

NETROPY[®] RECORDER

USER'S GUIDE

Version 1.0



Netropy® Recorder User's Guide

Revision 1a, January 2011

Apposite® Technologies, Inc.

11500 W. Olympic Blvd., Suite 510
Los Angeles, CA 90064 USA
www.apposite-tech.com

tel: 1.310.477.9955
fax: 1.310.477.9956
email: info@apposite-tech.com

Copyright ©2011 Apposite Technologies, Inc. All rights reserved. Apposite and Linktropy are registered trademarks of Apposite Technologies, Inc. Netropy, the Apposite logo, and “WAN Emulation Made Easy” are trademarks of Apposite Technologies, Inc.

Part No. DOC-UG-NR-1a

Contents

Overview 4

Installation..... 4

Operation 6

Options 8

Data 10

Support 10

Recording File Format 11

Appendix A: Netropy Recorder License Agreement 13

Overview

The Netropy Recorder is a Windows-based utility that captures and records the delay and loss characteristics over time of a wide-area network link or network path. The Netropy Recorder is designed for use in conjunction with the recording playback functionality of the Netropy network emulator. The Netropy Recorder captures the conditions of the live network and saves them to a recording file. Recording files are loaded into the Netropy network emulator and the time sequence replayed as the delay and loss of any emulated path, reproducing the characteristics of a live link in a repeatable test environment. For more information on playback of recording files, please consult the *Netropy Network Emulator User's Guide*.

The Netropy Recorder sends ICMP echo requests, commonly referred to as “Pings,” from the PC on which it is running to a specified device on the other side of the network, and captures the reported delay and loss values. The Netropy Recorder can probe the link up to ten times per second and record up to 100,000 data points. By using the zoom controls, particular periods of interest can be displayed and saved in separate recordings for individual playback.

The Netropy Recorder uses an open file format described in the Recording File Format section of this document. The data saved by the Netropy Recorder can be reviewed and edited. Users can also manually create their own recording files to generate any desired time sequence of delay and loss conditions.

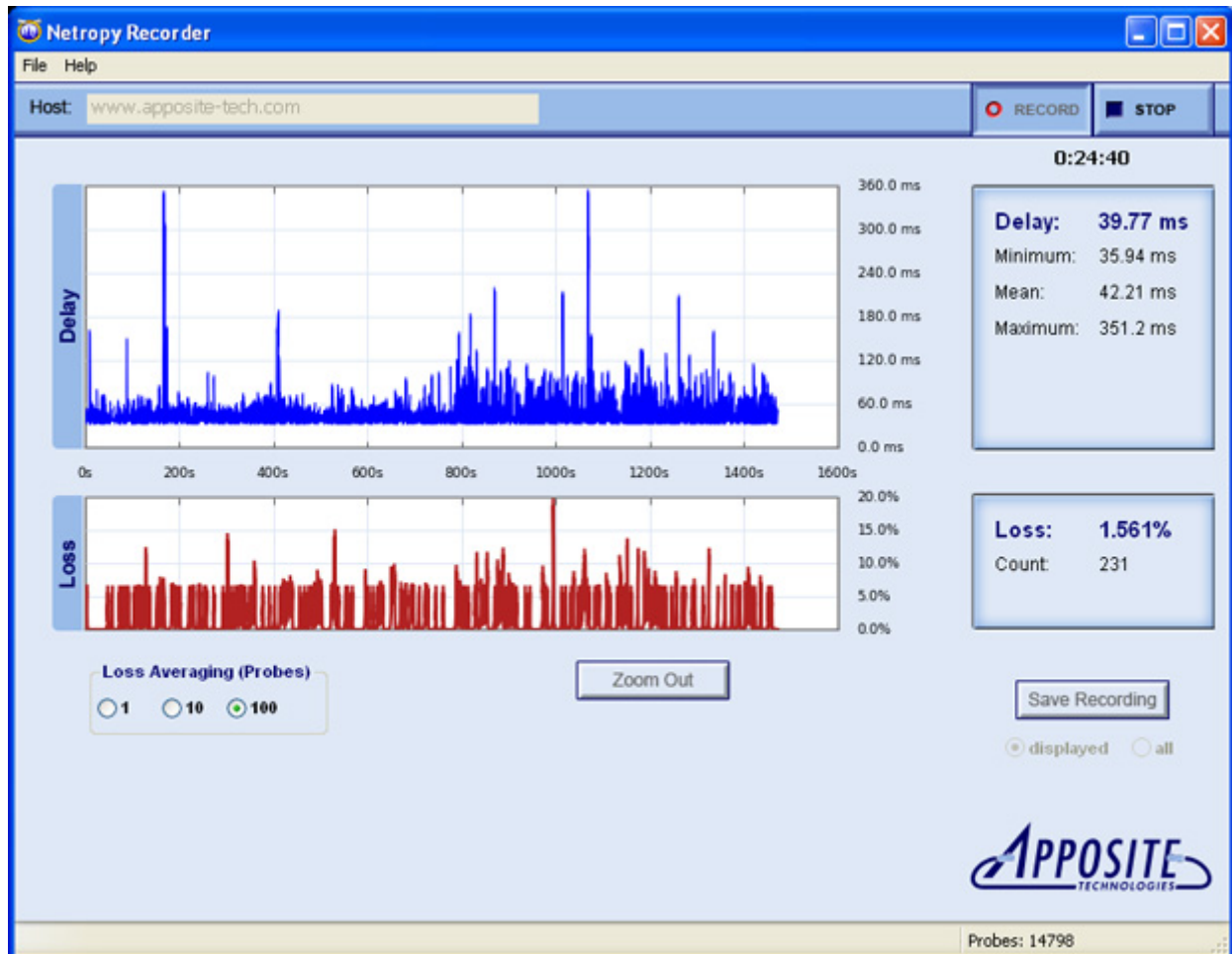
The Netropy Recorder is available at no charge to supported users of the Netropy network emulator. The latest version of the Netropy Recorder can be downloaded from the Netropy support section of the Apposite website at www.apposite-tech.com.

Installation

The Netropy Recorder runs on Windows XP, Windows Vista, and Windows 7. It must run in an account with appropriate permissions to access the network. Please ensure that all firewall and anti-virus software are configured to allow the Netropy Recorder to access the network.

To install the Netropy Recorder, click on the setup file and follow the instructions on the screen.

To uninstall the Netropy Recorder, click on Windows Start > All Programs > Netropy Recorder > Uninstall Netropy Recorder.



Netropy Recorder Main Screen

Operation

To use the Netropy Recorder, first open the application. On the top bar of the main screen, specify an IP address or host name of a device on the other side of the network. The Netropy Recorder collects delay and loss statistics for the network path between the PC on which the Netropy Recorder is running and the specified remote device. Please ensure that the remote device can respond to ICMP echo requests, and that any firewalls between the two devices do not block ICMP packets.

Recording Controls — Record, Stop, Save

To begin collecting data, press the *Record* button. While the Recorder is running, other controls except for Loss Averaging interval selector are disabled. When finished, press *Stop*.

To save the data to a recording file, click the *Save Recording* button. If the zoom in /out controls have been used to display a portion of the full recording, a radio button below the *Save Recording* button selects whether the entire recording or only the subset currently displayed is saved.

Once the recording has been saved, it can be viewed, edited, and loaded into the Netropy network emulator.



Be sure to save any data prior to starting a new recording. Previously captured data are cleared when the *Record* button is pressed.

Zoom In / Zoom Out

To zoom in on a particular time interval of interest, place the cursor over the Delay or Loss graph, hold down the left mouse button, and highlight the interval to view. Once the mouse is released, the graph will zoom in to display the selected interval. The graph can be progressively zoomed in to smaller intervals up to the maximum precision of the data.

To zoom back out, click on the *Zoom Out* button. Each click on the *Zoom Out* button will undo one zoom operation.

Loss Averaging

A single probe can only generate a loss rate of either 0% or 100%. Individual probes are aggregated to produce composite values that are displayed on the graph and saved in the recording file. The Loss Averaging interval selector specifies the number of probes to use to produce the composite loss values. Click on the appropriate radio button to choose between 1, 10, and 100 probes. By default, loss values are averaged over 10 probes.

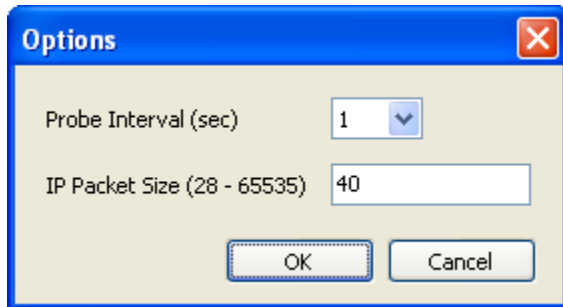
Longer averaging intervals use more data points and therefore offer greater granularity, but can miss short term effects. A loss averaging rate of 1 probe turns off averaging and shows each individual loss event.



To capture short-term effects with greater precision, use a shorter probe interval to generate more data points over the same time period.

The loss rate at any point in time is calculated as a rolling weighted average over the loss averaging interval, centered on that point in time. For example, a loss averaging interval of 10 seconds means that the reported value for any point in time is an average of the loss rate reported in the 5 seconds before and 5 seconds after that point, weighted towards the values closest to the center of the interval. The end of the loss graph is adjusted as probes return.

Options



Probe Interval

To change the frequency of the probes, click on File > Options, and use the drop-down selector to choose the desired probe interval. By default, the Netropy Recorder probes the link once per second. To capture short-term effects with greater precision, use a shorter probe interval to generate more data points over the same time period. To reduce the load on the network, particularly when using large packets, or to record more than 24 hours of link conditions, select a longer probe interval.

The table to the right shows the maximum recording time for different probe intervals.

The probe interval can not be changed while recording is in progress.

Probe Interval (sec.)	Max. Recording Time
0.1	2 hours, 46 minutes
0.5	13 hours, 53 minutes
1	27 hours, 47 minutes
2	2 days, 7 hours
5	5 days, 18 hours
10	11 days, 13 hours

IP Packet Size

To change the size of the probe packets, click on File > Options, and enter the desired size of the IP packet in bytes. By default, the Netropy Recorder uses 40 byte probes. The probe may be any size between 28 and 65535 bytes.

The packet size can not be changed while recording is in progress.



Some devices may not respond to the probe if the packet size causes fragmentation (usually greater than 1500 bytes).

Data

The ICMP echo request probes used by the Netropy Recorder can only determine the delay and loss for the round trip from the Recorder to the remote device and back. The delay and loss graphs show these round-trip values. When saving the recording file, the data is converted into symmetric, one-way values:

- ▶ Delay: the one-way delay in each direction is calculated as half the round-trip time (RTT).
- ▶ Loss: the one-way loss rate in each direction is derived such that the probability of packet loss over two one-way trips matches the reported round-trip loss rate.

Support

If you experience any problem with the Netropy Recorder, please check the Apposite website at <http://www.apposite-tech.com> for updated software and documentation. If your problem is not resolved, please contact Apposite Support at:

support@apposite-tech.com
1.310.477.9955 ext. 2

Please be sure to include the following information:

- ▶ Netropy model
- ▶ Serial number
- ▶ Your e-mail address and phone number
- ▶ Software version number
- ▶ A detailed description of the problem

Recording File Format

Recordings are text files with the format described in the table below. The recording file may contain up to 100,000 lines of data.

Line Type	Syntax and Description
metadata	<p><attribute> : <value> A list of attributes of the recording and their values. Must be at the beginning of the file, prior to any recording data, and preceded by a “#” symbol. Defined attributes are:</p> <p># Name (or # title) : <recording name/title> The title of the recording. The Recorder creates a title of "<hostname> to <destname>". The hostname is the system running the Recorder. The destname is the name or IP address entered in the host field of the Recorder.</p> <p># Description : <description> A description of the recording. May include multiple description items which will be concatenated. The recording file generated by the Netropy Recorder will include the following description items:</p> <p># Description : Netropy Recorder Version <version number> Software version number.</p> <p># Description : Start Time : <time> The local time that the recording was started.</p> <p># Description : Probe Interval : <interval> The frequency of the probes, as specified in the Options dialog.</p> <p># Description : Packet Size : <size> The size of the probe packets, as specified in the Options dialog.</p> <p># Description : Loss Averaging : <value> The setting for the Loss Averaging at the time the recording was saved.</p> <p># Contents : <impairment 1, impairment 2, ..., impairment n> An ordered, comma-separated list of impairment names that defines the fields of the data section. Currently valid impairment names are limited to DELAY and LOSS, so possible values for the Contents metadata are:</p> <p># Contents : DELAY # Contents : LOSS # Contents : DELAY, LOSS # Contents : LOSS, DELAY</p> <p>If the contents are not specified, "DELAY, LOSS" is assumed.</p>

data	<p data-bbox="402 338 1292 365"><start time> <impairment 1 value> [<impairment 2 value>]</p> <p data-bbox="457 380 1395 527">Start time is the time in seconds, relative to the beginning of the recording, when the delay and loss values of the line take effect. Start time is a floating point number and must be at least 0.1 seconds greater than the start time of the previous line. On the final line in the recording file, the start time is used to determine the duration of the previous line. Delay and loss values are ignored.</p> <p data-bbox="457 537 1276 564">Delay values are specified as latency in milliseconds with a resolution of 0.1 ms.</p> <p data-bbox="457 575 1390 632">Loss values are specified as the packet loss rate in percent (without the percent sign) between 0.0000 and 100.0000.</p>
------	---

APPENDIX A

Netropy Recorder License Agreement

PLEASE READ THE FOLLOWING LICENSE AGREEMENT CAREFULLY BEFORE USING, COPYING, INSTALLING, OR UPGRADING THE NETROPY RECORDER SOFTWARE AND ASSOCIATED DOCUMENTATION (THE "SOFTWARE") FROM APPOSITE TECHNOLOGIES, INC. ("APPOSITE").

By using the Software, you are accepting the terms of this Agreement. Apposite is willing to grant you the following right to use the Software only if you agree to be bound by all of the terms of this Agreement. If you do not agree to be bound by all of the terms of this Agreement, delete, return, and/or discard all files associated with this Software.

Conditioned upon compliance with the terms of this Agreement, Apposite hereby grants you a nonexclusive, royalty-free license to use, copy, and distribute the Software.

Title and Restrictions

Apposite retains all right, title and interest in the Software. The Software is protected by United States and international copyright and other intellectual property laws and international trade provisions. Except as otherwise expressly provided under this Agreement or agreed to in writing by Apposite, you shall not directly or authorize any third party to (i) sell, rent, lease, or otherwise charge for the distribution, installation, copying, or storage of the Software; (ii) modify or adapt the Software or create derivative works based upon the Software; (iii) reverse engineer, disassemble, decompile, decrypt, or otherwise attempt to derive the source code of the Software, or (iv) remove, alter, cover or obfuscate any of the trademarks, trade names, logos, patent or copyright notices or markings, or add any other notices or markings to or on the Software.

Disclaimer of Warranty

The Software is provided "as is", without warranty of any kind, and you use it at your own risk. Apposite disclaims any and all warranties or conditions, including without limitation, any implied warranties of title, non-infringement, merchantability, or fitness for a particular purpose.

Limitation of Liability

IN NO EVENT WILL APPOSITE OR ITS SUPPLIERS BE LIABLE FOR ANY DAMAGES, INCLUDING WITHOUT LIMITATION, ANY LOST PROFITS, BUSINESS INTERRUPTION, LOSS OF INFORMATION, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES HOWEVER CAUSED AND REGARDLESS OF THE THEORY OF LIABILITY OR WHETHER ARISING OUT OF THE USE OF OR INABILITY TO USE THE SOFTWARE AND EVEN IF APPOSITE OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. SOME STATES DO NOT ALLOW THE LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY. IN NO EVENT SHALL APPOSITE OR ITS SUPPLIERS' LIABILITY, WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), BREACH OF WARRANTY, OR OTHERWISE, EXCEED THE PRICE PAID FOR THE SOFTWARE.

Term and Termination

This Agreement takes effect upon your use of the Software and remains effective until terminated. You may terminate this Agreement at any time by destroying all copies of the Software in your possession. This license will terminate immediately if you fail to comply with any term or condition of this Agreement. You agree on termination of this Agreement to cease all use of the Software. The provisions of the sections “U.S. Government Restricted Rights” and “Export” shall survive termination of this Agreement.

Export

The Software, including the underlying technology, is subject to U.S. export control laws, and may be subject to export or import regulations in other countries. You may not export or import the Software and the underlying technology, directly or indirectly, in violation of these laws. You agree to comply strictly with all such laws and regulations and acknowledge that you have the responsibility to obtain such licenses to export, re-export, or import as may be required.

U.S. Government Restricted Rights

The Software qualifies as “commercial computer software” and “commercial computer software documentation” pursuant to FAR 12.212 and DFAR 227.7202. The Software is being licensed to U.S. Government end users only as Commercial Items and with only those rights as are granted to all other end users pursuant to the terms and conditions of this agreement.

General Provisions

This Agreement will be governed by and construed in accordance with the laws of the State of California without reference to its conflicts of law provisions. If for any reason a court of competent jurisdiction finds any provision, or portion thereof, to be unenforceable, the remainder of this Agreement shall continue in full force and effect. This Agreement constitutes the entire agreement between the parties with respect to the Software and supersedes all prior or contemporaneous understandings regarding such subject matter, whether written or oral, and supersedes any conflicting or additional terms contained in any purchase order or elsewhere, all of which terms are excluded. No amendment to or modification of this Agreement is binding unless in writing and signed by Apposite.

Apposite® Technologies, Inc.

11500 W. Olympic Blvd., Suite 510
Los Angeles, CA 90064 USA
www.apposite-tech.com

tel: 1.310.477.9955
fax: 1.310.477.9956
email: info@apposite-tech.com