CLAIMS

~~What is claimed is:~~

1. A method for analyzing user online behavior and monitoring network quality in a home gateway, comprising:

A10. collecting user online data, specifically: analyzing a data packet arriving at a home gateway according to characteristics of an object to be monitored, generating a corresponding online behavior CSV file according to analyzed data and uploading the file to an FTP server;

A20. monitoring network quality, specifically: simulating periodically, by the home gateway, PPPOE dial-up, actively initiating TCP, DNS, HTTP and FTP service availability detection, generating a corresponding network quality CSV file according to a detection result and uploading the file to the FTP server; and

A30. analyzing the online behavior CSV file and the network quality CSV file, to obtain user online behavior and network quality results~~.~~;

wherein in step A10, a hook point is mounted at NF_PREROUTING_HOOK in a Netfilter frame of a Linux kernel of the home gateway, the data packet is analyzed in a hook function according to characteristics of objects to be monitored, valid information is uploaded to an application layer by means of Netlink communication, and the application layer further collates the valid information, to obtain a result of the user online behavior; and wherein the process of analyzing the data packet in the home gateway is as follows:

A101. analyzing an IP address, a port and a protocol of the data packet in the hook point at NF_PREROUTING_HOOK in the Netfilter frame when the data packet passes through the Linux kernel;

A102. determining whether the protocol of the data packet is IPPROTO_TCP, if yes, the process proceeds to A103, and otherwise, the process skips to A104;

A103. executing QQ analysis to determine whether a destination port is 80, if yes, the process proceeds to A105, and otherwise, the process skips to A106;

A104. determining whether the data packet is IPPROTO_ICMP, if yes, adding 1 to the number of icmp packets, and otherwise, the process skips to A116;

A105. executing HTTP protocol analysis;

A106. determining whether the destination port is 25, if yes, the process proceeds to A107, otherwise, the process skips to A108;

A107. analyzing a sent mail;

A108. determining whether the destination port is 110, if yes, the process proceeds to A109, and otherwise, the process skips to A110;

A109. analyzing a received mail;

A110. determining whether the destination port is 1863, if yes, the process proceeds to A111, and otherwise, the process skips to A112;

A111. analyzing MSN login;

A112. determining whether the destination port is 1863, if yes, the process proceeds to A113, and otherwise, the process skips to A114;

A113. analyzing MSN logout;

A114. determining whether the destination port is 16000, if yes, the process proceeds to A115, and otherwise, the process goes back to A102 to analyze next data packet;

A115. analyzing AliWangWang;

A116. determining whether protocol of the data packet is IPPROTO_UDP, if yes, the process proceeds to A117, and otherwise, the process goes back to A102 to analyze next

data packet; and

A117. performing QQ analysis.

2. The method for analyzing user online behavior and monitoring network quality in a home gateway according to claim 1, wherein in step A10 and step A20, the online behavior CSV file and the network quality CSV file are uploaded to a specified FTP server according to an upload cycle delivered by an integrated terminal management system.

3. The method for analyzing user online behavior and monitoring network quality in a home gateway according to claim 1, wherein in step A30, the statistical analysis is implemented by a WEB client.

~~4. The method for analyzing user online behavior and monitoring network quality in a home gateway according to claim 1, wherein in step A10, a hook point is mounted at NF_PREROUTING_HOOK in a Netfilter frame of a Linux kernel of the home gateway, the data packet is analyzed in a hook function according to characteristics of objects to be monitored, valid information is uploaded to an application layer by means of Netlink communication, and the application layer further collates the valid information, to obtain a result of the user online behavior.~~

~~5. The method for analyzing user online behavior and monitoring network quality in a home gateway according to claim 4, wherein the process of analyzing the data packet in the home gateway is as follows:~~

~~A101. analyzing an IP address, a port and a protocol of the data packet in the hook point at NF_PREROUTING_HOOK in the Netfilter frame when the data packet passes through the Linux kernel;~~

~~A102. determining whether the protocol of the data packet is IPPROTO_TCP, if yes, the process proceeds to A103, and otherwise, the process skips to A104;~~

~~A103. executing QQ analysis to determine whether a destination port is 80, if yes, the~~

process proceeds to A105, and otherwise, the process skips to A106;

A104. determining whether the data packet is IPPROTO_ICMP, if yes, adding 1 to the number of icmp packets, and otherwise, the process skips to A116;

A105. executing HTTP protocol analysis;

A106. determining whether the destination port is 25, if yes, the process proceeds to A107, otherwise, the process skips to A108;

A107. analyzing a sent mail;

A108. determining whether the destination port is 110, if yes, the process proceeds to A109, and otherwise, the process skips to A110;

A109. analyzing a received mail;

A110. determining whether the destination port is 1863, if yes, the process proceeds to A111, and otherwise, the process skips to A112;

A111. analyzing MSN login;

A112. determining whether the destination port is 1863, if yes, the process proceeds to A113, and otherwise, the process skips to A114;

A113. analyzing MSN logout;

A114. determining whether the destination port is 16000, if yes, the process proceeds to A115, and otherwise, the process goes back to A102 to analyze next data packet;

A115. analyzing AliWangWang;

A116. determining whether protocol of the data packet is IPPROTO_UDP, if yes, the process proceeds to A117, and otherwise, the process goes back to A102 to analyze next data packet; and

~~A117. performing QQ analysis.~~

~~6~~4. The method for analyzing user online behavior and monitoring network quality in a home gateway according to claim ~~5~~1, wherein

when QQ protocol analysis is performed, analysis is performed for data packets with all UDP data packet data field starting byte being 0x02, login and logout states and account information are obtained through analysis according to data packet characteristics of QQ login and logout;

when MSN protocol analysis is performed, analysis is performed for data packets with all source ports and destination ports being 1863, login and logout states and account information are obtained through analysis according to data packet characteristics of MSN login and logout; and

when AliWangWang protocol analysis is performed, analysis is performed for data packets with all source ports and destination ports being 16000, login and logout states and account information are obtained through analysis according to data packet characteristics of AliWangWang login and logout.

~~7~~5. The method for analyzing user online behavior and monitoring network quality in a home gateway according to claim 1, the network quality comprises time delay, jitter, packet loss rate and HTTP/FTP service availability.

~~8~~6. The method for analyzing user online behavior and monitoring network quality in a home gateway according to claim 1, wherein the network quality monitoring comprises:

A201. obtaining an SN number, a ping server address, a DNS destination address, an FTP server address, a user name, a password and other information of a gateway device by reading a configuration file config;

A202. creating a net_monitor child thread;

A203. performing step A204 if the net_monitor child thread is successfully created,

and otherwise, performing step A205;

A204. executing the net_monitor child thread, setting a timer cycle sequence in the net_monitor child thread to execute the following tests: obtain user basic information, destination address ping test, FTP server availability test, HTTP server availability test, DNS time delay and jitter test;

A205. monitoring the net_monitor child thread; and

A206. determining whether the net_monitor child thread exits in a normal manner, if yes, the process proceeds to A202, and otherwise, ending the network quality monitoring.

~~9~~7. The method for analyzing user online behavior and monitoring network quality in a home gateway according to claim 1, wherein in step A10 and step A20, according to upload periods at different intervals in the configuration file, the online behavior CSV file and the network quality CSV file generated are uploaded to a specified FTP server in batch, the corresponding online behavior CSV file and the network quality CSV file in the gateway are deleted.

~~10~~8. The method for analyzing user online behavior and monitoring network quality in a home gateway according to claim 1, wherein in step A30, communication between the integrated terminal management system and the home gateway comprises communication when the home gateway starts and communication when the home gateway is operating;

when the home gateway starts, the integrated terminal management system first reads a switching value related to user online behavior in the configuration file beh.conf, if the switching value is 0, no processing is performed; otherwise, whether user online data collection process collect_data and network quality monitoring process net_monitor exist simultaneously are determined, if yes, the two processes are killed first and then restarted to enter the procedure that the home gateway is operating; otherwise, if neither collect_data nor net_monitor exists, the two processes are started; if one of collect_data and net_monitor exists, the process that exists is killed and the other process is started; a signal sent by the

agent process is received and a signal processing function is executed; and

when the home gateway is operating, the integrated terminal management system performs uniform configurations and delivers the configurations, the home gateway is responsible for writing the configurations into a configuration file of user online behavior, sets a switching value to indicate the configurations are valid after the writing, and sends a signal to a process itms_control; the process itms_control, after receiving the signal, reads the configuration file to determine whether a switch of a user online behavior analysis function is turned on, determines whether a user online data collection process and a network quality monitoring process exist if the switch is turned on, kills a process that exists and restarts if either the user online data collection process or the network quality monitoring process exists, and starts the two processes if neither the user online data collection process nor the network quality monitoring process exists.

~~11. A home gateway, comprising:~~

~~a user online data collecting module, configured to analyze a data packet arriving at a home gateway according to characteristics of an object to be monitored, generate a corresponding online behavior CSV file according to analyzed data and upload the file to an FTP server; and~~

~~a network quality monitoring module, configured to simulate periodically PPPOE dial-up, actively initiate TCP, DNS, HTTP and FTP service availability detection, generate a corresponding network quality CSV file according to a detection result and upload the file to the FTP server.~~