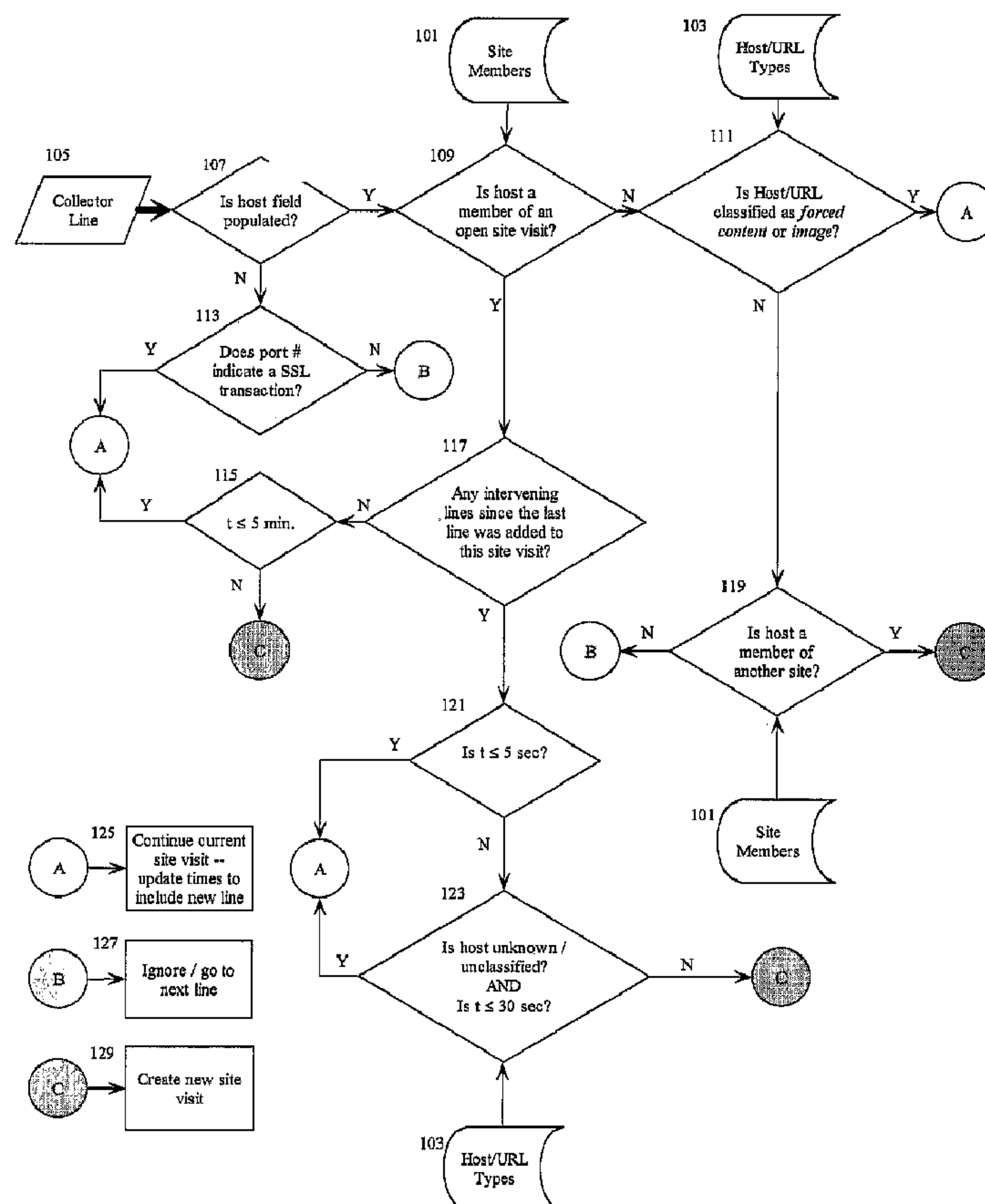




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(72) Inventeurs/Inventors:
TARQUINI, MAUREEN MENDICK, US;
ROBERTSON, MICHAEL CHAD, US;
SANDEFUR, ROBERT ASHEVILLE, JR., US
(73) Propriétaire/Owner:
HITWISE PTY. LTD., AU
(74) Agent: SMART & BIGGAR

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(57) Abrégé/Abstract:

Data about computer network traffic is collected as user website visit recording sessions. The data captured is analyzed and organized with sufficient level of detail or granularity to determine a single request from a server. Each data request is analyzed to



(57) **Abrégé(suite)/Abstract(continued):**

determine if it comes from a server with which an ongoing end user interaction or open site visit is occurring. If not, a new site visit is created as a general proposition. If the data request is part of an open site visit, then the time is compared to the time of the last interaction and if the interval is sufficiently small, the data request is treated as a continuation of the visit. If the interval is large, a new site visit is created.

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(72) Inventors: **TARQUINI, Maureen, Mendick;** 110 Pahlmeyer Place, Apex, NC 27502 (US). **ROBERTSON, Michael, Chad;** 1603 Claiborne Ct., Raleigh, NC 27606 (US). **SANDEFUR, Robert, Asheville, Jr.;** 6 Mt. Bolus Road, Chapel Hill, NC 27514 (US).

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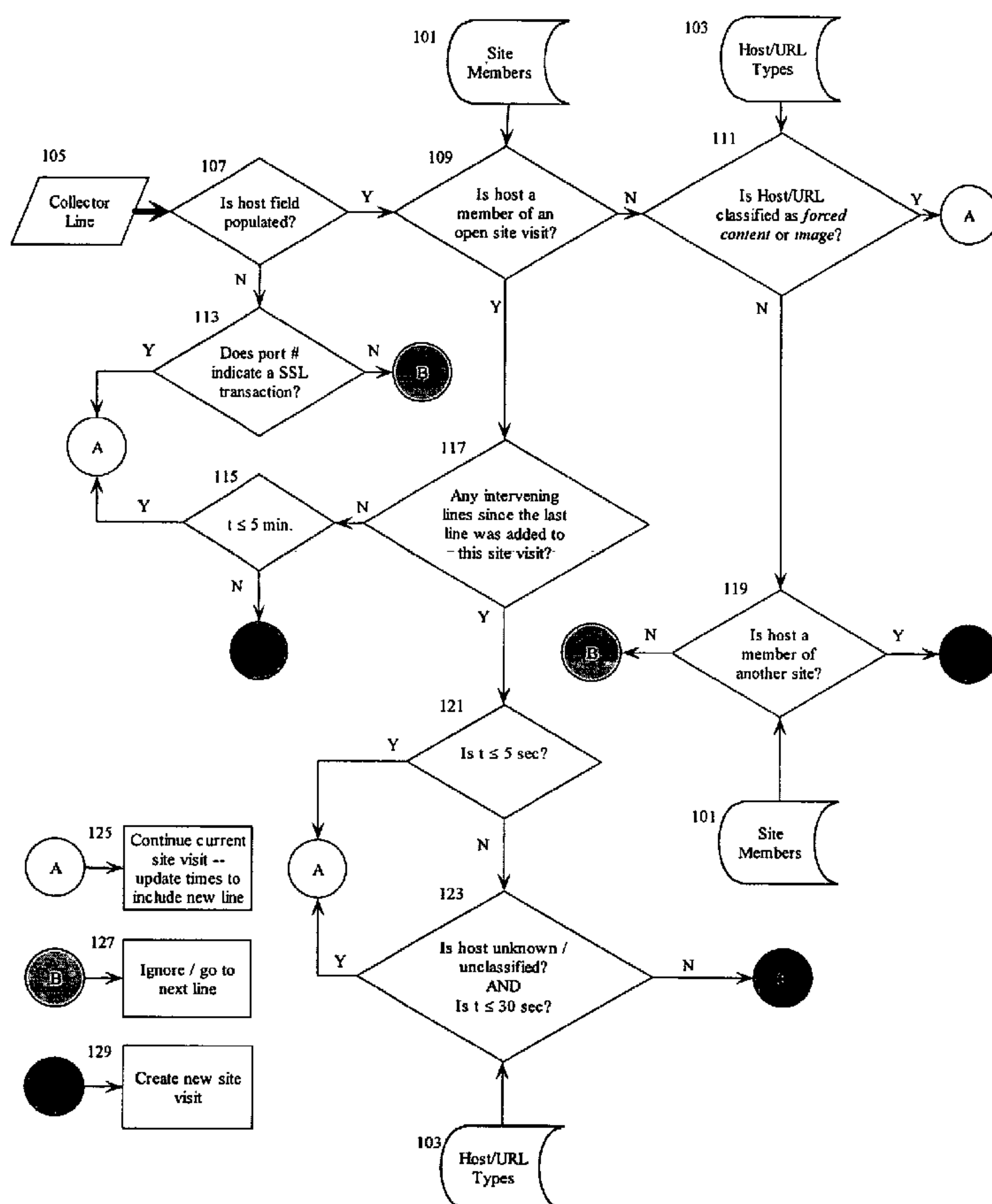
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(71) Applicant: HITWISE PTY. LTD [—/AU]; Level 7, 580 St. Kilda Road, Melbourne, VIC 3004 (AU).

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(54) Title: METHOD AND SYSTEM FOR CHARACTERIZATION OF ONLINE BEHAVIOR



(57) Abstract: Data about computer network traffic is collected as user website visit recording sessions. The data captured is analyzed and organized with sufficient level of detail or granularity to determine a single request from a server. Each data request is analyzed to determine if it comes from a server with which an ongoing end user interaction or open site visit is occurring. If not, a new site visit is created as a general proposition. If the data request is part of an open site visit, then the time is compared to the time of the last interaction and if the interval is sufficiently small, the data request is treated as a continuation of the visit. If the interval is large, a new site visit is created.

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METHOD AND SYSTEM FOR CHARACTERIZATION OF ONLINE BEHAVIOR

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BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] This invention relates to a method and system for collecting and classifying computer network traffic, particularly Internet traffic. Specifically, the method and system of the invention characterize the interaction between users and web sites to facilitate construction of more accurate online behavior profiles for marketing purposes.

2. Discussion of the Background

[0003] The Internet has rapidly grown into a center for conducting commerce with unprecedented efficiency and commercial advantage; however, the Internet also presents numerous new challenges to the development and execution of appropriate business models and processes. To design and implement effective marketing and business plans, companies need to gain a better understanding of consumer behavior and preferences while they are conducting Internet commerce.

[0004] Behavior profiles are created using network usage data collected through various methods. Once the data is collected, it is analyzed to determine the behavior of a particular user. In order to create an accurate behavior profile, it is useful to generalize Internet usage by identifying the types of Web sites a particular type of user accesses and the way that type of user accesses a particular type of Web site.

[0005] For example, it would be valuable to a merchant to know that users from a geographical area regularly purchase books from a merchant with a website, for example, Amazon.comTM. However, there is a need for more generalized data, than that which is specific to a particular merchant. It is desirable to have a system that can create what are known as "generalized behavior profiles." By generalized

behavior profile is meant a collection of data that describes the attributes and usage patterns of online shoppers, but does not contain personally identifiable information of such online shoppers. More specifically, it is valuable to know that users in a particular geographical area regularly conduct electronic commerce by
5 accessing online catalog and shopping sites by following links on a Web portal site.

[0006] To build accurate generalized behavior profiles, it is desirable to know typical behaviors and actions that lead up to a purchase. For example, it would be desirable to know that many users searched one online merchant site for
10 books to purchase and then went to a different online merchant site to make the actual purchase. For the specific merchant whose site was used for browsing, this information indicates that the site is successful in attracting potential shoppers, but perhaps prices need to be more competitive to retain those initially coming to the site. More generally, this information may indicate that price is a factor which
15 overrides factors such as convenience and functionality of a website in the decisions of similar consumers.

SUMMARY OF THE INVENTION

[0007] In accordance with one aspect of the invention, there is provided a method of collecting and classifying data about computer network traffic as user
20 website visit sessions. The method involves determining whether a data request to at least one website comprises a user ongoing interaction with a website or whether it is a new site visit by a user. The method also involves, if the request is a new visit, creating a record of a new site visit. The method also involves, if the request is a user ongoing interaction which occurred more than a predetermined amount of
25 time since the last visit, creating a record of the data request as a new site visit. The method further involves, if the request is a user ongoing interaction occurring at less than the predetermined amount of time since the last visit, creating a record of the visit as a continuation of the prior visit. The method also involves characterising the network traffic based on the records created. The method further

involves assembling a data table made up of all known hosts that direct a user to a specific website, and classifying the computer network traffic corresponding to the sessions by tracking each user request to all known hosts for each specific website. The network traffic is characterised for each website independent of which host is
5 used by a user to request data from each website, and the request is a new visit when the request is to one of the known hosts, an open site visit is not running to the specific website and the request is not for forced content or an image as classified in a host/URL types table.

[0007a] The method may further involve creating records of a website visit
10 which includes components of a website visit originating from hosts that are not members of a specific website.

[0007b] The components of a website visit originating from hosts that are not members of a specific website may include forced content and images, and may be recorded as data requests to the specific website.

15 **[0007c]** The method may further involve collecting and classifying computer network traffic for the sessions by concurrently running the sessions for each browser opened by users having multiple browsers open.

[0007d] The method may further involve detecting and recording the port numbers of each data request and determining whether the data requests are secure
20 socket layer transactions.

[0007e] The method may further involve determining the duration of a website visit by subtracting the start time of a session for a user from the latest end time.

[0007f] The end of a website visit by a user may be determined by detecting
25 when a user closes a session.

[0007g] The end of a website visit may be determined by detecting when a predetermined amount of time of inactivity occurs.

[0007h] The predetermined amount of time may be within five to fifteen minutes if the data request is to one of the known hosts, an open site visit is
30 running to the specific website, and an intervening data request has not been received.

[0007i] The predetermined amount of time may be within thirty to sixty seconds if the data request is to one of the known hosts, an open site visit may be running to the specific website, an intervening data request has been received within five to twenty seconds and the host of the intervening data request is known.

5 **[0007j]** In accordance with another aspect of the invention, there is provided a method performed by a computer system, of collecting and classifying data about computer network traffic as user website visit recording sessions. The method involves determining whether a data request to at least one website comprises an ongoing interaction with a website or whether the request is a new site visit by a
10 user of a plurality of users. The method further involves assembling a data table made up of all known hosts that are able to direct users to a specific website. The method further involves classifying the computer network traffic corresponding to the sessions by tracking each user request of the plurality of users to all known hosts for each specific website. The method further involves, if the request is a
15 new visit, creating a first record of a new site visit for each user. The method further involves, if the request for each user is a first ongoing interaction which occurred more than a predetermined amount of time since a last visit, creating a second record of the data request as a new site visit for each user. The method further involves, if the request is a second ongoing interaction occurring at less
20 than the predetermined amount of time since the last visit, processing the request as a continuation of the last visit for each user. The method further involves characterizing the network traffic based on the first or second records created for each website independent of which host is used by each user to request data from each website. The predetermined amount of time is within five to fifteen minutes if
25 the data request is to one of said known hosts, an open site visit is running to the specific website and an intervening data request has not been received.

[0007k] The method may involve creating records of a website visit which includes components of the website visit originating from hosts that are not members of the specific web site.

[0007l] The components of a website visit originating from hosts that are not members of a specific website may include forced content and images, and may be processed as data requests to the specific website.

[0007m] The method may further involve collecting and classifying
5 computer network traffic for the sessions by concurrently running the sessions for each browser opened by users having multiple browsers open.

[0007n] The method may further involve detecting and recording the port numbers of each data request and determining whether the data requests are secure socket layer transactions.

10 **[0007o]** The method may further involve determining the duration of a website visit by subtracting the start time of a session for each user of said plurality of users from the latest end time.

[0007p] The end of a web site visit by a user may be determined by detecting when the user closes a session.

15 **[0007q]** The end of a website visit may be determined by detecting when the predetermined amount of time of inactivity occurs.

[0007r] In accordance with another aspect of the invention, there is provided a method performed by a computer system, of collecting and classifying data about computer network traffic as user website visit recording sessions. The method
20 involves determining whether a data request to at least one website comprises an ongoing interaction with a website or whether the request is a new site visit by a user of a plurality of users. The method also involves assembling a data table made up of all known hosts that are able to direct users to a specific website, and classifying the computer network traffic corresponding to sessions by tracking
25 each user request of the plurality of users to all known hosts for each specific website. The method also involves, if the request is a new visit, creating a first record of a new site visit for each user. The method also involves, if the request for each user is a first ongoing interaction which occurred more than a predetermined amount of time since a last visit, creating a second record of the
30 data request as a new site visit for each user. The method also involves, if the request is a second ongoing interaction occurring at less than the predetermined

amount of time since the last visit, processing the request as a continuation of the last visit for each user. The method also involves characterizing the network traffic based on the first or second records created for each website independent of which host is used by each user to request data from each website. The
 5 predetermined amount of time is within thirty to sixty seconds if the data request is to one of the known hosts, an open site visit is running to the specific website, an intervening data request has been received within five to twenty seconds and the host of the intervening data request is known.

[0007s] The request may be a new visit when the request is to one of the
 10 known hosts, an open site visit is not running to the specific website and the request is not for forced content or an image.

[0007t] The method may further involve creating records of a website visit which includes components of the website visit originating from hosts that are not members of the specific website.

15 [0007u] The components of a website visit originating from hosts that are not members of a specific website may include forced content and images, and may be processed as data requests to the specific website.

[0007v] The method may further involve collecting and classifying
 20 computer network traffic for the sessions by concurrently running the sessions for each browser opened by users having multiple browsers open.

[0007w] The method may further involve detecting and recording the port numbers of each data request and determining whether the data requests are secure socket layer transactions.

[0007x] The method may further involve determining the duration of a
 25 website visit by subtracting the start time of a session for each user of the plurality of users from the latest end time.

[0007y] The end of a website visit by a user may be determined by detecting when the user closes a session.

[0007z] The end of a website visit may be determined by detecting when the
 30 predetermined amount of time of inactivity occurs.

[0007aa] In accordance with another aspect of the invention, there is provided a computer readable medium encoded with codes for directing a microprocessor to carry out the method.

[0007ab] In accordance with another aspect of the invention, there is provided
5 a system for collecting and classifying data about computer network traffic as user website visit sessions. The system includes a microprocessor, and a computer readable medium encoded with codes for directing the microprocessor to carry out the method.

[0007ac] In accordance with another aspect of the invention, there is provided
10 a system for collecting and classifying data about computer network traffic as user website visit sessions. The system includes means for determining whether a data request to at least one website comprises a user ongoing interaction with a website or whether it is a new site visit by a user. The system also includes first creating means for creating a record of a new site visit if the request is a new visit, a record
15 of the data request as a new site visit if the request is a user ongoing interaction which occurred more than a predetermined amount of time since the last visit, and a record of the visit as a continuation of the prior visit if the request is a user ongoing interaction occurring at less than said predetermined amount of time since the last visit. The system further includes means for characterising the network
20 traffic based on the records created, means for assembling a data table made up of all known hosts that direct a user to a specific website, and means for classifying the computer network traffic corresponding to said sessions by tracking each user request to all known hosts for each specific website. The means for characterising is configured to characterize the network traffic for each website independent of
25 which host is used by a user to request data from each website, and the request is a new visit when the request is to one of said known hosts, an open site visit is not running to said specific website and the request is not for forced content or an image as classified in a host/URL types table.

[0007ad] The system may further include second creating means for creating
30 records of a website visit which includes components of a website visit originating from hosts that are not members of a specific website.

[0007ae] The components of a website visit originating from hosts that are not members of a specific website may include forced content and images, and the second creating means may be configured to record the records as data requests to the specific website.

- 5 **[0007af]** The means for classifying the computer network traffic for the sessions may be configured to classify the computer network traffic for the sessions by concurrently running the sessions for each browser opened by users having multiple browsers open.

[0007ag] The system may further include means for detecting and recording
10 the port numbers of each data request, and means for determining whether the data requests are secure socket layer transactions.

[0007ah] The system may further include means for determining the duration of a website visit by subtracting the start time of a session for a user from the latest end time.

- 15 **[0007ai]** The means for determining the duration of a website visit may be configured to determine the end of a website visit by a user detecting when a user closes a session.

[0007aj] The means for determining the duration of a website visit may be configured to determine the end of a website visit by detecting when a
20 predetermined amount of time of inactivity occurs.

[0007ak] The predetermined amount of time may be within five to fifteen minutes if the data request is to one of said known hosts, an open site visit is running to said specific website and an intervening data request has not been received.

- 25 **[0007al]** The predetermined amount of time may be within thirty to sixty seconds if the data request is to one of said known hosts, an open site visit is running to said specific website, an intervening data request has been received within five to twenty seconds and the host of the intervening data request is known.

[0007am] In accordance with another aspect of the invention, there is provided
30 a system for collecting and classifying data about computer network traffic as user website visit recording sessions. The system includes means for determining

whether a data request to at least one website comprises an ongoing interaction with a website or whether the request is a new site visit by a user of a plurality of users, means for assembling a data table made up of all known hosts that are able to direct users to a specific website, and means for classifying the computer network traffic corresponding to the sessions by tracking each user request of the plurality of users to all known hosts for each specific website. The system also includes first creating means for creating, if the request is a new visit, a first record of a new site visit for each user, and if the request for each user is a first ongoing interaction which occurred more than a predetermined amount of time since a last visit, a second record of the data request as a new site visit for each user. If the request is a second ongoing interaction occurring at less than the predetermined amount of time since the last visit, the first creating means is configured to process the request as a continuation of the last visit for each user. The system further includes means for characterizing the network traffic based on the first or second records created for each website independent of which host is used by each user to request data from each website. The predetermined amount of time is within five to fifteen minutes if the data request is to one of the known hosts, an open site visit is running to the specific website and an intervening data request has not been received.

[0007an] The system may further include second creating means for creating records of a website visit which includes components of the website visit originating from hosts that are not members of the specific web site.

[0007ao] The components of a website visit originating from hosts that are not members of a specific website may include forced content and images, and the second creating means may be configured to record the records as data requests to the specific website.

[0007ap] The means for classifying the computer network traffic for the sessions may be configured to classify the computer network traffic for the sessions by concurrently running the sessions for each browser opened by users having multiple browsers open.

[0007aq] The system may further include means for detecting and recording the port numbers of each data request, and means for determining whether the data requests are secure socket layer transactions.

5 [0007ar] The system may further include means for determining the duration of a website visit by subtracting the start time of a session for each user of said plurality of users from the latest end time.

[0007as] The means for determining the duration of a website visit may be configured to determine the end of a website visit by a user detecting when a user closes a session.

10 [0007at] The means for determining the duration of a website visit may be configured to determine the end of a website visit by detecting when the predetermined amount of time of inactivity occurs.

[0007au] In accordance with another aspect of the invention, there is provided a system for collecting and classifying data about computer network traffic as user website visit recording sessions. The system includes means for determining whether a data request to at least one website comprises an ongoing interaction with a website or whether the request is a new site visit by a user of a plurality of users, means for assembling a data table made up of all known hosts that are able to direct users to a specific web site, and means for classifying the computer network traffic corresponding to the sessions by tracking each user request of the plurality of users to all known hosts for each specific website. The system also includes first creating means for creating, if the request is a new visit, a first record of a new site visit for each user, and if the request for each user is a first ongoing interaction which occurred more than a predetermined amount of time since a last visit, a second record of the data request as a new site visit for each user. If the request is a second ongoing interaction occurring at less than the predetermined amount of time since the last visit, the first creating means is configured to process the request as a continuation of the last visit for each user. The system further includes means for characterizing the network traffic based on the first or second records created for each website independent of which host is used by each user to request data from each website. The predetermined amount of time is within thirty

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to sixty seconds if the data request is to one of the known hosts, an open site visit is running to the specific website, an intervening data request has been received within five to twenty seconds and the host of the intervening data request is known.

[0007av] The request may be a new visit when the request is to one of the known hosts, an open site visit is not running to the specific website and the request is not for forced content or an image.

[0007aw] The system may further include second creating means for creating records of a website visit which includes components of the website visit originating from hosts that are not members of the specific website.

[0007ax] The components of a website visit originating from hosts that are not members of a specific website may include forced content and images, and the second creating means may be configured to record the records as data requests to the specific website.

[0007ay] The means for classifying the computer network traffic for the sessions may be configured to classify the computer network traffic for the sessions by concurrently running the sessions for each browser opened by users having multiple browsers open.

[0007az] The system may further include means for detecting and recording the port numbers of each data request and determining whether the data requests are secure socket layer transactions.

[0007ba] The system may further include means for determining the duration of a website visit by subtracting the start time of a session for each user of the plurality of users from the latest end time.

[0007bb] The means for determining the duration of a website visit may be configured to determine the end of a website visit by a user detecting when a user closes a session.

[0007bc] The means for determining the duration of a website visit may be configured to determine the end of a website visit by detecting when the predetermined amount of time of inactivity

[0007bd] In accordance with other aspects of the invention, a method and system are provided for collecting and characterizing computer network traffic

data. All data captured is analyzed and organized with sufficient level of detail (or granularity) to determine a single request from a server (e.g. a single gif file on a web site). As one of ordinary skill in the art will appreciate, there are many methods for organizing data to achieve this level of detail. Each data request is

5 analyzed to determine if it comes from a server with which an ongoing end user interaction (or open site visit) is occurring. If not, generally a new site visit is created. If the data request is part of an open site visit, then the time is compared to the time of the last interaction with that site. If the interval is sufficiently small, then the data

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request is generally treated as a continuation of that open site visit. If the interval is sufficiently large, a new site visit is created.

BRIEF SUMMARY OF THE DRAWING

- 5 [0008] Figure 1 is a basic flow chart of the method to characterize computer network traffic data.

DETAILED DESCRIPTION OF THE INVENTION

[0009] In a step 101, a data table that contains all known hosts (the part of
10 the URL path name that precedes the backslash) that direct a user to a particular location (site) is established. This is referred to as the Site Members Table. By way of example, let us consider the merchant known as Barnes and Noble. In the case of Barnes and Noble, the following hosts are all members of the Barnes and Noble site: *www.bn.com*, *www.barnesandnoble.com*, *music.barnesandnoble.com*,
15 *shop.barnesandnoble.com*, and *207.36.92.145*. By compiling a table containing all hosts which are members of the Barnes and Noble site, this allows the capture of unique users, visits, and the calculation of visit durations for the Barnes and Noble site regardless of what host is entered or how the user navigates on the site.

[0010] To calculate durations accurately, the logic of the method and
20 system must also have a capability for handling components (ads, images, etc.) of a Web site coming from servers (hosts) that are not members of a given site. An additional data table is compiled in step 103, and contains hosts that are classified as "forced content" (e.g. ads, or banners, or counters). Further, URL content types that are classified as images (e.g. .gif, .jpg, etc.) are also compiled into this data
25 table in step 103. This data table is referred to as the Host/URL Types Table.

[0011] For example, the host *ads.ebay.com* is an advertisement, and may appear in the datastream, and thereby suggest a visit to the merchant known as eBay, when a user is actually visiting the merchant using the URL *amazon.com*. The method and system must recognize that although that host is not a member of
30 the current site, it is a component of that site visit to the merchant known as

Amazon, and may also appear on many other sites. The logic underlying the method and system therefore treats ads, images, counters, etc., as part of a running visit, and does not allow the hosts classified as ads, images, counters, etc., to “break” a running visit or spawn the creation of a new site visit. Lines that are
 5 generated from secure socket layer (SSL) traffic will also be included as part of the most recent site visit.

[0012] The method and system can create concurrently running site-visit sessions in the event a user has multiple browsers open. Web sites with frames can also be perceived as multiple visits with overlapping times if the frames are
 10 served from hosts belonging to different sites.

[0013] The method and system employ the following rules:

1. A new site visit will begin if the line includes a host that is a valid “site member” and:
 - An open site visit is not already running for that site;
 - 15 • The URL does not have a content type of “image” (e.g., .gif, .jpg, etc.); and
 - The host is not classified as “forced content” (e.g., ads, banners, counters, etc.)
2. If the host is a site member of an “open” site visit and there are no
 20 intervening lines and less than five (5) minutes’ time has passed, it will be included in the open site visit.
3. If the line contains a host that is a site member of an open site visit (Site “A”), but there have been one or more intervening lines, it will roll into the site visit from Site A if the following conditions are met:
 - 25 • The intervening lines contain known (or classified) hosts and the elapsed time is less than/equal to five (5) seconds or
 - The intervening lines have null host fields or contain only unknown hosts and the elapsed time is less than/equal to thirty (30) seconds.

Note that if the intervening lines contain a host that is a member of Site
 30 B, an overlapping site visit for Site B would start.
4. If the host field is not populated and the port number indicates a secure socket layer (SSL) transaction, then the line is rolled into the most-

recent open site visit. Lines that contain any other port number with a null host field are ignored.

- 5 5. If the line contains a host that is not a member of any open site visit and the host is classified as “forced content” (e.g., ads, banners, counters, etc.), the line will roll into the most-recently created site visit.
6. If the line that contains a host that is not a member of an open site visit and the URL content type is defined as “image” (e.g., .gif, .jpg, etc.), it will roll into the most-recent site visit.

[0014] The level of greatest detail at which data is collected is referred to as a Collector Line, and contains all captured elements (user, times, bytes, port number, content types, etc.) from a single request from a server (e.g., a single .gif file on a Web site.) The Site Visits Table is an aggregate table that captures start time, end time, duration, and bytes for each intentional visit to a particular site.

[0015] In step 107, each Collector Line from step 105 is analyzed, and it is determined whether or not the host field of the Collector Line is populated. If not, then at step 113, the port number is analyzed to determine if an SSL transaction is indicated. If an SSL transaction is indicated, then at step 125, the current site visit is continued, and times are updated to include the new Collector Line. If an SSL transaction is not indicated, then, at step 127, the Collector Line is ignored, and the next Collector Line is analyzed.

[0016] If, in step 107, the host field is populated, then the host is checked against the Site Members Table in step 109 to determine if the host is a member of an open site visit. If so, a check is performed in step 117 to determine if there have been any intervening Collector Lines since the last line was added to this site visit. If not, the time interval between the time of the current Collector Line and the time that the last Collector Line was added to the site visit is analyzed in step 115. If the interval is less than or equal to an arbitrary but suitably large time interval, then, in step 125, the current site visit is continued, and times are updated to include the new Collector Line. If the interval is greater than the arbitrary but suitably large time interval, then a new site visit is created in step 129. In a preferred embodiment, the arbitrary but suitably large time interval is within the range of approximately zero to fifteen minutes. In a more preferred embodiment,

the arbitrary but suitably large time interval is within the range of approximately zero to ten minutes. In the most preferred embodiment, the arbitrary but suitably large time interval is approximately five minutes.

[0017] If it is determined, in step 117, that there were intervening Collector
5 Lines since the last line was added to this site visit, the time interval between the time of the current Collector Line and the time that the last Collector Line was added to the site visit is analyzed in step 121. If the time interval is less than or equal to an arbitrary but suitably small time interval, then, in step 125, the current site visit is continued, and times are updated to include the new Collector Line. If
10 the time interval is greater than the arbitrary but suitably small time interval, then in step 123, the host is checked against the Host/URL Types Table to determine if the host is known or classified. In a preferred embodiment, the arbitrary but suitably small time interval is within the range of approximately zero to twenty seconds. In a more preferred embodiment, the arbitrary but suitably small time
15 interval is within the range of approximately zero to ten seconds. In the most preferred embodiment, the arbitrary but suitably small time interval is approximately five seconds.

[0018] If, in step 123, the host is not known or classified, and the time interval is less than or equal to an arbitrary but suitably moderate time interval,
20 then in step 125, the current site visit is continued, and times are updated to include the new Collector Line. If the host is known or classified or if the time interval is greater than the arbitrary but suitably moderate time interval, then in step 129, a new site visit is created. In a preferred embodiment, the arbitrary but suitably moderate time interval is within the range of approximately zero to sixty
25 seconds. In a more preferred embodiment, the arbitrary but suitably moderate time interval is within the range of approximately zero to forty-five seconds. In the most preferred embodiment, the arbitrary but suitably moderate time interval is approximately thirty seconds.

[0019] In step 109, if the host is not a member of an open site visit, then the
30 host and URL are checked in step 111 against the Host/URL Types Table to determine if they are classified as forced content, or if the URL is classified as an image. If so, then in step 125, the current site visit is continued, and times are

updated to include the new Collector Line 125. If not, the host is checked against the Site Members Table in step 119, to determine if the host is a member of another site. If not, the Collector Line is ignored, and the next Collector Line is analyzed in step 127. If the host is a member of another site, then a new site visit
5 is created in step 129.

[0020] The duration of a site visit is determined by subtracting the start time from the latest end time. Because the data lines are analyzed in order by start time, the latest end time may not be the last time received. For example, a request to a web server for a web page may involve multiple requests for different parts of
10 the page. Specifically, one request line may have a start time of 10:02 a.m. and an end time of 10:05 a.m., and a second request line may have a start time of 10:03 a.m. and an end time of 10:04 a.m. Thus, the latest end times are used in the determination of the site visit duration.

[0021] There are two indicators used to determine when a site visit ends:
15 when the end user closes the session, or there is an arbitrary but suitably large period of inactivity. The most preferred arbitrary but suitably large period of inactivity is fifteen minutes. When either of these indicators is present, all open site visits for the end user are closed.

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**THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSION
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:**

1. A method of collecting and classifying data about computer network traffic
5 as user website visit sessions, the method comprising:
 - determining whether a data request to at least one website
comprises a user ongoing interaction with a website or whether it is
a new site visit by a user;
10
 - if the request is a new visit, creating a record of a new site visit;
 - if the request is a user ongoing interaction which occurred more
than a predetermined amount of time since the last visit, creating a
15 record of the data request as a new site visit;
 - if the request is a user ongoing interaction occurring at less than
said predetermined amount of time since the last visit, creating a
record of the visit as a continuation of the prior visit;
20
 - characterising the network traffic based on the records created;
 - assembling a data table made up of all known hosts that direct a
user to a specific website; and
25
 - classifying the computer network traffic corresponding to said
sessions by tracking each user request to all known hosts for each
specific website;

wherein the network traffic is characterised for each website independent of which host is used by a user to request data from each website; and

5 wherein said request is a new visit when the request is to one of said known hosts, an open site visit is not running to said specific website and the request is not for forced content or an image as classified in a host/URL types table.

10 2. The method of claim 1, further comprising creating records of a website visit which includes components of a website visit originating from hosts that are not members of a specific website.

15 3. The method of claim 2, wherein said components of a website visit originating from hosts that are not members of a specific website comprise forced content and images, and are recorded as data requests to the specific website.

20 4. The method of claim 1, further comprising collecting and classifying computer network traffic for said sessions by concurrently running said sessions for each browser opened by users having multiple browsers open.

25 5. The method of claim 1, further comprising detecting and recording the port numbers of each data request and determining whether the data requests are secure socket layer transactions.

6. The method of claim 1, further comprising determining the duration of a website visit by subtracting the start time of a session for a user from the latest end time.

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7. The method of claim 6, wherein the end of a website visit by a user is determined by detecting when a user closes a session.
8. The method of claim 6, wherein the end of a website visit is determined by detecting when a predetermined amount of time of inactivity occurs.
9. The method of claim 1, wherein said predetermined amount of time is within five to fifteen minutes if the data request is to one of said known hosts, an open site visit is running to said specific website and an intervening data request has not been received.
10. The method of claim 1, wherein said predetermined amount of time is within thirty to sixty seconds if the data request is to one of said known hosts, an open site visit is running to said specific website, an intervening data request has been received within five to twenty seconds and the host of the intervening data request is known.
11. A method performed by a computer system, of collecting and classifying data about computer network traffic as user website visit recording sessions, comprising determining whether a data request to at least one website comprises an ongoing interaction with a website or whether the request is a new site visit by a user of a plurality of users, said method including:
- assembling a data table made up of all known hosts that are able to direct users to a specific website;
- classifying the computer network traffic corresponding to said sessions by tracking each user request of said plurality of users to all known hosts for each specific website;

if the request is a new visit, creating a first record of a new site visit for each user;

5 if the request for each user is a first ongoing interaction which occurred more than a predetermined amount of time since a last visit, creating a second record of the data request as a new site visit for each user;

10 if the request is a second ongoing interaction occurring at less than the predetermined amount of time since the last visit, processing the request as a continuation of the last visit for each user; and

15 characterizing the network traffic based on the first or second records created for each website independent of which host is used by each user to request data from each website;

20 wherein said predetermined amount of time is within five to fifteen minutes if the data request is to one of said known hosts, an open site visit is running to said specific website and an intervening data request has not been received.

25 12. The method of claim 11, further comprising creating records of a website visit which includes components of the website visit originating from hosts that are not members of the specific web site.

30 13. The method of claim 12, wherein said components of a website visit originating from hosts that are not members of a specific website comprise forced content and images, and are processed as data requests to the specific website.

14. The method of claim 11, further comprising collecting and classifying computer network traffic for said sessions by concurrently running said sessions for each browser opened by users having multiple browsers open.
- 5 15. The method of claim 11, further comprising detecting and recording the port numbers of each data request and determining whether the data requests are secure socket layer transactions.
- 10 16. The method of claim 11, further comprising determining the duration of a website visit by subtracting the start time of a session for each user of said plurality of users from the latest end time.
- 15 17. The method of claim 16, wherein the end of a web site visit by a user is determined by detecting when the user closes a session.
18. The method of claim 16, wherein the end of a website visit is determined by detecting when the predetermined amount of time of inactivity occurs.
- 20 19. A method performed by a computer system, of collecting and classifying data about computer network traffic as user website visit recording sessions, comprising determining whether a data request to at least one website comprises an ongoing interaction with a website or whether the request is a new site visit by a user of a plurality of users, said method including:
- 25 assembling a data table made up of all known hosts that are able to direct users to a specific web site;
- 30 classifying the computer network traffic corresponding to said sessions by tracking each user request of said plurality of users to all known hosts for each specific website;

if the request is a new visit, creating a first record of a new site visit for each user;

5 if the request for each user is a first ongoing interaction which occurred more than a predetermined amount of time since a last visit, creating a second record of the data request as a new site visit for each user;

10 if the request is a second ongoing interaction occurring at less than the predetermined amount of time since the last visit, processing the request as a continuation of the last visit for each user; and

15 characterizing the network traffic based on the first or second records created for each website independent of which host is used by each user to request data from each website;

20 wherein said predetermined amount of time is within thirty to sixty seconds if the data request is to one of said known hosts, an open site visit is running to said specific website, an intervening data request has been received within five to twenty seconds and the host of the intervening data request is known.

25 **20.** The method of claim **19**, wherein said request is a new visit when the request is to one of said known hosts, an open site visit is not running to said specific website and the request is not for forced content or an image.

30 **21.** The method of claim **19**, further comprising creating records of a website visit which includes components of the website visit originating from hosts that are not members of the specific website.

22. The method of claim 21, wherein said components of a website visit originating from hosts that are not members of a specific website comprise forced content and images, and are processed as data requests to the specific website.
- 5
23. The method of claim 19, further comprising collecting and classifying computer network traffic for said sessions by concurrently running said sessions for each browser opened by users having multiple browsers open.
- 10 24. The method of claim 19, further comprising detecting and recording the port numbers of each data request and determining whether the data requests are secure socket layer transactions.
- 15 25. The method of claim 19, further comprising determining the duration of a website visit by subtracting the start time of a session for each user of said plurality of users from the latest end time.
26. The method of claim 25, wherein the end of a website visit by a user is determined by detecting when the user closes a session.
- 20
27. The method of claim 25, wherein the end of a website visit is determined by detecting when the predetermined amount of time of inactivity occurs.
28. A computer readable medium encoded with codes for directing a microprocessor to carry out the method of any one of claims 1 to 27.
- 25
29. A system for collecting and classifying data about computer network traffic as user website visit sessions, the system comprising:
- 30 a microprocessor; and

a computer readable medium encoded with codes for directing the microprocessor to carry out the method of any one of claims 1 to 27.

- 5 **30.** A system for collecting and classifying data about computer network traffic as user website visit sessions, the system comprising:

10 means for determining whether a data request to at least one website comprises a user ongoing interaction with a website or whether it is a new site visit by a user;

first creating means for creating:

15 a record of a new site visit if the request is a new visit;

 a record of the data request as a new site visit if the request is a user ongoing interaction which occurred more than a predetermined amount of time since the last visit; and

20 a record of the visit as a continuation of the prior visit if the request is a user ongoing interaction occurring at less than said predetermined amount of time since the last visit;

25 means for characterising the network traffic based on the records created;

 means for assembling a data table made up of all known hosts that direct a user to a specific website; and

means for classifying the computer network traffic corresponding to said sessions by tracking each user request to all known hosts for each specific website;

5 wherein said means for characterising is configured to characterize the network traffic for each website independent of which host is used by a user to request data from each website; and

10 wherein said request is a new visit when the request is to one of said known hosts, an open site visit is not running to said specific website and the request is not for forced content or an image as classified in a host/URL types table.

15 31. The system of claim 30, further comprising second creating means for creating records of a website visit which includes components of a website visit originating from hosts that are not members of a specific website.

20 32. The system of claim 31, wherein said components of a website visit originating from hosts that are not members of a specific website comprise forced content and images, and wherein said second creating means is configured to record said records as data requests to the specific website.

25 33. The system of claim 30, wherein said means for classifying the computer network traffic for said sessions is configured to classify the computer network traffic for said sessions by concurrently running said sessions for each browser opened by users having multiple browsers open.

30 34. The system of claim 30, further comprising means for detecting and recording the port numbers of each data request, and means for determining whether the data requests are secure socket layer transactions.

35. The system of claim 30, further comprising means for determining the duration of a website visit by subtracting the start time of a session for a user from the latest end time.
- 5 36. The system of claim 35, wherein said means for determining the duration of a website visit is configured to determine the end of a website visit by a user detecting when a user closes a session.
- 10 37. The system of claim 35, wherein said means for determining the duration of a website visit is configured to determine the end of a website visit by detecting when a predetermined amount of time of inactivity occurs.
- 15 38. The system of claim 30, wherein said predetermined amount of time is within five to fifteen minutes if the data request is to one of said known hosts, an open site visit is running to said specific website and an intervening data request has not been received.
- 20 39. The system of claim 30, wherein said predetermined amount of time is within thirty to sixty seconds if the data request is to one of said known hosts, an open site visit is running to said specific website, an intervening data request has been received within five to twenty seconds and the host of the intervening data request is known.
- 25 40. A system for collecting and classifying data about computer network traffic as user website visit recording sessions, the system comprising:
- means for determining whether a data request to at least one website comprises an ongoing interaction with a website or whether the request is a new site visit by a user of a plurality of users;

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means for assembling a data table made up of all known hosts that are able to direct users to a specific website;

5 means for classifying the computer network traffic corresponding to said sessions by tracking each user request of said plurality of users to all known hosts for each specific website;

first creating means for creating:

10 if the request is a new visit, a first record of a new site visit for each user; and

15 if the request for each user is a first ongoing interaction which occurred more than a predetermined amount of time since a last visit, a second record of the data request as a new site visit for each user;

20 wherein if the request is a second ongoing interaction occurring at less than the predetermined amount of time since the last visit, said first creating means is configured to process the request as a continuation of the last visit for each user; and

25 means for characterizing the network traffic based on the first or second records created for each website independent of which host is used by each user to request data from each website;

30 wherein said predetermined amount of time is within five to fifteen minutes if the data request is to one of said known hosts, an open site visit is running to said specific website and an intervening data request has not been received.

- 5 **41.** The system of claim **40**, further comprising second creating means for creating records of a website visit which includes components of the website visit originating from hosts that are not members of the specific web site.
- 10 **42.** The system of claim **41**, wherein said components of a website visit originating from hosts that are not members of a specific website comprise forced content and images, and wherein said second creating means is configured to record said records as data requests to the specific website.
- 15 **43.** The system of claim **40**, wherein said means for classifying the computer network traffic for said sessions is configured to classify the computer network traffic for said sessions by concurrently running said sessions for each browser opened by users having multiple browsers open.
- 20 **44.** The system of claim **40**, further comprising means for detecting and recording the port numbers of each data request and determining whether the data requests are secure socket layer transactions.
- 45.** The system of claim **40**, further comprising means for determining the duration of a website visit by subtracting the start time of a session for each user of said plurality of users from the latest end time.
- 25 **46.** The system of claim **45**, wherein said means for determining the duration of a website visit is configured to determine the end of a website visit by a user detecting when a user closes a session.
- 30 **47.** The system of claim **45**, wherein said means for determining the duration of a website visit is configured to determine the end of a website visit by detecting when the predetermined amount of time of inactivity occurs.

48. A system for collecting and classifying data about computer network traffic as user website visit recording sessions, the system comprising:

5 means for determining whether a data request to at least one website comprises an ongoing interaction with a website or whether the request is a new site visit by a user of a plurality of users;

10 means for assembling a data table made up of all known hosts that are able to direct users to a specific web site;

means for classifying the computer network traffic corresponding to said sessions by tracking each user request of said plurality of users to all known hosts for each specific website;

15

first creating means for creating:

if the request is a new visit, a first record of a new site visit for each user; and

20

if the request for each user is a first ongoing interaction which occurred more than a predetermined amount of time since a last visit, a second record of the data request as a new site visit for each user;

25

wherein if the request is a second ongoing interaction occurring at less than the predetermined amount of time since the last visit, said first creating means is configured to process the request as a continuation of the last visit for each user; and

30

means for characterizing the network traffic based on the first or second records created for each website independent of which host is used by each user to request data from each website;

5 wherein said predetermined amount of time is within thirty to sixty seconds if the data request is to one of said known hosts, an open site visit is running to said specific website, an intervening data request has been received within five to twenty seconds and the host of the intervening data request is known.

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49. The system of claim **48**, wherein said request is a new visit when the request is to one of said known hosts, an open site visit is not running to said specific website and the request is not for forced content or an image.

15 **50.** The system of claim **48**, further comprising second creating means for creating records of a website visit which includes components of the website visit originating from hosts that are not members of the specific website.

20 **51.** The system of claim **50**, wherein said components of a website visit originating from hosts that are not members of a specific website comprise forced content and images, and wherein said second creating means is configured to record said records as data requests to the specific website.

25 **52.** The system of claim **48**, wherein said means for classifying the computer network traffic for said sessions is configured to classify the computer network traffic for said sessions by concurrently running said sessions for each browser opened by users having multiple browsers open.

- 53.** The system of claim **48**, further comprising means for detecting and recording the port numbers of each data request and determining whether the data requests are secure socket layer transactions.
- 5 **54.** The system of claim **48**, further comprising means for determining the duration of a website visit by subtracting the start time of a session for each user of said plurality of users from the latest end time.
- 10 **55.** The system of claim **54**, wherein said means for determining the duration of a website visit is configured to determine the end of a website visit by a user detecting when a user closes a session.
- 15 **56.** The system of claim **54**, wherein said means for determining the duration of a website visit is configured to determine the end of a website visit by detecting when the predetermined amount of time of inactivity occurs.

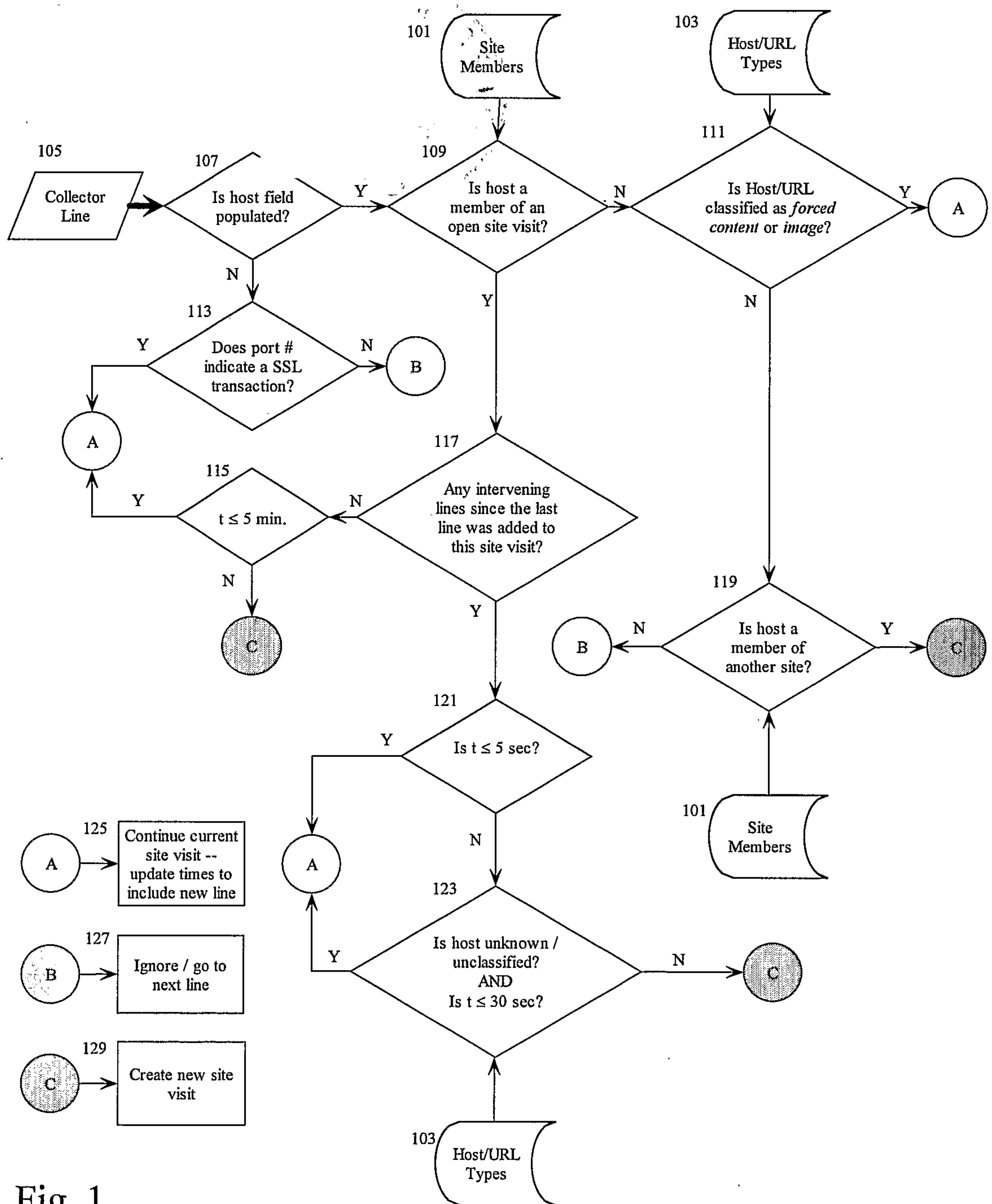


Fig. 1

