering the transactions including:

processing requests saved in the first database using at least a plurality of application definers; and

saving information related to the discovered web applications in a classify data structure (CDS).

9. The SLM system of claim 10, wherein the CDS includes a list of identified sites, for each site a list of its web applications, and for each web application a list transactions and modules that construct the web application.

10. The SLM system of claim 3, wherein the CDS is saved in a database, wherein the database is coupled to the application learner.

11. The SLM system of claim 1, wherein the statistics respective of the operation of the web servers are generated for each web application and include at least one of the following measures: throughput, response time, number of errors, hits per second, and latency.

12. The SLM system of claim 11, wherein the generated statistics are saved in a database, wherein the database is coupled to the monitor.

13. The SLM system of claim 1, wherein the monitor is further producing a plurality of reports based on the generated statistics.

14. The SLM system of claim 1, wherein the corrective actions including at least one of: scheduling requests to reduce response time, shaping traffic to balance the load, and recovery actions on web servers.

15. The SLM system of claim 14, wherein each of the plurality of predefined policies defines at least one corrective action to be performed.

16. The SLM system of claim 15, wherein a policy is determined for a web server, a web application, a module and a transaction.

17. The SLM system of claim 15, wherein each policy is assigned with a priority and time periods to be activated.

18. The SLM system of claim 1 is configured to operate in series with data traffic and for controlling and maintaining a level of service of web applications.

19. A method for controlling and maintaining a level of service of web applications, comprising:

generating a context for each request sent from a client to a web server and for each reply sent from a web server to a client;

determining whether the context belongs to an identified transaction;

gathering statistics respective of the identified transaction;

determining whether at least one policy predefined for the identified application is violated; and

performing a plurality of corrective actions if at least one policy is determined to be violated.

20. The method of claim 19, further comprising:

saving the context in a database if it is determined that the context does not belong to an identified transaction; and

learning new applications using data stored in the database.

21. The method of claim 20, wherein the learning of the new applications is performed using at least one of: an application definer, and a correlation process.

22. The method of claim 21, wherein learning new applications further comprising:

discovering transactions and modules that construct each of the web applications; and

generating a site tree.

23. The method of claim 22, wherein the request is at least a hypertext transfer protocol (HTTP) request.

24. The method of claim 23, wherein generating the context includes parsing the HTTP request.

25. The method of claim 23, wherein determining if the context belongs to an identified transaction, comprising:

matching the context against a classify data structure (CDC) and a plurality of application filters.

26. The method of claim 25, wherein the CDC including: a list of identified sites, for each site a list of its web applications, and for each web application a list of transactions and modules that construct the web application.

27. The method of claim 26, wherein the gathered statistics include measures on at least one of: throughput, response time, number of errors, hits per second, and latency.

28. The method of claim 19, wherein the step of gathering statistics further comprising: producing a plurality of reports based on the gather statistics.

29. The method of claim 19, wherein the at least one policy is checked against the gathered statistics.

30. The method of claim 29, wherein the at least one policy defines at least one corrective action to be performed.

31. The method of claim 30, wherein a policy is determined for a web server, a web application, a module, and a transaction.

32. The method of claim 31, wherein the corrective actions include at least one of: scheduling requests to reduce response time, shaping traffic to balance the load, and recovery actions on web servers.

33. The method of claim 19 is configured to operate in the line of traffic.

34. A computer program product including a computer-readable medium comprising software instructions operable to enable a computer to perform a method for controlling and maintaining a level of service of web applications, comprising:

generating a context for each request sent from a client to a web server and for each reply sent from a web server to a client;

determining whether the context belongs to an identified web application;

gathering statistics respective of the identified transaction;

determining whether at least one policy predefined for the transaction is violated; and

performing a plurality of corrective actions if at least one policy is determined to be violated.

35. The computer program product of claim 34, further comprising:

saving the context in a database if it is determined that the context does not belong to an transaction application;

learning new applications using data stored in the database.

36. The computer program product of claim 35, wherein learning of the new applications is performed using at least one of: an application definer, and a correlation process.

37. The computer program product of claim 36, wherein learning new applications further comprising:

discovering transactions and modules that construct each of the web applications; and

generating a site tree.

38. The computer program product of claim 37, wherein the request is at least a hypertext transfer protocol (HTTP) request.

39. The computer program product of claim 38, wherein generating the context includes parsing the HTTP request.

40. The computer program product of claim 38, wherein determining if the context belongs to an identified transaction, comprising:

matching the context against a classify data structure (CDC) and a plurality of application filters.

41. The computer program product of claim 40, wherein the CDC including: a list of identified sites, for each site a list of its web applications, and for each web application a list of transactions and modules that construct the web application.

42. The computer program product of claim 41, wherein the gathered statistics include measures on at least one of: throughput, response time, number of errors, hits per second, and latency.

43. The computer program product of claim 34, wherein the step of gathering statistics further comprising: producing a plurality of reports based on the gather statistics.

44. The computer program product of claim 34, wherein the at least one policy is checked against the gathered statistics.

45. The computer program product of claim 44, wherein the at least one policy defines at least one corrective action to be performed.

46. The computer program product of claim 45, wherein a policy is determined for a web server, a web application, a module, and a transaction.

47. The computer program product of claim 46, wherein the corrective actions include at least one of: scheduling requests to reduce response time, shaping traffic to balance the load, and recovery actions on web servers.

48. The computer program product of claim 34 is configured for execution on a controller operating in series with data traffic.

49. A service level management (SLM) system installed in series with data traffic between a plurality of clients and a plurality of web servers, the SLM system comprising:

a traffic processor for processing data traffic sent from the plurality of clients and from the plurality of web servers;

an application learner for identifying transactions sent from the plurality of clients;

a monitor for monitoring and generating statistics respective of the operation of the web servers and their respective web applications; and

a controller for performing corrective actions according to a plurality of predefined policies.

ABSTRACT

A service level management (SLM) system where the system learns the structure of a web application, monitors the operation of the application, and controls the processing of incoming requests to achieve optimal performance as defined in a service level agreement (SLA). The system is operative for example in enterprise web applications and in enterprise data centers that deploy web applications and optimally is capable of controlling and maintaining a level of service of web applications.

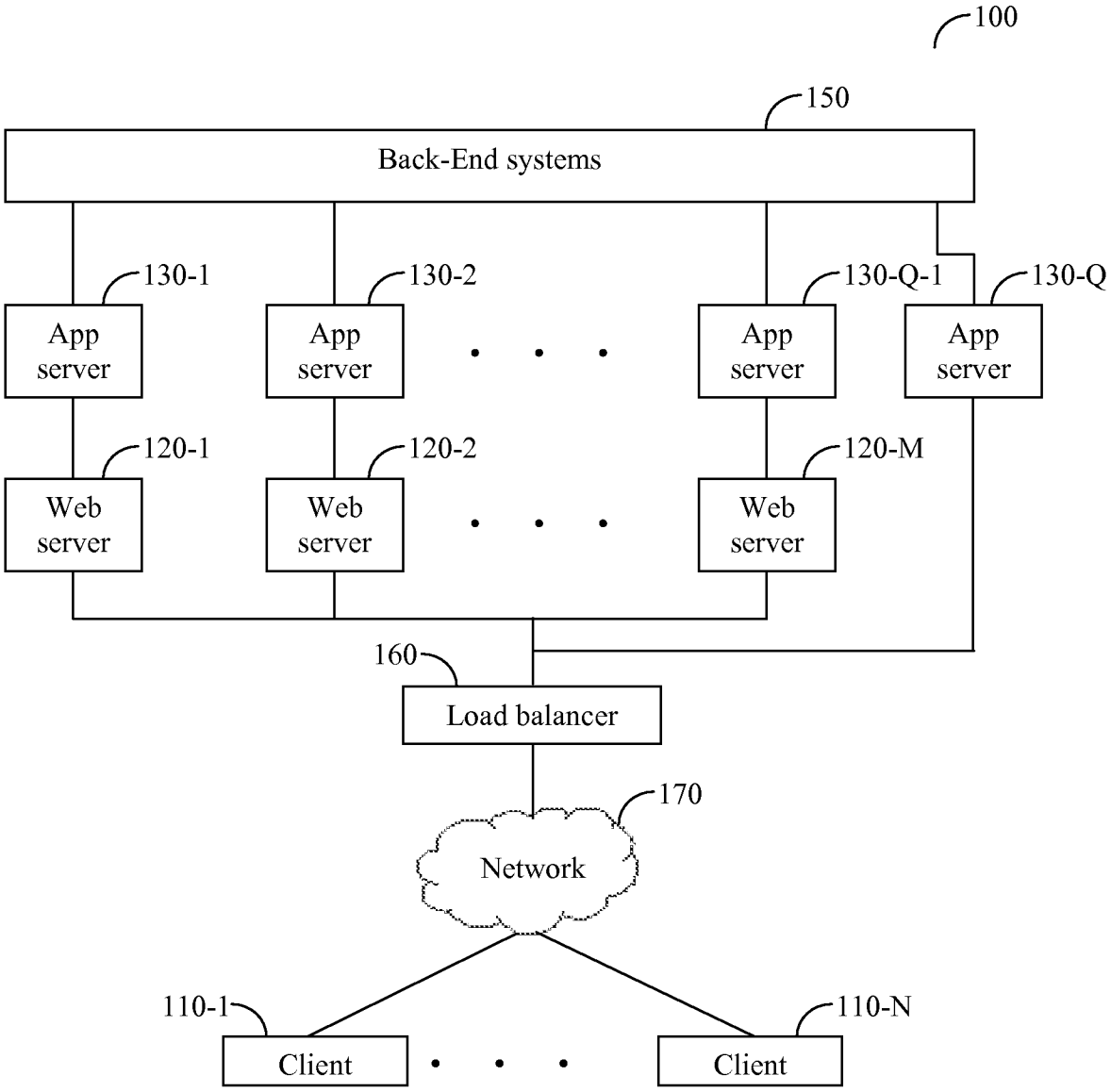

FIG. 1 (PRIOR ART)

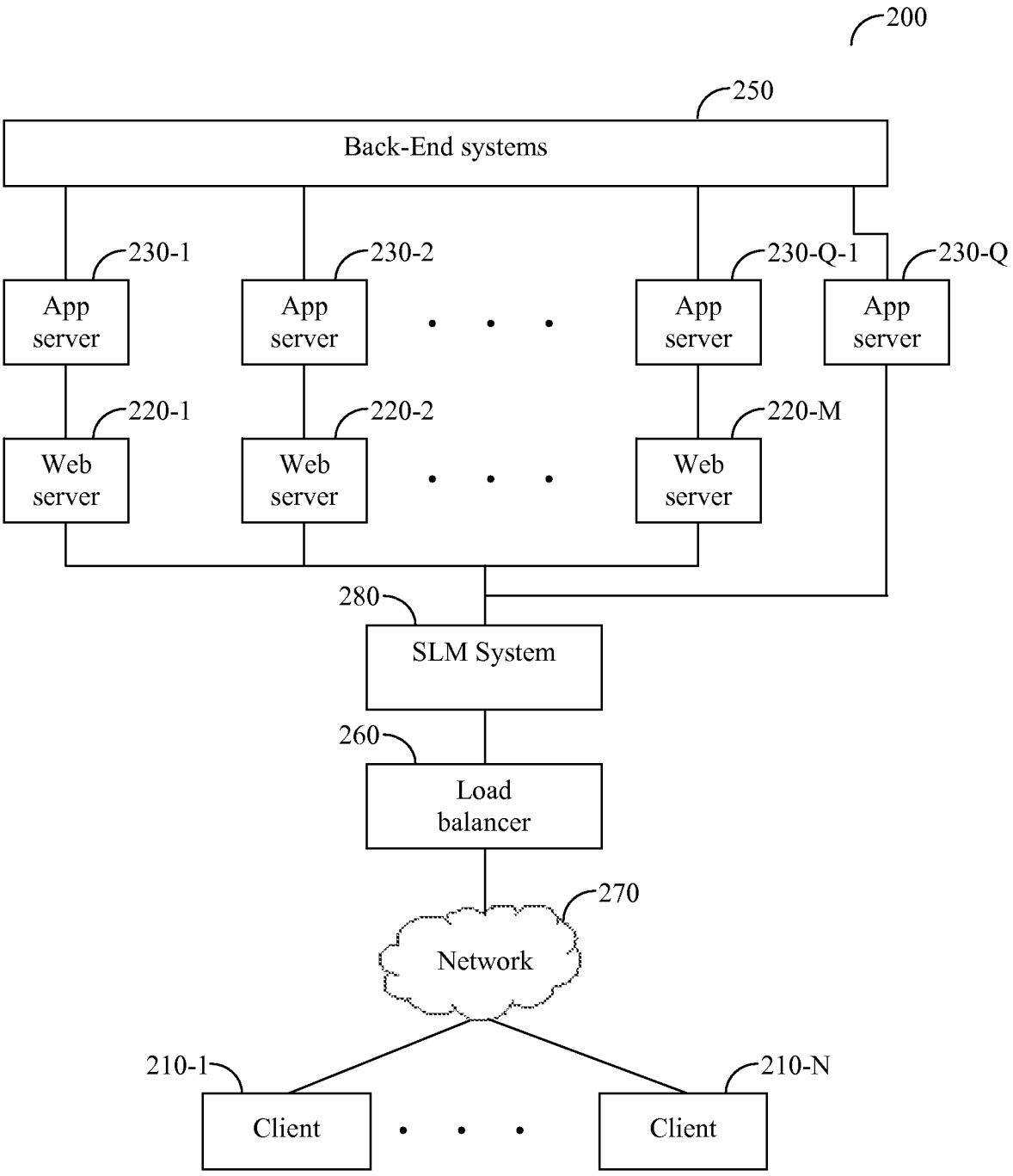
200
250
Back-End systems
230-1
230-2
230-Q-1
230-Q
App server
App server
App server
App server
220-1
220-2
220-M
Web server
Web server
Web server
280
SLM System
260
Load balancer
270
Network
210-1
210-N
Client
Client

FIG. 2

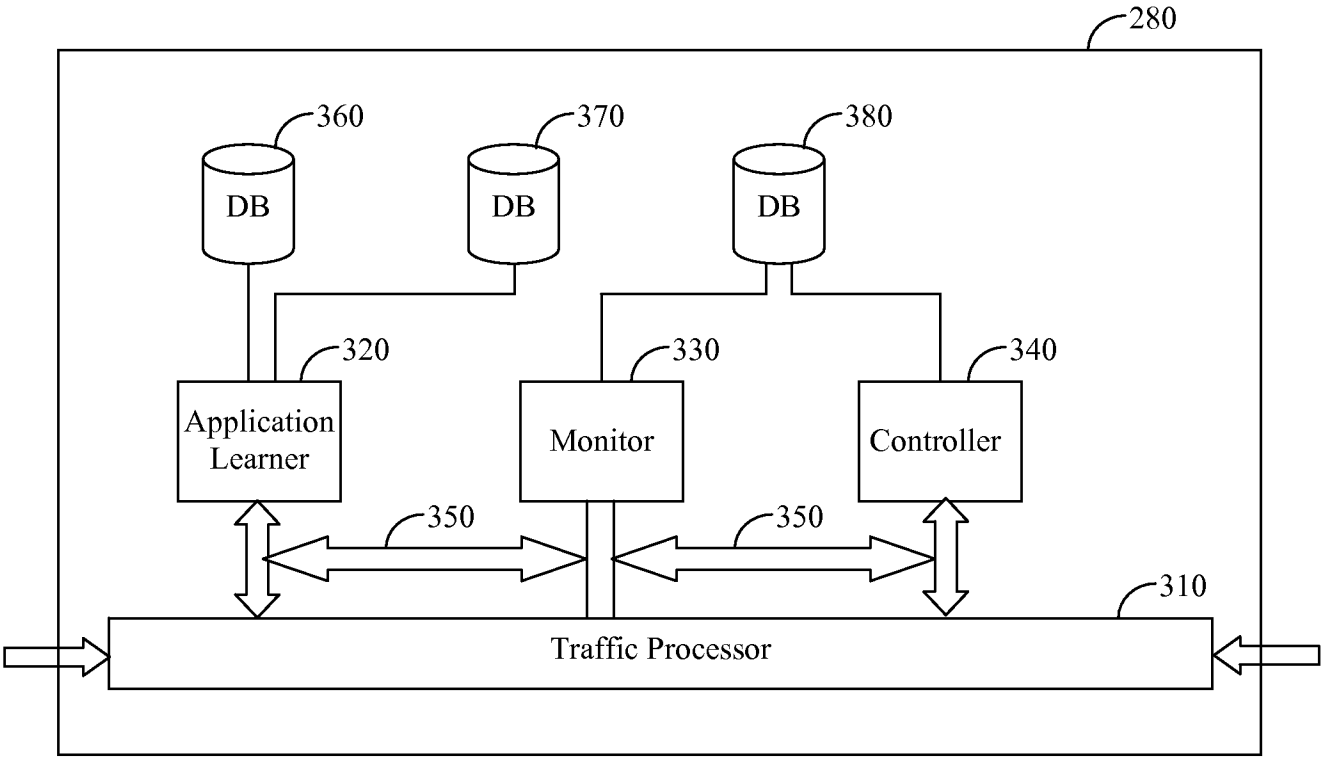
280
360
370
380
DB
DB
DB
320
330
340
Application Learner
Monitor
Controller
350
350
310
Traffic Processor

FIG. 3

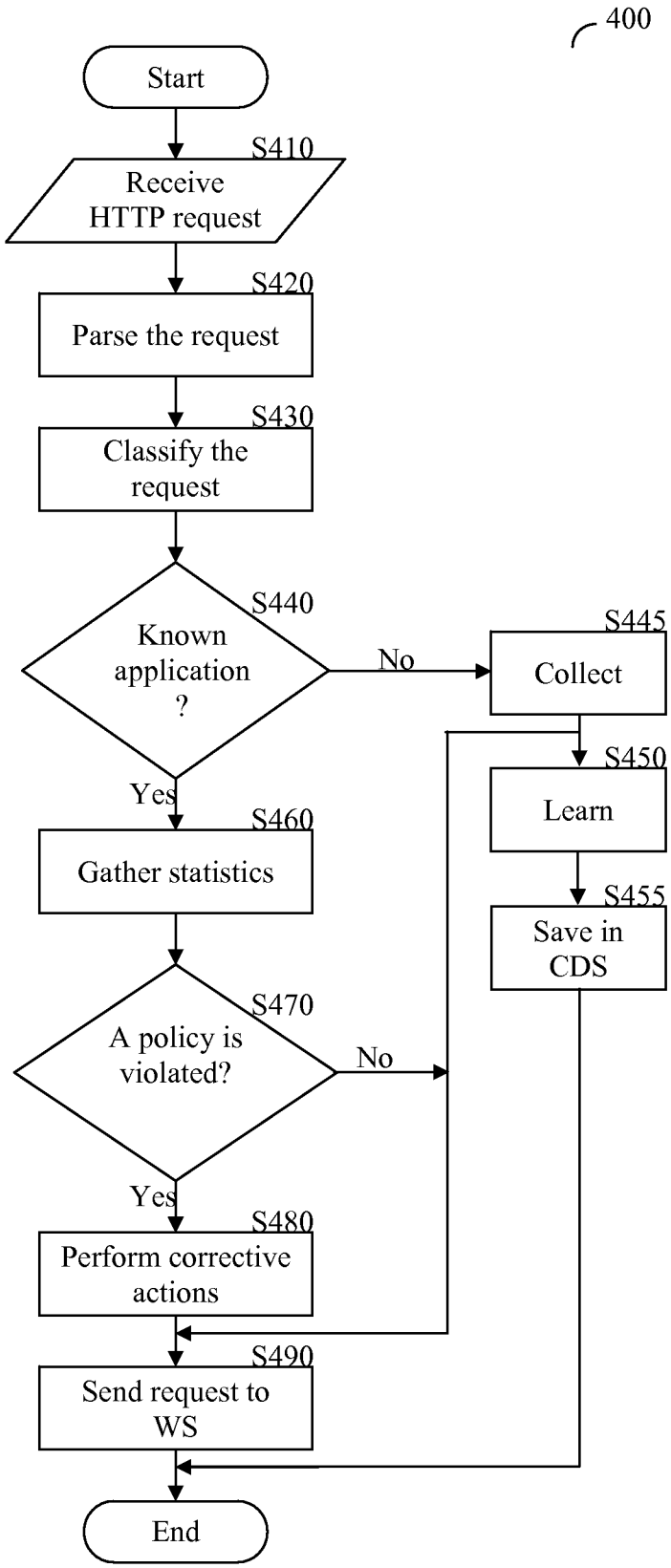
400
Start
S410
Receive HTTP request
S420
Parse the request
S430
Classify the request
S440
Known application ?
No
S445
Collect
S450
Learn
S455
Save in CDS
Yes
S460
Gather statistics
S470
A policy is violated?
No
Yes
S480
Perform corrective actions
S490
Send request to WS
End

FIG. 4

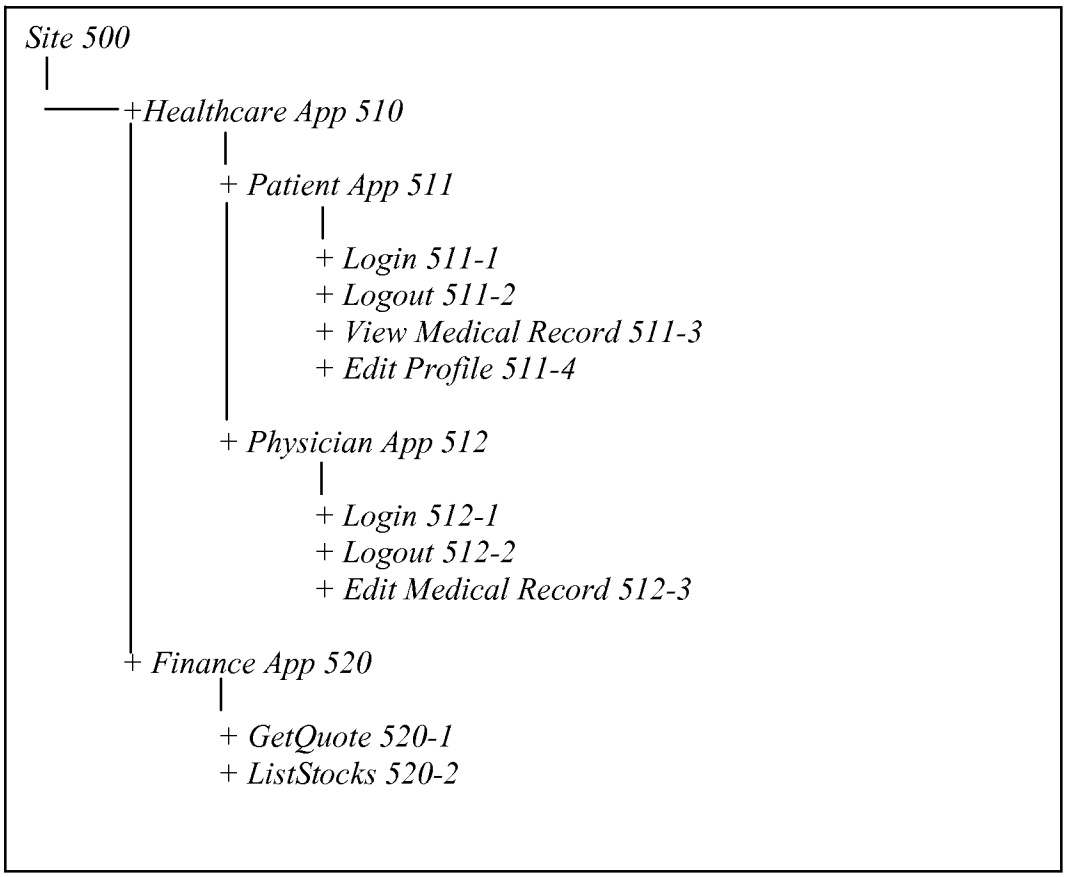
Site 500
+Healthcare App 510
+ Patient App 511
+ Login 511-1
+ Logout 511-2
+ View Medical Record 511-3
+ Edit Profile 511-4
+ Physician App 512
+ Login 512-1
+ Logout 512-2
+ Edit Medical Record 512-3
+ Finance App 520
+ GetQuote 520-1
+ ListStocks 520-2

FIG. 5

Attorney Docket: **BHVE 5**

DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.
I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **Service Level Management System**, the specification of which:

☒ is attached hereto, or
☐ was filed on **<Date>**, as U.S. or PCT Application **<Number>**.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by an amendment referred to above. I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

(Number)	(Country)	(Day/Month/Year Filed)

I hereby claim the benefit under Title 35, U.S. Code §120 or §119(e) of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

60/779,706	March 6, 2006	Pending
(Application Number)	(Filing Date)	(Patented, pending, abandoned)

I hereby appoint as my attorneys and agents all practitioners associated with **Customer Number 61650**, to prosecute this application and to transmit all business in the USPTO connected therewith.

Address all correspondence to: **CUSTOMER NUMBER 61650**

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the U.S. Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of first inventor: Asaf Wexler
Inventor's Signature: _____ Date: Mar 6 2007
Residence: Raanana, Israel Citizenship: Israel
Post Office Address: c/o B-hive Networks, Inc., 2755 Campus Drive, Suite 130, San Mateo, CA 94403

Full name of second joint inventor: Yoav Dembak
Inventor's Signature: _____ Date: Mar 6 2007
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PTO/SB/14 (02-07)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	BHVE 5
	Application Number	
Title of Invention	Service Level Management System	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1 Remove

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Asaf		Wexler	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Raanana	Country Of Residence[i]	IL
Citizenship under 37 CFR 1.41(b)[i]	IL		

Mailing Address of Applicant:

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Address 2	2755 Campus Drive, Suite 130		
City	San Mateo	State/Province	CA
Postal Code	94403	Country[i]	US

Applicant 2 Remove

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Yoav		Dembak	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Petah Tikwa	Country Of Residence[i]	IL
Citizenship under 37 CFR 1.41(b)[i]	IL		

Mailing Address of Applicant:

Address 1	c/o B-hive Networks, Inc.		
Address 2	2755 Campus Drive, Suite 130		
City	San Mateo	State/Province	CA
Postal Code	94403	Country[i]	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

PTO/SB/14 (02-07)
Approved for use through 02/28/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	BHVE 5
	Application Number	
Title of Invention	Service Level Management System	

Customer Number	61650		
Email Address	harris.wolin@myerswolin.com	Add Email	Remove Email
Email Address	brian.myers@myerswolin.com	Add Email	Remove Email

Application Information:

Title of the Invention	Service Level Management System		
Attorney Docket Number	BHVE 5	**Small Entity Status Claimed**	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		**Sub Class (if any)**	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	5	**Suggested Figure for Publication (if any)**	2

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not been and will not be the subject of an application filed in another country, or under a multilateral agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ US Representative (37 CFR 11.9)
Customer Number	61650		

Domestic Priority Information:

This section allows for the applicant to claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c). Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	60779706	2006-03-06

Additional Domestic Priority Data may be generated within this form by selecting the **Add** button. Add

PTO/SB/14 (02-07)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	BHVE 5
	Application Number	
Title of Invention	Service Level Management System	

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

Remove

Application Number	Country [i]	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			(•) Yes ( ) No

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Remove

Assignee 1

If the Assignee is an Organization check here. [X]

Organization Name	B-hive Networks, Inc.		
Mailing Address Information:			
Address 1	2755 Campus Drive		
Address 2	Suite 130		
City	San Mateo	**State/Province**	CA
Country [i] US		Postal Code	94403
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the **Add** button. Add

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/Harris A. Wolin/			Date (YYYY-MM-DD)	2007-03-06
First Name	Harris	Last Name	Wolin	Registration Number	39432

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/08a (08-03)
Approved for use through 07/31/2006. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	
	Filing Date	
	First Named Inventor	Asaf Wexler
	Art Unit	
	Examiner Name	
	Attorney Docket Number	BHVE 5

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6944678	B2	2005-09-13	Lu et al.	
	2	6970933	B1	2005-11-29	Masters	
	3	6813637	B2	2004-11-02	Cable	
	4	6813635	B1	2004-11-02	Jorgenson	
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20050262098	A1	2005-11-24	Manfredi et al.	
	2	20040138939	A1	2004-07-15	Theiler	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	
	First Named Inventor	Asaf Wexler
	Art Unit	
	Examiner Name	
	Attorney Docket Number	BHVE 5

	3	20030187946	A1	2003-10-02	Cable	
	4	20020103896	A1	2002-08-01	von Klopp Lemon	
	5	20020065911	A1	2002-05-30	von Klopp et al.	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	
	Filing Date	
	First Named Inventor	Asaf Wexler
	Art Unit	
	Examiner Name	
	Attorney Docket Number	BHVE 5

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	
	Filing Date	
	First Named Inventor	Asaf Wexler
	Art Unit	
	Examiner Name	
	Attorney Docket Number	BHVE 5

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Harris A. Wolin/	Date (YYYY-MM-DD)	2007-03-06
Name/Print	Harris A. Wolin	Registration Number	39432

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	Service Level Management System
First Named Inventor/Applicant Name:	Asaf Wexler
Filer:	Harris Wolin
Attorney Docket Number:	BHVE 5

Filed as Small Entity

Utility Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	75	75
Utility Search Fee	2111	1	250	250
Utility Examination Fee	2311	1	100	100
Pages:				
Claims:				
Claims in excess of 20	2202	29	25	725
Independent claims in excess of 3	2201	1	100	100
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1250**

Electronic Acknowledgement Receipt

EFS ID:	1567653
Application Number:	11682426
International Application Number:	
Confirmation Number:	9081
Title of Invention:	Service Level Management System
First Named Inventor/Applicant Name:	Asaf Wexler
Customer Number:	61650
Filer:	Harris Wolin
Filer Authorized By:	
Attorney Docket Number:	BHVE 5
Receipt Date:	06-MAR-2007
Filing Date:	
Time Stamp:	13:20:43
Application Type:	Utility

Payment information:

Submitted with Payment	yes
Payment was successfully received in RAM	$1250
RAM confirmation Number	2045
Deposit Account	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)	Multi Part /.zip	Pages (if appl.)

1	Transmittal of New Application	BHVE_5_Utility_Transmittal.pdf	459784	no	1
Warnings:					
Information:					
2		BHVE_5_NonProvisional_Specification_and_Drawings.pdf	170805	yes	29

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	13
Claims	14	23
Abstract	24	24
Drawings	25	29

Warnings:					
Information:					
3	Oath or Declaration filed	BHVE_5_Declaration_Executed.pdf	74893	no	1
Warnings:					
Information:					
4	Application Data Sheet	BHVE_5_ADS.pdf	1068765	no	4
Warnings:					
Information:					
5	Information Disclosure Statement (IDS) Filed	BHVE_5_IDS.pdf	730469	no	5
Warnings:					
Information:					
6	Fee Worksheet (PTO-06)	fee-info.pdf	8525	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2513241		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (12-04)
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PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

11/682,426

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))				75			
SEARCH FEE (37 CFR 1.16(k), (i), or (m))				250			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))				100			
TOTAL CLAIMS (37 CFR 1.16(i))	49 minus 20 =	29	X$25=	725	OR	X$50	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4 minus 3 =	1	X$100=	100		X$200=	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			N/A			N/A	
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	1250		TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDI-TIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDI-TIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
					TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDI-TIONAL FEE ($)	OR	RATE ($)	ADDI-TIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
					TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

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