NETROPY® TRAFFIC GENERATION:

APPPLAYBACK

USER'S GUIDE

Version 2.0

APPOSITE
TECHNOLOGIES

Netropy® Traffic Generation AppPlayback User's Guide

Revision 2a, March 2024

Apposite® Technologies LLC
4223 Glencoe Ave, Suite B121
Marina Del Rey, CA 90292 USA
1.310.477.9955
info@apposite-tech.com
www.apposite-tech.com

Part No. DOC-UG-NTG-AP-2a

CONTENTS

1 OVERVIEW

Apposite Technologies would like to thank you for purchasing the Apposite Technologies' Netropy Traffic Generation AppPlayback. This User's Guide is intended to describe the proper installation, configuration, and operation of this product. Please reference the *Quick Start Guide* and *Hardware Guide* for additional information. The Quick Start Guide may be used to facilitate initial configuration and the Hardware Guide to outline the specific hardware components for each model.

1.1 Netropy Traffic Generation Configuration

The Netropy Traffic Generation must be configured through the browser-based Graphical User Interface (GUI) or using the CLI. The recommended browser is Google Chrome using HTTP or HTTPS.

1.2 AppPlayback Operation

The configuration and use of the AppPlayback require the following configuration steps accessed using the system's GUI:

1. **Open the GUI**
   Connect to the Netropy Traffic Generation using the default IP/Hostname assigned. Login using your user account credentials.

2. **Reserve Ports**
   Reserve the specified quantity of ports you will need for your test.

3. **Create Test Bed**
   Name and select AppPlayback to configure a new test bed.

4. **Adjust Configuration Ports**
   Add or remove selected ports from the test bed.

5. **Select PCAP(s)**
   Identify various types of packets to evaluate for the test.

6. **Configure the Traffic**
   Configure the hosts, clients, and traffic settings.

7. **Summary**
   Verify the testbed configuration.

8. **Start the Test**
   Click the “Start Test” button to begin capturing data on the test bed.

9. **Evaluate results and logs**
   View the graphs and statistics to analyze and evaluate the test results. Download any logs and reports.

10. **Adjust configuration**
    Alter the configuration after the initial test. This can be conducted in an effort to analyze various different configurations. All previous configuration steps from 4 to 6 can be adjusted on the same test bed.

2 INSTALLATION AND SET-UP

To configure and operate the Netropy Traffic Generation AppPlayback through its browser-based GUI, the dedicated Ethernet management port must first be configured with an appropriate IP address and subnet mask. For convenience, the MGMT interface comes pre-configured with an IP address of 10.0.0.10 and is accessible from a directly connected host on the 10.0.0.0/255.0.0.0 subnet. The IP address and subnet mask of the MGMT interface can be changed through the GUI by an account with administrator privileges or by using the CLI.

2.1 Preparation

Management of the Netropy Traffic Generation device through the GUI requires a PC running an up-to-date web browser.

Initial configuration of the management interface requires:

- a PC running a supported web browser that can be configured and placed on the 10.0.0.0/255.0.0.0 network.

2.2 Hardware Installation

The Netropy Traffic Generation appliance is designed for installation in a standard 19” rack. Please refer to the *Hardware Guide* for your specific model for rack-mount installation instructions.

Plug either one or two standard power cords into the Netropy Traffic Generation device, depending on your model, and turn on the power. Either a U.S. standard or a U.S. Y-power cable will be supplied with each unit. The system will be available for use within 1-4 minutes.

2.3 IP Address Configuration via the Netropy Traffic Generation GUI

To configure the MGMT interface using the Netropy Traffic Generation GUI:

1. Configure a PC running a supported web browser with the IP address 10.0.0.2 or another address on the 10.0.0.0/255.0.0.0 subnet.

2. Connect an Ethernet cable between the PC and the MGMT port on the front of the Netropy Traffic Generation.

3. Open the browser on the PC and enter http://10.0.0.10 in the address bar. Review the End User License Agreement.

4. Review the End User License Agreement. The Netropy Traffic Generation GUI will be displayed once the License Agreement is accepted.

5. Log in using the username “admin” and password “admin” to access the administrator portal.

6. Click on IP management in the top right corner and select change IP. Enter your network settings and select “Apply” to change these settings.

7. After the management interface has been configured, use the Ethernet cable to connect the MGMT port of the Netropy Traffic Generation to the management network.

2.4 IP Address Configuration via the Serial Console

1. Using the provided RJ45 to DB9 cable, connect the serial port of a PC running terminal emulation software to the CONSOLE port of the Netropy. Set the serial port parameters to 9600 baud, 8 bits, no parity, 1 stop bit, and disable flow control. For more details on connecting to the serial console, see the Hardware Guide for your specific model.

2. Press [ENTER] to display a login prompt. At the prompt, log in as “admin”, password is “admin”.

```
ntg login: admin
```

3. Use the following commands to set the IP address, netmask, and default gateway of the Netropy management interface:

```
[ntg]> mgmt set gw <default-gateway>

[ntg]> mgmt set addr <ip-address> netmask <mask>
```

IP addresses and subnet masks are entered in dotted-decimal format. For example:

```
[ntg]> mgmt set addr 192.168.1.1 netmask 255.255.255.0
```

4. Once the management interface has been configured, use an Ethernet cable to connect the MGMT port of the Netropy to the management network. Open a browser and enter the IP address of the MGMT interface in the address bar. The Netropy End User License Agreement will be displayed.

5. Review the License Agreement. The Netropy GUI will be displayed once the License Agreement is accepted.

6. Log in using username “admin” password “admin”.

3 CONFIGURATION

To enable efficient configuration of the Netropy AppPlayback system, it is best to develop a fundamental understanding of some basic concepts and terminology.

3.1 Ports

A port is a physical connection from one device or host to another. Ports can be configured to adjust bandwidth, line rate, mapping, and mode. These factors will alter the rates and manner through which traffic is transmitted over a link.

Refer to Section 4 and 6 for additional information on how to configure ports.

3.2 Hosts

Netropy Traffic Generation AppPlayback uses virtual clients and servers to simulate devices on a network.

Refer to Section 8 for additional information on how to configure hosts.

3.3 PCAPs

A PCAP, also known as a packet capture, is a data capture file often provided by software systems and applications that analyze network traffic. These files are often used to evaluate the type of network traffic and data that passes through a network.

Refer to Section 7 for additional information on how to configure streams.

4 PORTS

4.1 Ports Overview

Ports can either be set into reserve or release status. By releasing the port, you release ownership of the port, allowing it to be accessed by other users. By reserving the port, the port is retained and can be used in a new test bed.

Note: Reserving a port will not allow any other users to manage and use this same port.

These options can be enabled by clicking the switch in the Ports section of the Home page.

To configure a test bed, the necessary ports must be selected and reserved.

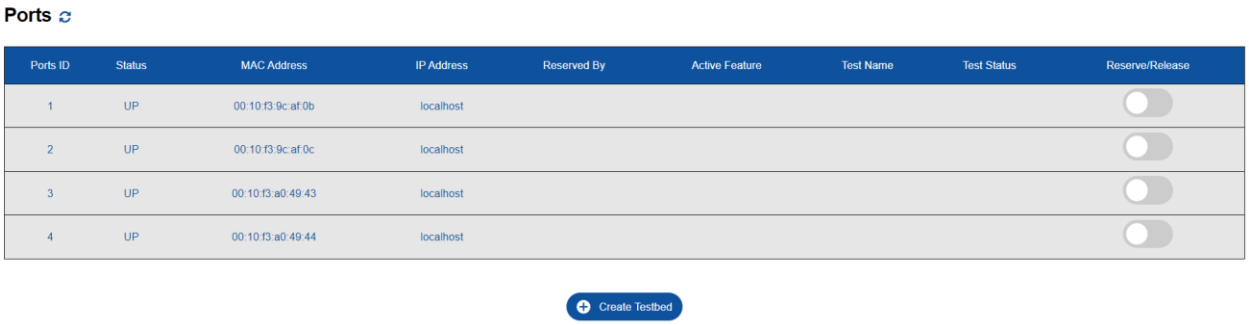

Figure 1: Reserve/Release Ports

4.2 Port Reset

To reset the ports, login using admin credentials and select the Ports tab.

The Ports tab displays the status of ports and allows the administrator to manually release ports as needed. This will override any port releases and reservations made by other user accounts.

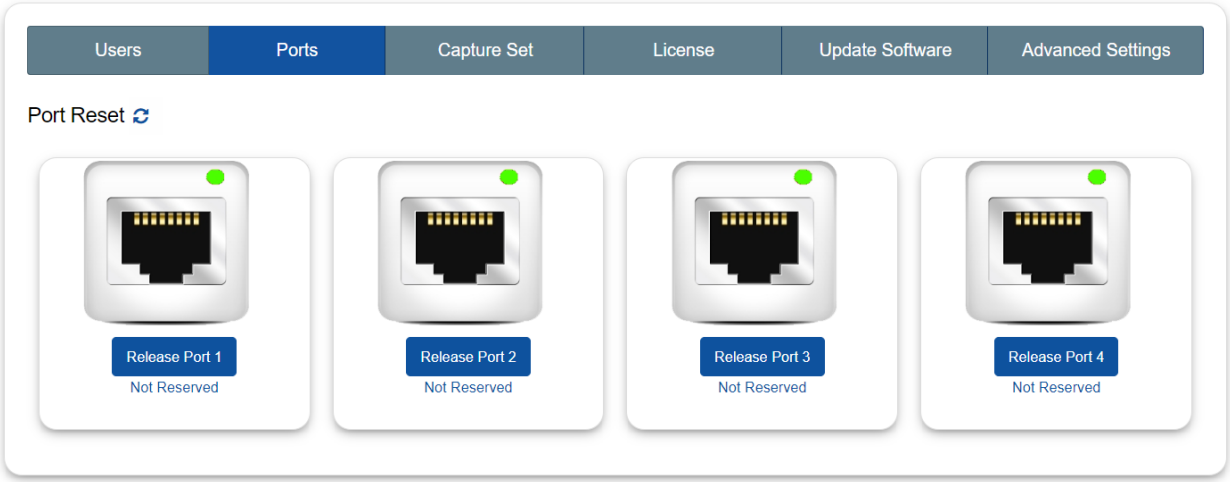

Figure 2: Port Reset

To release a port, click on the associated “Release Port X” button. As demonstrated in the figure below, this button will open a pop-up that displays the IP Address, status, speed, MAC address, and details on whether the port is reserved. By clicking “Release” the port will be released.

Refer to Section 14 for more information on Admin settings.

5 Test Beds

5.1 Test Beds Overview

A test bed is a platform used to configure and develop a simulated system. The test bed can be configured to emulate the specific hosts, data streams, and settings needed to accurately reflect the requirements of your system.

5.2 Configuring Test Beds

To create a test bed, select the “Create Testbed” button underneath the Port section. Select “AppPlayback” from the menu and name the test. After naming and selecting the proper menu option, double click to add the new bed to your test environment.

The “Test Name:” field is limited to 15 characters.

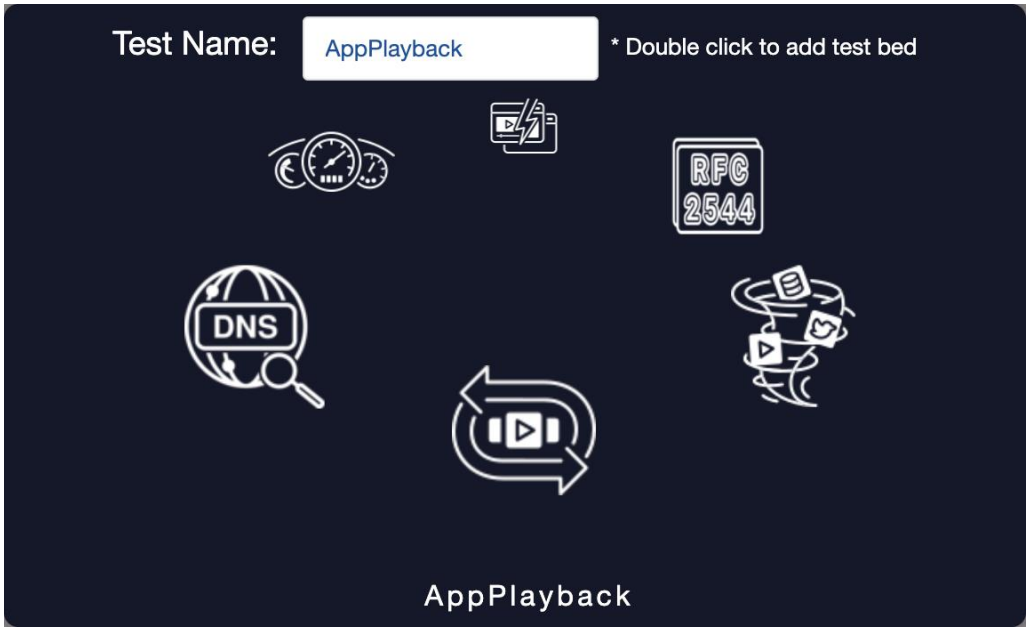

Figure 3: Naming Test Bed

After roughly 60 seconds, the new test bed should appear in the Test Bed section of the home page. Select “Configure” to begin configuring the new test. This operation will redirect you to the five-step configuration menu, starting with Drop Application Tracks.

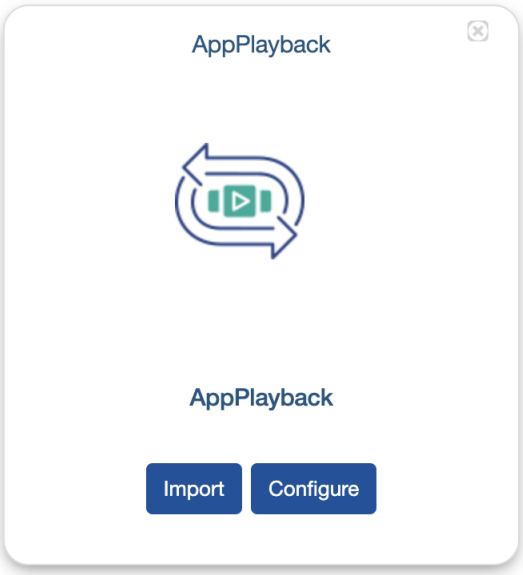

Figure 4: Configuring Test Bed

6 TEST BED: PORT RESERVATION

6.1 Port Reservation Overview

The Port Reservation menu allows you to add ports to the test bed, set up multi-site configuration, and review the current active ports, their link state, MAC address, IP address, reservation, and feature.

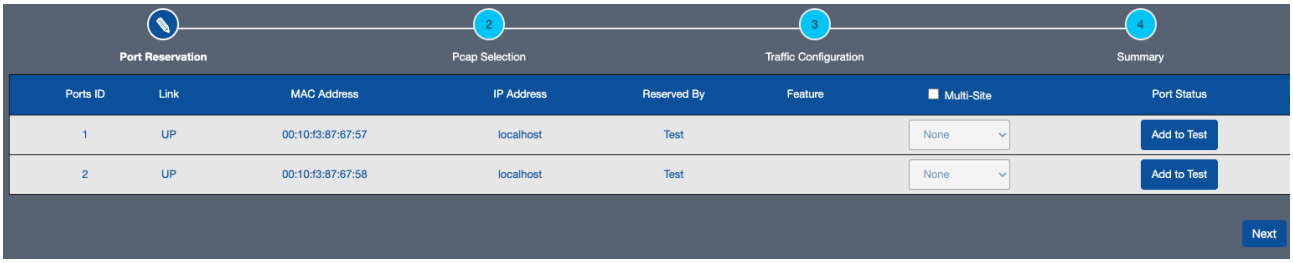

Figure 5: Port Reservation Overview

6.2 Configuring Multi-Site

Multi-Site allows you to connect two different physical units to simulate two sites.

By default, Multi-Site is disabled. When disables, a single device is used to simulate both the client and server on the same different but different ports.

When you enable Multi-Site, a drop-down menu is available to select of the of the following options:

- None
- Client
- Server

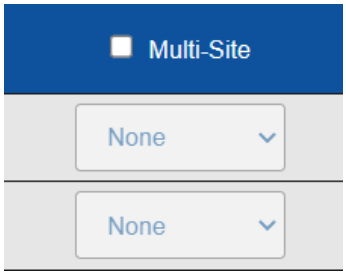

Figure 6: Configuring Multi-Site

6.3 Adding Ports

To add a Port to a test bed, select the “Add to Test” button on the right side of the Ports Configuration Tab. Selecting this button will automatically add the port to the test and be confirmed with a notification pop-up that the port has been added.

Add all ports that will be needed to develop your test environment.

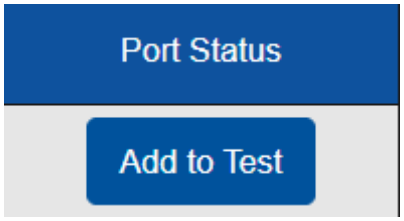

Figure 7: Add Port to Test

7 TEST BED: PCAP SELECTION

7.1 PCAP Selection Overview

The PCAP Selection tab allows you to identify various types of traffic to evaluate and move them from the PCAP Library to the Selected PCAP list.

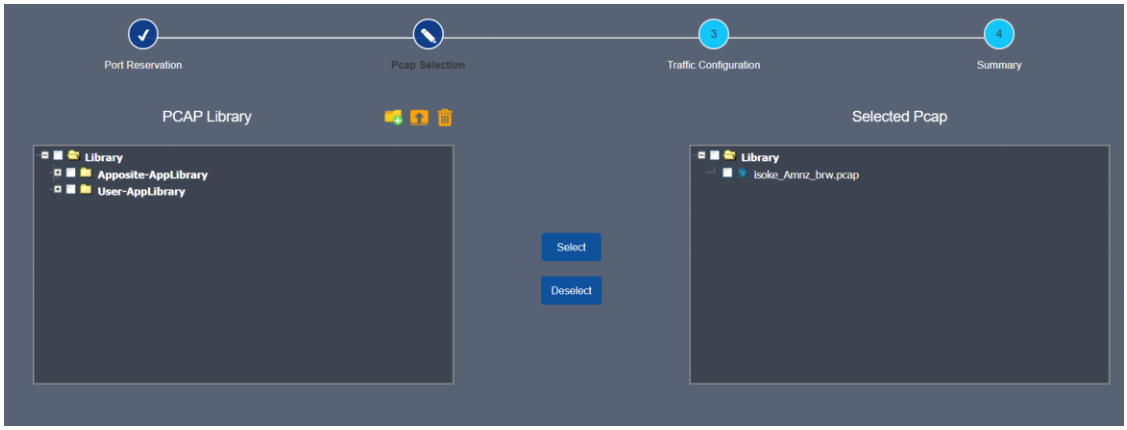

Figure 8: PCAP Selection Overview

Pcap options in the library include some of the following:

- Apposite-AppLibrary
- User-AppLibrary

By default, “Apposite-AppLibrary” contains some sample libraries provided by Apposite, including 33across, Abola, Agro, and Alexa.

By default, the “User-AppLibrary” is empty.

7.2 Selecting PCAPs

To select a PCAP, click the check box on the PCAP in the PCAP Library and select the “Select” button. This action will move the PCAP into the Selected PCAP window.

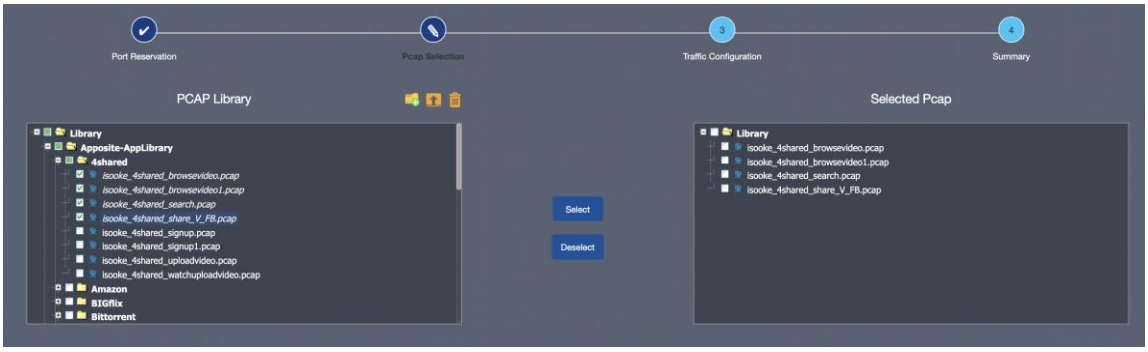

Figure 9: Selecting PCAPs

7.3 Deselecting PCAPs

To deselect a PCAP, click the check box on the PCAP in the Selected PCAP Window and select the “Select” button. This action will remove the PCAP from the Selected PCAP window.

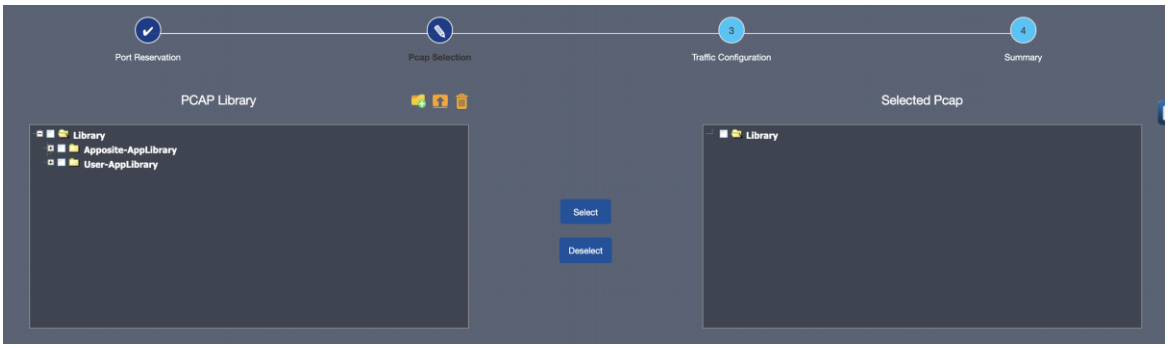

Figure 10: Deselecting PCAPs

7.4 User’s PCAPs

Users can upload their own PCAP files to save to “User-AppLibrary” in a subfolder.

To upload the PCAP file:

1. First create a folder by clicking on the folder icon and then give it a name.

Figure 11: PCAP Library (Add)

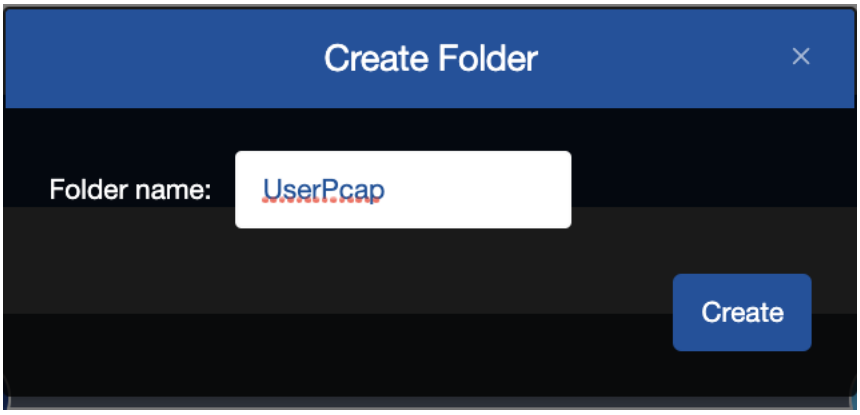

Figure 12: Create Folder

2. To upload a PCAP file, click the upload icon and it will open a dialogue box. Select a folder from the folder drop-down menu and choose a file to upload. Click upload.

Figure 13: PCAP Library (Upload)

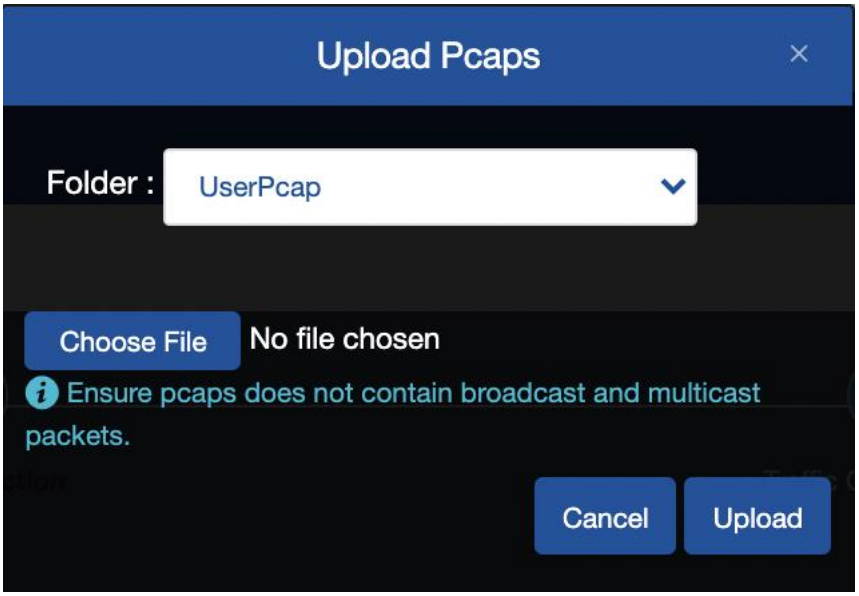

Figure 14: Upload PCAPs

3. PCAP and user folders can be deleted by selecting the folder or file and clicking the delete icon.

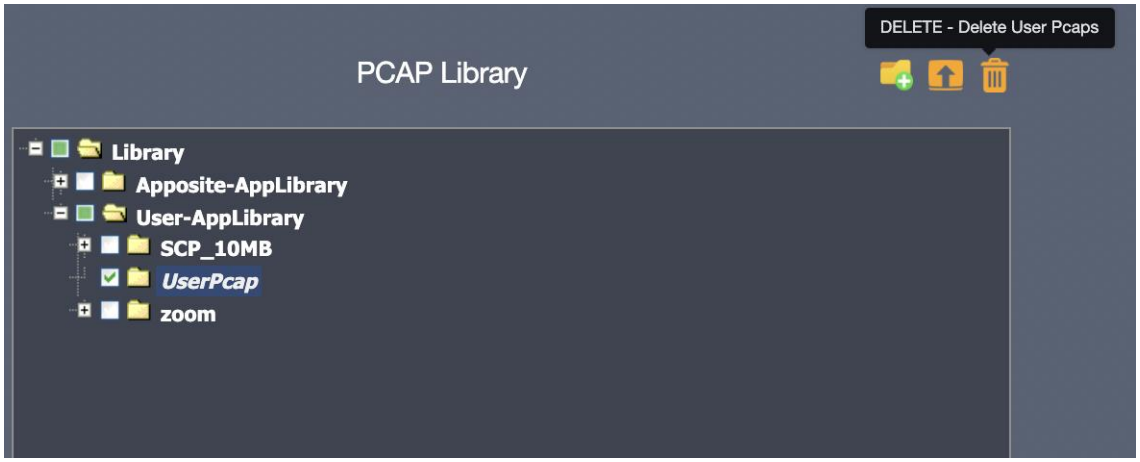

Figure 15: Delete PCAPs

8 Test Bed: Client & Server Configuration

8.1 Client Configuration

The client configuration window provides options to modify the client settings. Options include each of the following:

- Client Port
- Client MAC
- Encapsulation Type (None, VLAN, QinQ)
- IP Mode (Dynamic, Manual)
- Client IP
- Client Subnet Mask
- Dest Mac Address
- External Gateway IP

The available port options will vary depending on the ports previously reserved when establishing the test bed.

Figure 16: Client Configuration

8.1.1 Client Port

By default, the port value for the client will be set to “None”. To adjust this value, select one of the available ports from the drop-down menu.

Figure 17: Client Port

8.1.2 Client MAC

To figure the MAC address of the server, enter a 12-digital hexadecimal value into the “Client MAC” field.

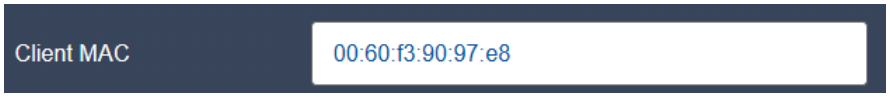

Figure 18: Client MAC

8.1.3 Encapsulation

By default, the Encapsulation value is set to “None”. To adjust this value, select an option from

the drop-down menu. The available options are “None”, “VLAN”, and “QinQ”.

Figure 19: Encapsulation

8.1.4 IP Mode

By default, the VLAN value will be set to “Manual”. This value can be changed to “Dynamic” by selecting the option from the drop-down menu.

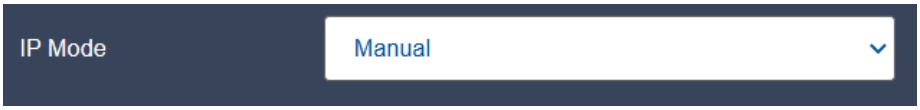

Figure 20: IP Mode

8.1.5 Client IP

By default, the Client IP address will already be set. To adjust this value, enter the appropriate dotted-decimal address.

To adjust the CIDR address select an option from the drop-down menu. The default CIDR address will be 27.

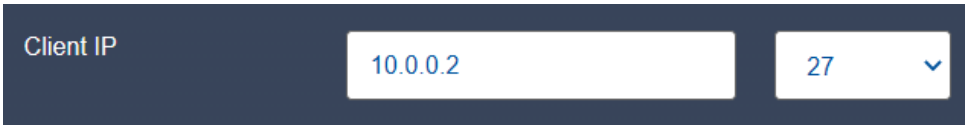

Figure 21: Client IP

8.1.6 Dest Mac Address

To figure the Dest Mac Address, enter a 12-digital hexadecimal value into the “Dest Mac Address” field.

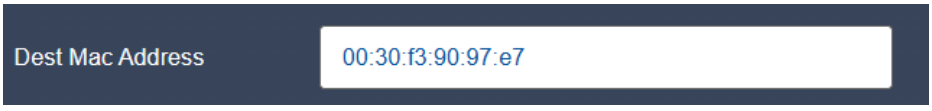

Figure 22: Dest Mac Address

8.1.7 External Gateway

The external gateway will be disabled by default, as shown in the figure below.

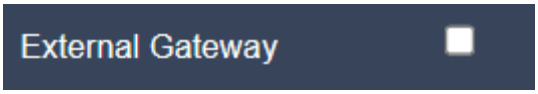

Figure 23: Client Gateway Disabled

To enable this value, click the check box. Checking this box will display the “Gateway IP” address field and allow you to enter a value into the gateway field.

Figure 24: Server Gateway Enabled

When the External Gateway is enabled, the Dest Mac Address field is no longer available.

8.1.8 Clients

The number of hosts will adjust according to the CIDR address assigned in the Client IP configuration.

For example, a CIDR value of /27 will correspond to 32 hosts. On the other hand, a CIDR value of /16 will correspond to 65526 hosts.

The following figure depicts the CIDR value of 27:

Figure 25: Clients

To adjust the number of clients, perform one of the following steps:

- Click on the outer ring of the circle to alter the number of clients
- Manually select the center of the circle and enter in a number

Adjusting the number of clients will result in an allocation of fewer hosts than available on the selected subnet.

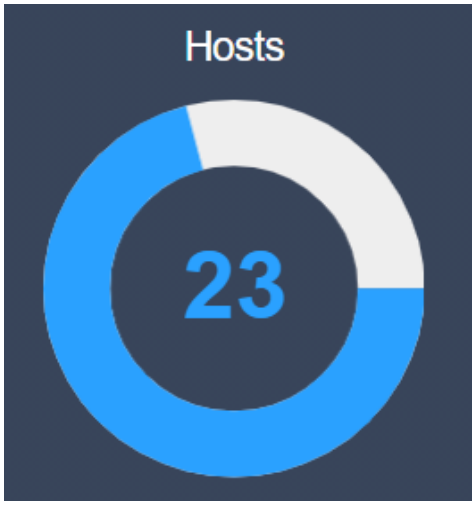

Figure 26: Client Configuration (Altered)

8.2 Server Configuration

The following server configurations can be modified:

- Server Port
- MAC
- VLAN (None, Enable, QinQ)
- IP Mode (Dynamic, Manual)
- Server IP
- Gateway IP

The available port options will vary depending on the ports previously reserved when establishing the test bed.

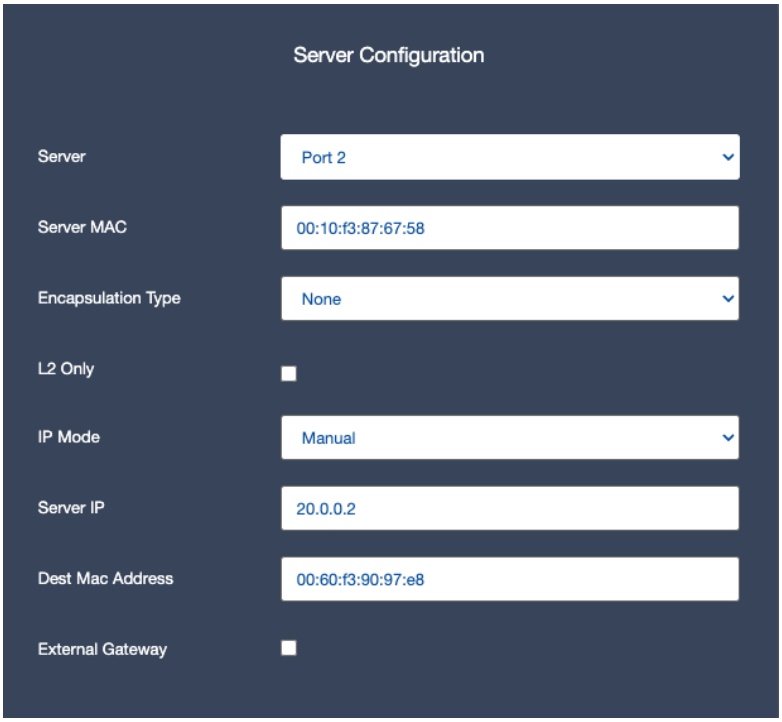

Figure 27: Server Configuration

8.2.1 Server Port

By default, the port value for the server will be set to “None”. To adjust this value, select one of the available ports from the drop-down menu.

Figure 28: Server Port

8.2.2 Server MAC

To figure the MAC address of the server, enter a 12-digit hexadecimal value into the “Server MAC” field.

Figure 29: Server MAC

8.2.3 Encapsulation

By default, the Encapsulation value is set to “None”. To adjust this value, select an option from the drop-down menu. The available options are “None”, “VLAN”, and “QinQ”.

Figure 30: Encapsulation

8.2.4 IP Mode

By default, the VLAN value will be set to “Manual”. This value can be changed to “Dynamic” by selecting the option from the drop-down menu.

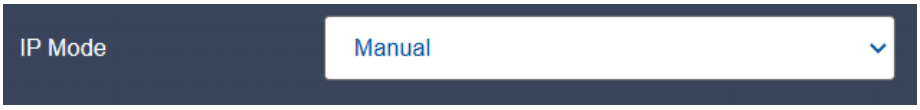

Figure 31: IP Mode

8.2.5 Server IP

By default, the Client IP address will already be set. To adjust this value, enter the appropriate dotted-decimal address.

Figure 32: Server IP

8.2.6 Dest Mac Address

To figure the Dest Mac Address, enter a 12-digital hexadecimal value into the “Dest Mac Address” field.

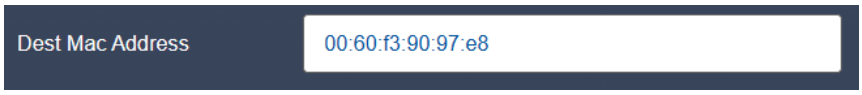

Figure 33: Dest Mac Address

8.2.7 External Gateway

The external gateway will be disabled by default, as shown in the figure below.

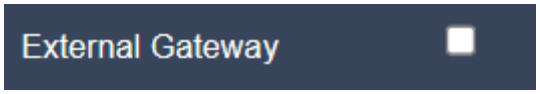

Figure 34: Server Gateway Disabled

To enable this value, click the check box. Checking this box will display the “Gateway IP” address field and allow you to enter a value into the gateway field.

Figure 35: Server Gateway Enabled

When the External Gateway is enabled, the Dest Mac Address field is no longer available.

9 TEST BED: ADDITIONAL CONFIGURATION

9.1 Additional Configuration Overview

The Additional Configuration menu provides settings that allow for adjustments to various elements of the network traffic, including mode, retries, pkts/sec, port number, RTT, payload update, stateful replay, stateless replay, speed, TTL, and NAT.

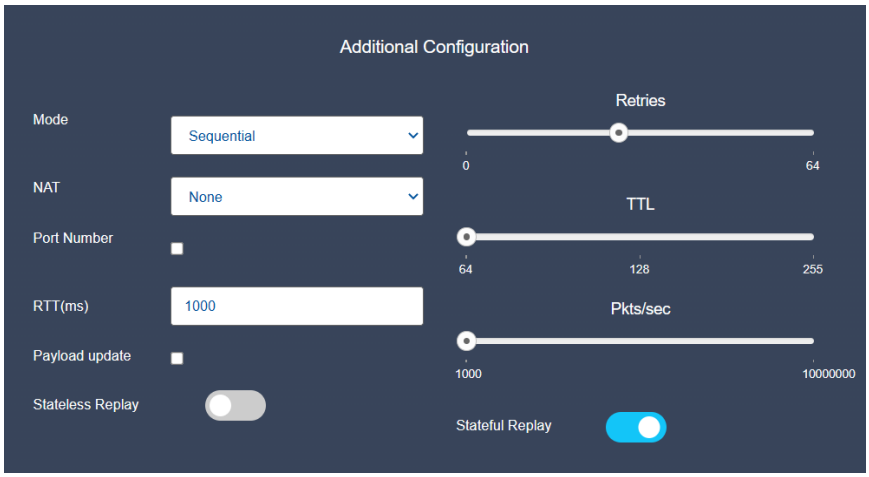

Figure 36: Additional Configuration

9.2 Additional Configuration Settings

9.2.1 Mode

To adjust the mode, select either “Sequential” or “Parallel” from the menu drop-down. By default, this mode will be set to “Sequential”.

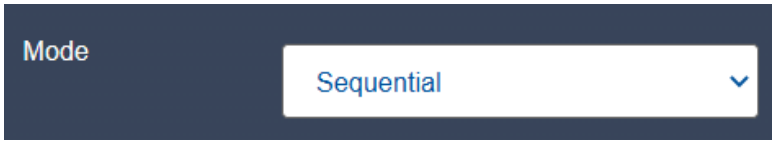

Figure 37: Mode

9.2.2 NAT

To adjust the NAT setting, select either “None”, “One to One”, or “Many to One” from the drop-down menu.

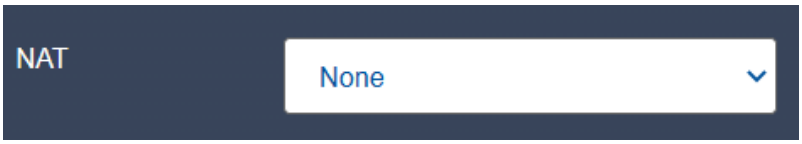

Figure 38: NAT

9.2.3 Port Number

Port Number will be unchecked by default.

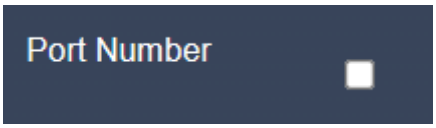

Figure 39: Port Number

To enable the Port Number, click on the check box. This will allow the selection of a source port and destination port to send packets.

Figure 40: Port Number Settings

9.2.4 RTT

To adjust the RTT, enter a numeric value in the RTT field.

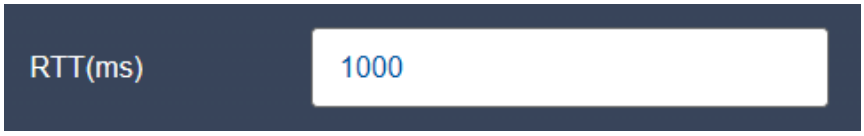

Figure 41: RTT

9.2.5 Payload Update

By default, the payload update is disabled. To enable, select the checkbox next to “Payload update”. By enabling this feature, the payload will continue to update throughout the test.

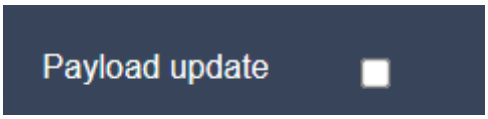

Figure 42: Payload Update

9.2.6 Stateless Replay

To enable stateless replay, switch on the “Stateless Replay” setting. When you enable stateless replay, the test runs in UDP. As such, packets will be sent without an acknowledgement.

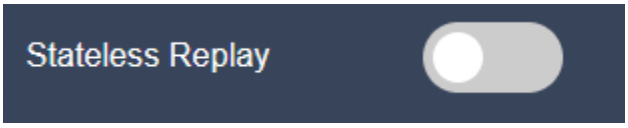

Figure 43: Stateless Replay

9.2.7 Retries

By default, the Retries is set to 1. To adjust this value click on the increment button and drag to the left.

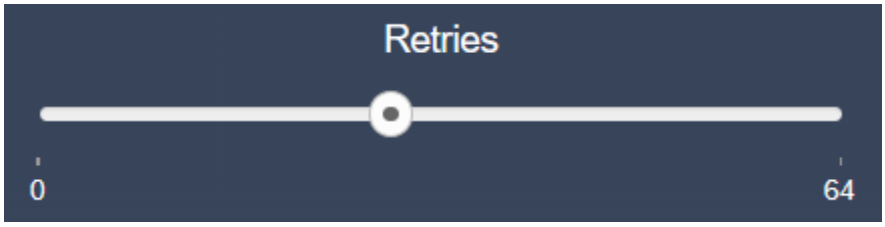

Figure 44: Retries

9.2.8 TTL

By default, the TTL value is set to 64. To adjust this value click on the increment button and drag to the left.

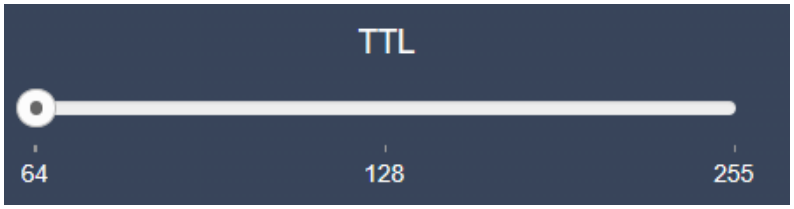

Figure 45: TTL

9.2.9 Pkts/sec

By default, the Pkts/sec is 1000. To adjust this value click on the increment button and drag to the left.

Figure 46: Pkts/sec

9.2.10 Stateful Replay

By default, the stateful replay is enabled. With stateful replay enabled, the test runs in TDP. As such, packets will be sent with an acknowledgement as part of the TCP three-way handshake.

To disable stateless replay, switch off the “Statefull Replay” setting.

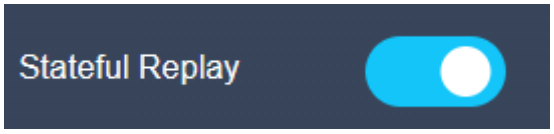

Figure 47: Stateful Replay

9.3 Test Duration and Iteration

By default, the load profile parameters checkbox is not selected, resulting in a grayed-out menu. By selecting the checkbox, the settings become available to change. Settings include test duration and iteration.

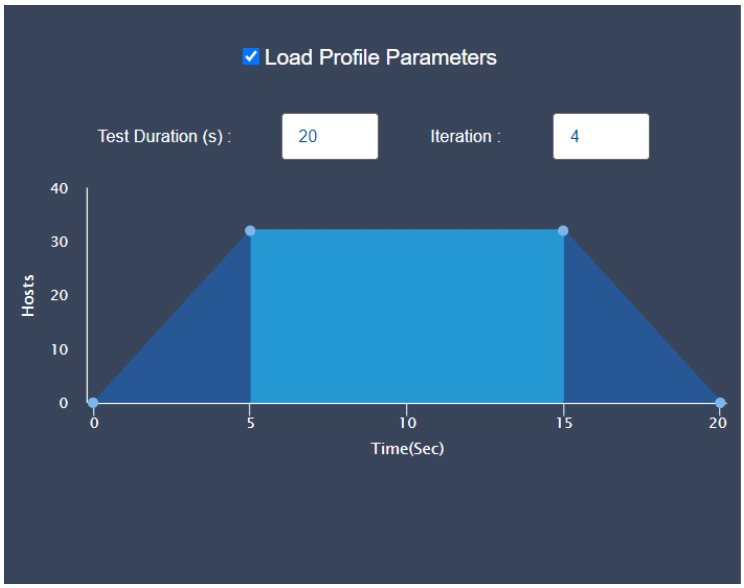

Figure 48: Traffic Duration and Iteration

9.3.1 Updating Test Duration

Changing the test duration impacts how long the test will run. To adjust the test duration, enter a value into the field, as shown below.

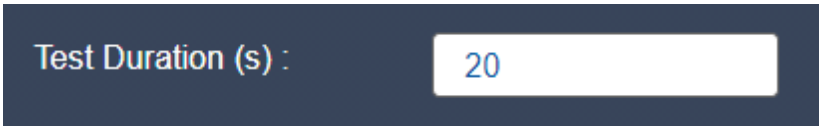

Figure 49: Test Duration

9.3.2 Changing Iteration

To adjust the number of times the test will run, adjust the iteration value by entering a value into the field.

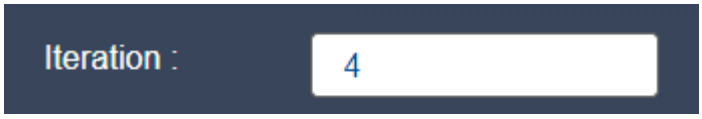

Figure 50: Iteration

10 TEST BED: SUMMARY

10.1 Configuration Summary

The Configuration summary provides a detailed breakdown of the configuration settings selected in the previous configuration steps.

If you note any problems or discrepancies with the summary, use the “Previous button” to go back to the section that needs revisions.

10.2 Summary of Configured Parameters

This summary provided a high-level overview of the various configured parameters. To modify any of these settings, select the “Previous” button at the bottom of the screen.

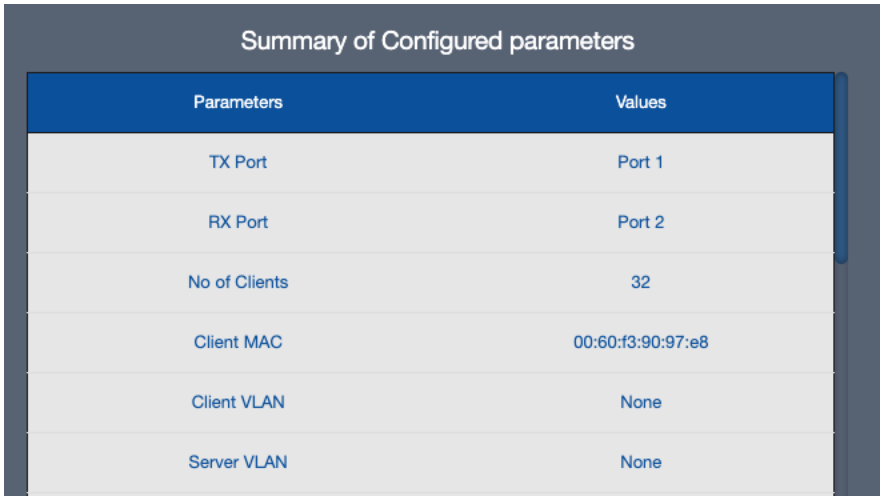

Figure 51: Summary of Configured Parameters

10.3 Selected PCAPs

The Selected PCAPs table provides a list of all of the PCAPs selected for this test. To add any additional PCAPs, return to the “PCAP Selection” tab.

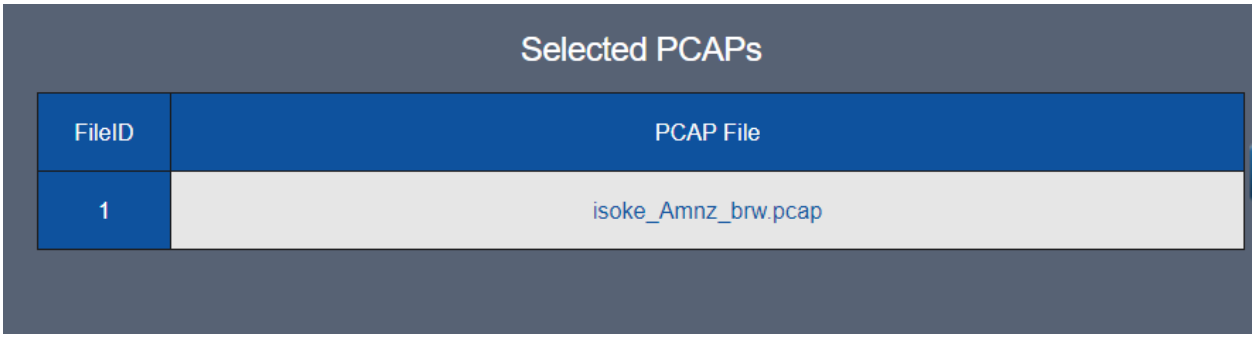

Figure 52: Selected PCAPs

10.4 Saving Configuration Settings

To download the test configuration summary in XML format, click the download icon in the top right corner next to “Save As XML”. This will download the XML file to the default download folder location on your computer.

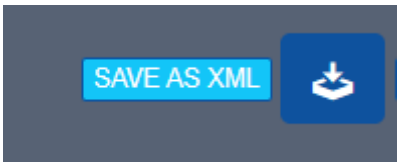

Figure 53: Save As XML

To generate a script, click the download icon in the top right corner text to “Generate Script”.

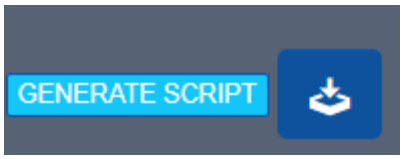

Figure 54: Generate Script

10.5 Start Test

The test can be started by selecting the “Start Test” button at the bottom of the Summary menu. By selecting this button, the test will begin, and the webpage will reload to the statistics window.

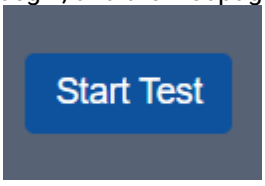

Figure 55: Start Test

11 Test Bed: Statistics

The Netropy Traffic Generation AppPlayback platform provides Aggregate Statistics, Statistics Per PCAP, and Offline Analyzer results. All results can be viewed in the Statistics window of the GUI.

11.1 Aggregate Statistics

The Aggregate Statistics tab provides detailed results for the test on the combined ports used in the test. This tab provides the following information:

- Statistics Table
- Client Statistics
- Server Statistics
- Packets/Second Graph
- Throughput Graph
- Latency Graph

To enable the Client and Server Statistics charts, select the “Show/Hide Stats” button in the top right corner.

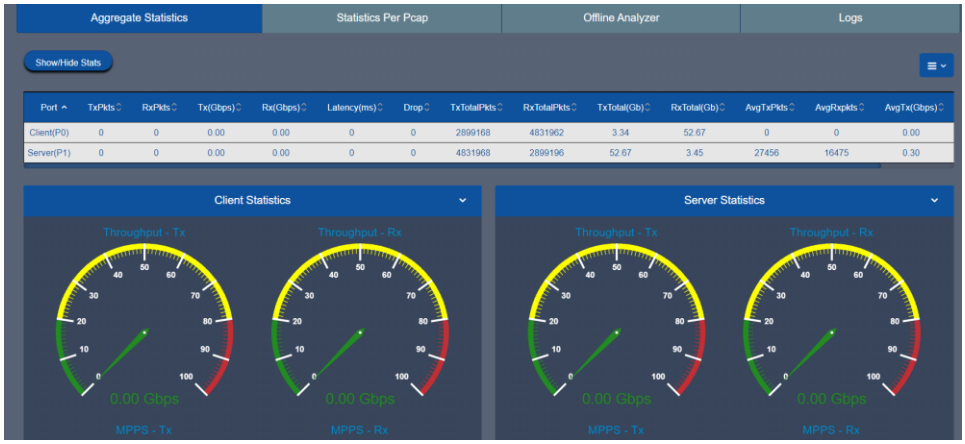

Figure 56: Show/Hide Stats

To adjust the fields shown in the table, select the blue hamburger menu icon. All fields are selected by default and unchecking a field will remove it from the graph's display.

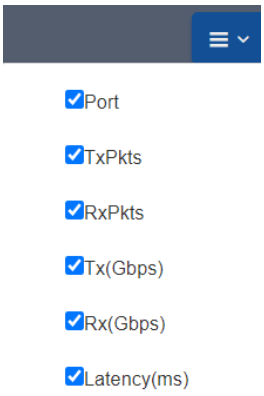

Figure 57: Statistics Filter

These statistics are further defined in Section 11.5.

The Packets/Second Graph provides a graphical view of the packets that travel over the network per second in each direction for both client and server.

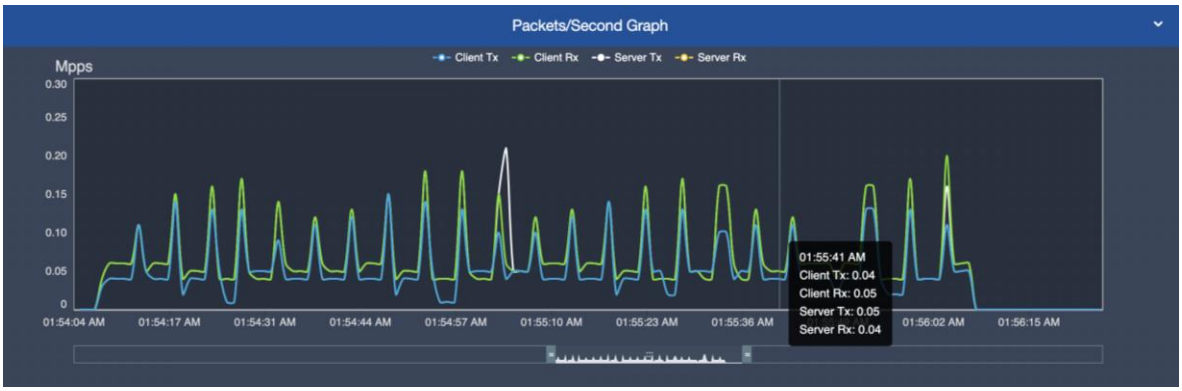

Figure 58: Packets/Second Graph

The Throughput Graph provides a graphical view of the throughput, packets sent over the network without drops, in Gbps in each direction for both client and server.

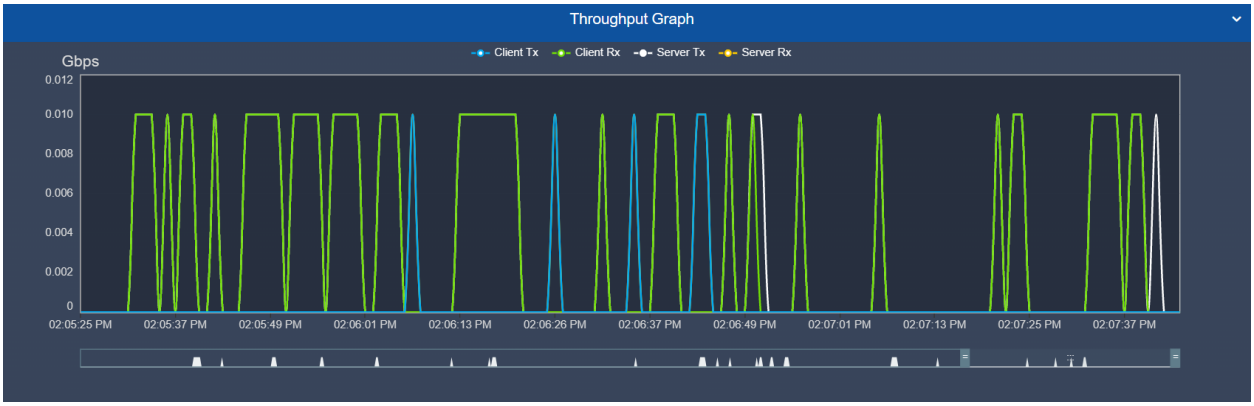

Figure 59: Throughput Graph

The Latency Graph provides a graphical view of the throughput, packets sent over the network without drops, in Gbps in each direction for both client and server.

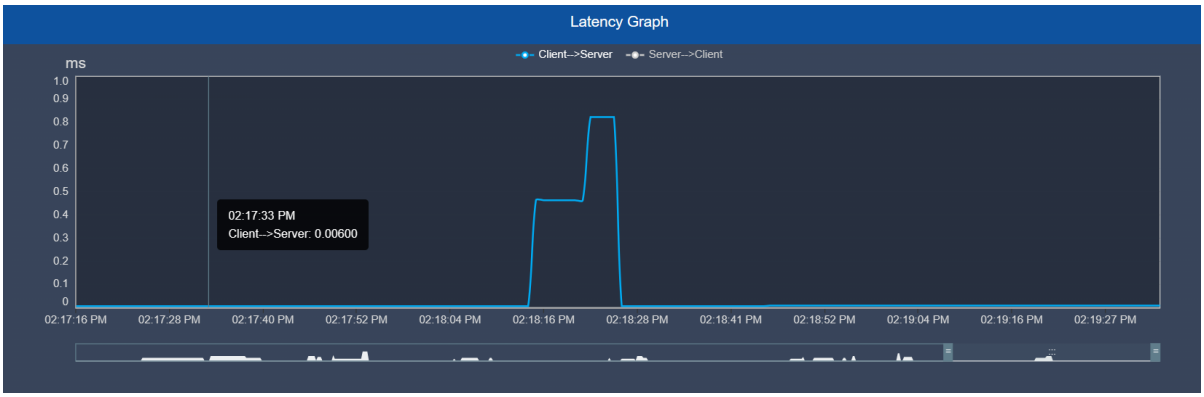

Figure 60: Latency Graph

Each of the graphs allow you to drill-down to view a single direction for either the client or server. The following graph shows the Throughput for Client Tx. In this view Client Tx is blue and all other selections have been grayed out.

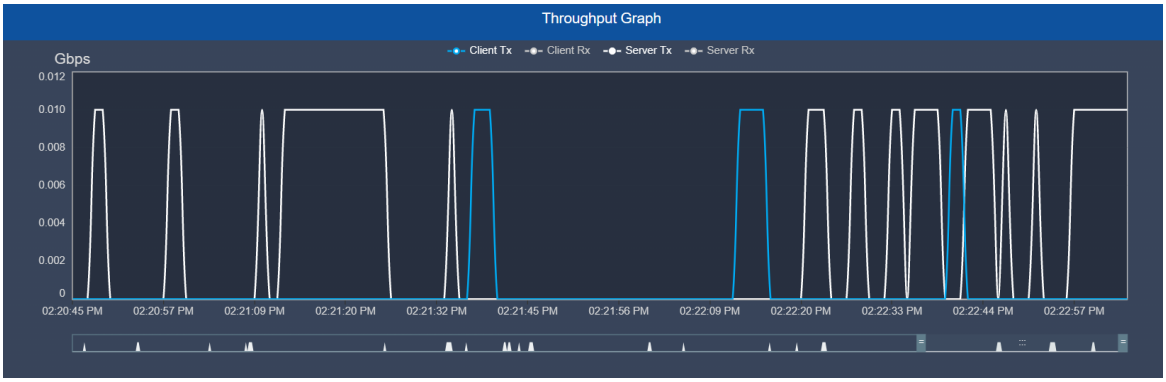

Figure 61: Throughput Graph – Client Tx

This selection can be made at the top of the graph by selecting one of the conditions.

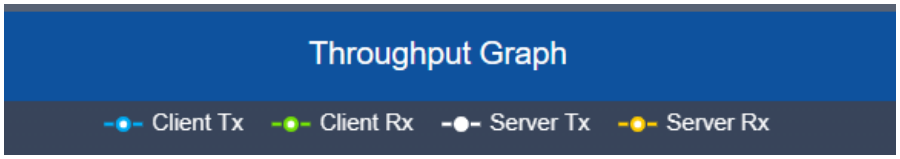

Figure 62: Graph Filters

11.2 Statistics Per PCAP

The Statistics Per App tab provides a detailed breakdown of various statistics for both the client and server.

Figure 63: Statistics Per App Tab

These statistics are shown in a table provided and include information regarding the TX packets, RX packets, latency, drops, status, result, and direction.

To adjust the fields shown in the table, select the blue hamburger menu icon. All fields are selected by default and unchecking a field will remove it from the graph's display.

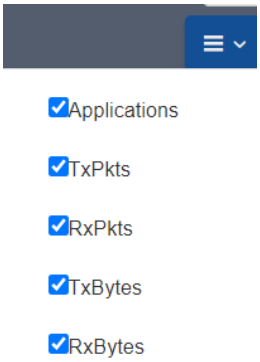

Figure 64: Statistics Per App Filter

These statistics are further defined in Section 11.4.

To search for specific keywords from the dataset, enter data into the search field. This will filter the packets for the specified data.

Figure 65: Search

To download the results, select the Adobe icon next to the “Save to PDF” text in the top right corner.

Figure 66: Save to PDF

To set the pass/fail criteria, select the “Result Criteria” button next to the Save to PDF icon.

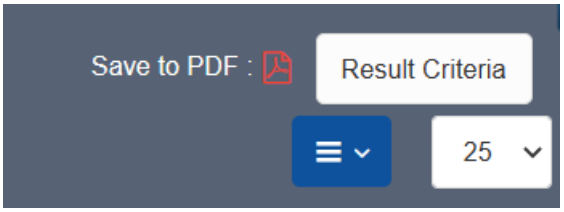

Figure 67: Result Criteria

The following options are available for the criteria:

Client Attributes:

- Client Tx Bytes
- Client Rx Bytes
- Server Tx Pkts
- Server Rx Pkts

Condition:

- >
- =
- <

Server Attributes:

- Server Tx Bytes
- Server Rx Bytes
- Server Tx Pkts
- Server Rx Pkts

Select the desired criteria for you pass/fail conditions and click “Apply” to enable these options. This selection will affect the available results shown in the graph under the “Result” column.

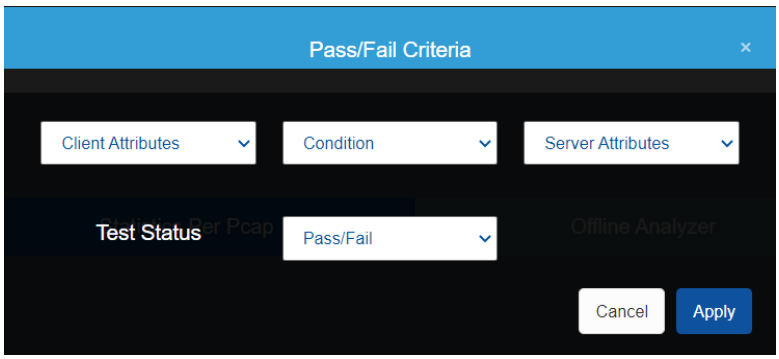

Figure 68: Pass/Fail Criteria

11.3 Offline Analyzer

The Offline Analyzer tab provides the following graphs:

- Packets/Second
- Throughput
- Latency

To download, select the download icon on the right of the graph and hover over “Download as…” to present the available download options.

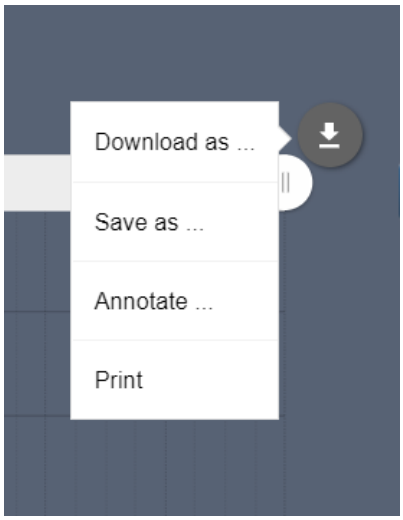

Figure 69: Downloading Graphs

Each of these graphs can be downloaded individually in either PDF, JPG, SVG, or PNG format. To select a file format, click your desired format from the menu. The selected file will be downloaded directly to your computer's default file location for downloads.

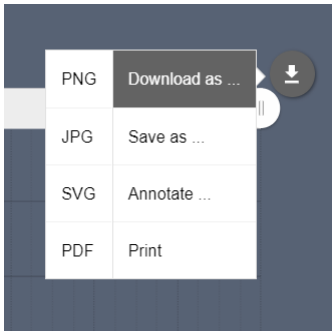

Figure 70: Download File Options

In addition, each graph can be saved as a CSV, JSON, or XSLX file. To select one of these options, hover over the “Save as…” option and select the desired file format.

Figure 71: Save As File Options

To print the graph, select the “Print” option from the menu shown in the figure above. This will open your browser’s printing menu and allow you to select your default printer and settings.

These graphs also may be annotated using the built-in illustration feature. These annotated graphs can also be downloaded in the same formats. To annotate a graph, select the “Annotate…” option from the menu.

Selecting this menu option will turn the graph white and allow you to annotate the graph. Users can add shapes and text directly to the graph. In addition, users are allowed to change the color and mode of the marker and text.

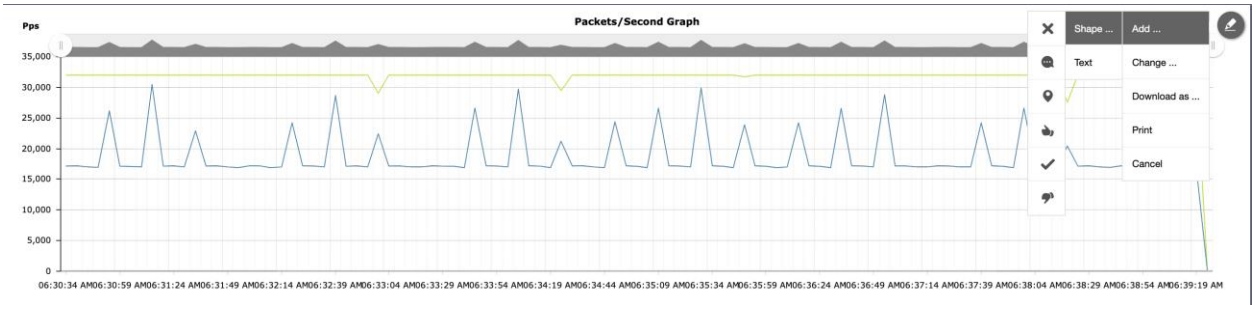

Figure 72: Annotate Graph

To change the annotated graph, hover on the edit pen on the top right corner of the graph and select “Change”.

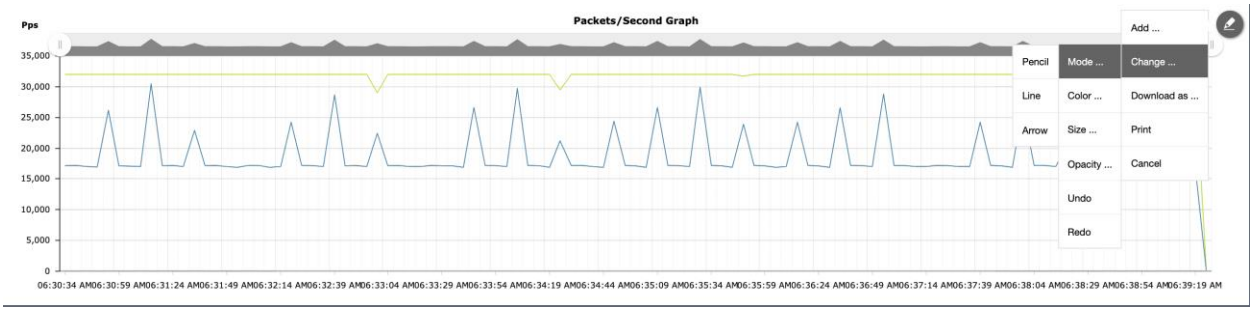

Figure 73: Change Graph

The annotated graph can be printed or downloaded in either PNG, JPG, SVG, or PDF format.

11.4 Definitions: Aggregate Statistics

Segment	Statistic	Description
	Client	This provides the statistics for the client.
	Server	This provides the statistics for the server.
	Port	The Port Number for which statistics are shown.
	Drop	The total number of packets dropped on the Port from the time test was started. The drop counter gets updated only when the test stops.
	TXPkts	The number of packets transmitted on the port in the last 1 second interval.
	RxPkts	The number of packets received on the port in the last 1 second interval.
	TX (Gbps)	The rate of packets transmitted (in Gigabits per second) on the port in the last 1 second interval.
	RX (Gbps)	The rate of packets received (in Gigabits per second) on the port in the last 1 second interval.
	Latency(ms)	The time (in milliseconds) taken by the packet to be received on the Destination port from the time it was transmitted on the Source port. This is calculated as an average for all the packets received in the last 1 sec interval.

	Status	The status of the application traffic. Available status options include “Allowed” or “Blocked”. Allowed - When TxPkts matches RxPkts. Blocked - When TxPkts doesn’t match RxPkts.
	Result	The result of the application traffic either “PASS” or “FAIL”. Result Criteria is configurable by selecting the “Result Criteria” button. By default, result criteria is Pass when RxPkts = TxPkts.
	Direction	The direction of application traffic from E → W or W → E. Green arrow indicates that there was no packet drop. Red arrow indicates that there were packet drops."
	TxTotalPkts	The total number of packets transmitted on the port from the time test was started.
	RxTotalPkts	The total number of packets received on the port from the time test was started.
	TxTotal (Gb)	The total number of gigabits transmitted on the port from the time test was started.
	RxTotal (Gb)	The total number of gigabits received on the port from the time test was started.
	AvgTxPkts	The average number of packets transmitted on the port per second from the time test was started.
	AvgRxPkts	The average number of packets received on the port per second from the time test was started.
	AvgTx(Gbps)	The average rate of packets transmitted (in Gigabits per second) on the port per second from the time test was started.
	AvgRx(Gbps)	The average rate of packets received (in Gigabits per second) on the port per second from the time test was started

11.5 Definitions: Statistics Per PCAP

Segment	Statistic	Description
	Client	This provides the statistics for the client.
	Server	This provides the statistics for the server.
	Drop	The total number of packets dropped on the Port from the time test was started. The drop counter gets updated only when the test stops.
	TXPkts	The number of packets transmitted on the port in the last 1 second interval.
	RxPkts	The number of packets received on the port in the last 1 second interval.
	Latency(ms)	The time (in milliseconds) taken by the packet to be received on the Destination port from the time it was transmitted on the Source port. This is calculated as an average for all the packets received in the last 1 sec interval.
	Status	The status of the application traffic. Available status options include “Allowed” or “Blocked”. Allowed - When TxPkts matches RxPkts. Blocked - When TxPkts doesn’t match RxPkts.
	Result	The result of the application traffic either “PASS” or “FAIL”. Result Criteria is configurable by selecting the “Result Criteria” button. By default, result criteria is Pass when RxPkts = TxPkts.
	Direction	The direction of application traffic from E → W or W → E. Green arrow indicates that there was no packet drop. Red arrow indicates that there were packet drops."
	TxBytes	The total number of bytes transmitted on the port for a specific pcap from the time test was started.
	RxBytes	The total number of bytes received on the port for a specific pcap from the time test was started.

12 TEST SETTINGS

The test provides options to capture pcaps, pause, play or stop the test, and clear statistics. The following sections will provide additional details on these configurations.

12.1 Play/Pause/Stop

To adjust the play, pause, and stop settings for a test, select the power button on the right side of the screen.

Figure 74: Play/Pause/Stop Settings

Selecting this button will present a menu to select the pause, play, and stop buttons. When the test is stopped, the test bed will initiate the generation of a report. This report will be available within the Logs tab. If a test is paused, the user will be notified and provided the option to replay in the same menu.

If a test is played, the user will be provided the option to either pause or stop the test.

12.2 Clear Statistics

To clear the current statistics, hover over the broom icon on the left side of the screen and select “Clear Statistics”. This action will clear all statistics shown in the available graphs but will not alter the contents of the Log files.

Figure 75: Clear Statistics

12.3 Start Packet Capture

To start a network packet capture of the traffic that occurs during your test, hover over the camera icon on the left side of the screen to present a green button labeled “Start Capture”. Click this button to begin a network packet capture.

Figure 76: Network Capture

13 Logs

13.1 Logs Overview

Logs may be collected from tests to use for analysis and review by users. The system will collect and maintain these logs for future use. These files can be found within the Logs tab of the Statistics menu.

The size of these logs will vary upon the amount of data collected and the number of packets selected within the capture. All capture files will be provided in .pcap form to ensure they're compatible with Wireshark and similar software programs.

13.2 Managing Logs

The Logs tab of the Statistics window presents a list of available reports. These reports can be downloaded or deleted.

To download a report, select the download icon on the specified file. This will download a zip folder to the default download location on your device. To delete a file from the logs, select the trash can icon on the specified file.

To delete all logs, select the "Delete All" button in the top right corner.

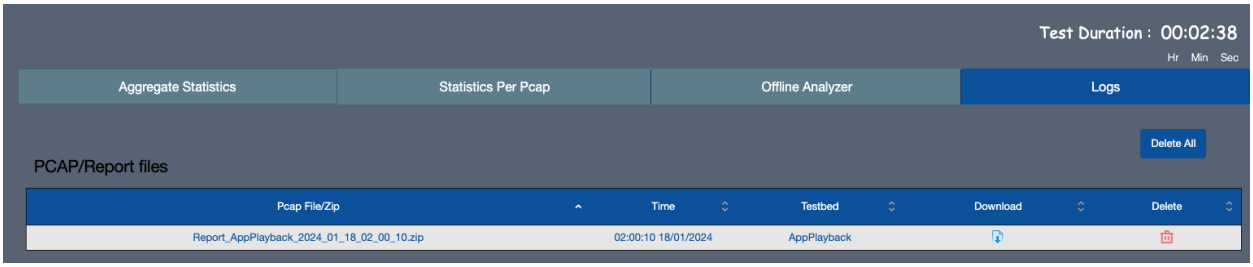

Figure 77: Logs Tab

If you select the delete icon or button, you will not be presented with a confirmation window. Unless previously downloaded, you cannot retrieve deleted reports.

13.3 Log Files

After a report has been downloaded, right click the zip folder, and select “Extract All” to extract the file’s content to another location. The extracted folder may include some the following files:

- Offline Analyzer Latency (CSV)

This file includes latency data collected from the test.

- Offline Analyzer PPS (CSV)

This file includes packets per second of data collected from the test.

- Offline Analyzer Throughput (CSV)

This file includes throughput data collected from the test.

- Configuration (XML)

This file includes the test bed configuration, which can be imported into the test later.

- Report Document (PDF)

The file includes a PDF summary of the test configuration and relevant statistics recorded from the test.

14 ADMINISTRATION

The Netropy Traffic Generation AppPlayback can be administered through the Administration portal accessible via browser. The administrator must log in using their administrative credentials.

14.1 User Settings

The User tab presents options to add, edit, and delete users. By default, there will only be a single user account, the administrator. To create additional accounts to manage and configure test beds, the administrator must add new users.

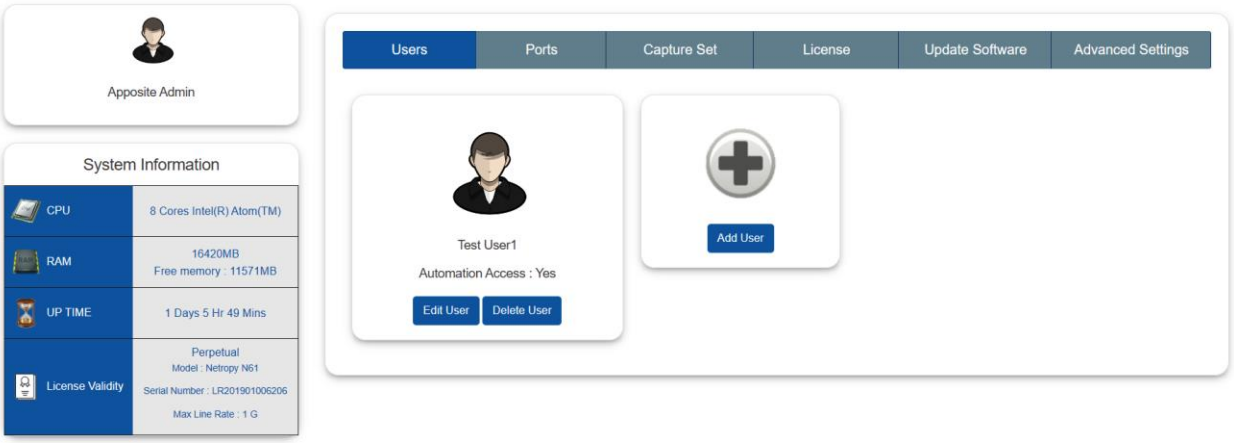

Figure 78: User Tab

When adding a new user, the following information is required:

- First Name
- Last Name
- User Name
- Email
- Password
- Automation access

The account will be created once the “Create User” button is selected. This user will then be able to access the configuration portal using their new credentials. Only the administrator will have access to these permissions. Other users will be able to make configuration changes but will not have privileges to access and manage other accounts.

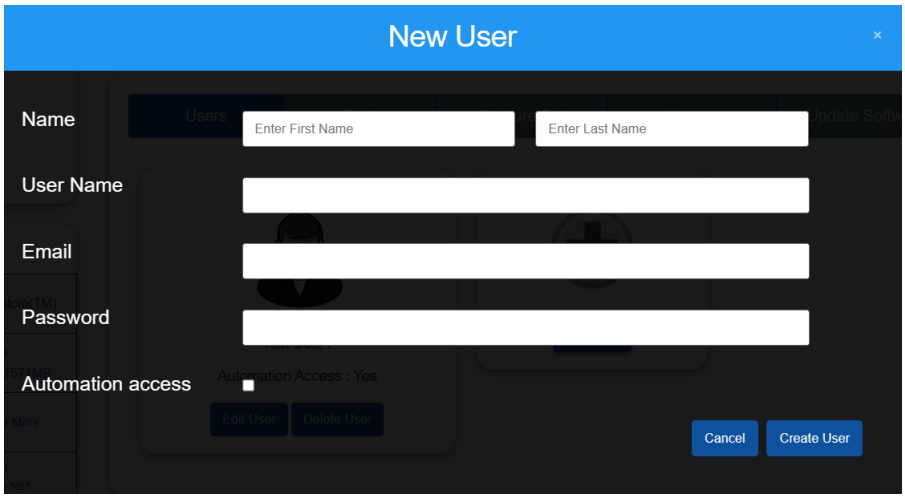

Figure 79: New User

14.2 Port Settings

The Port tab displays the status of ports and allows the administrator to manually release ports as needed. This will override any port releases and reservations made by other user accounts.

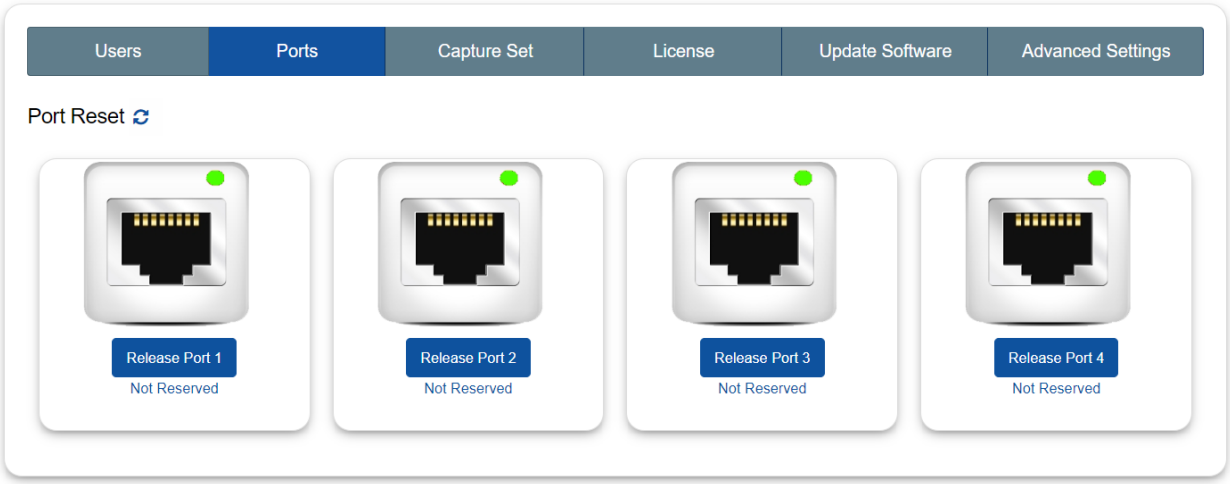

Figure 80: Port Tab

To release a port, click on the associated “Release Port X” button. As demonstrated in the figure below, this button will open a pop-up that displays the IP Address, status, speed, MAC address, and details on whether the port is reserved. By clicking “Release” the port will be released.

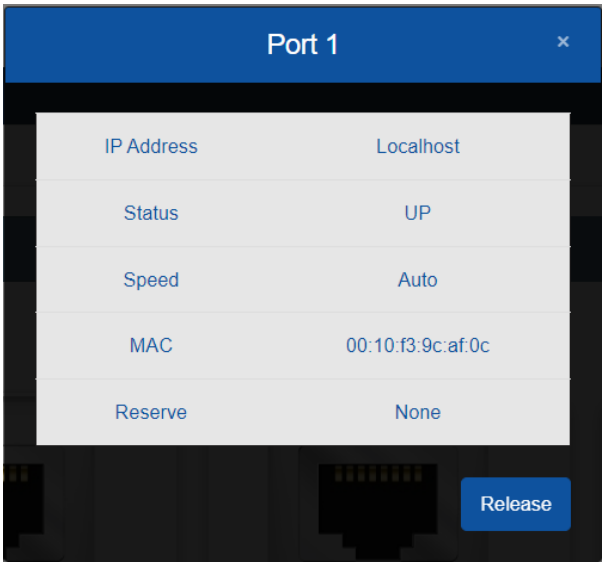

Figure 81: Release Port Settings

14.3 Capture Settings

AppPlayback Engine can be configured to capture a specific number of packets during a session. By default, the number of packets to capture will be set to 100 packets. This setting can easily be altered by clicking the drop-down menu, as shown in the figure below. Options in this menu will range from 100 packets to 1,000,000 packets.

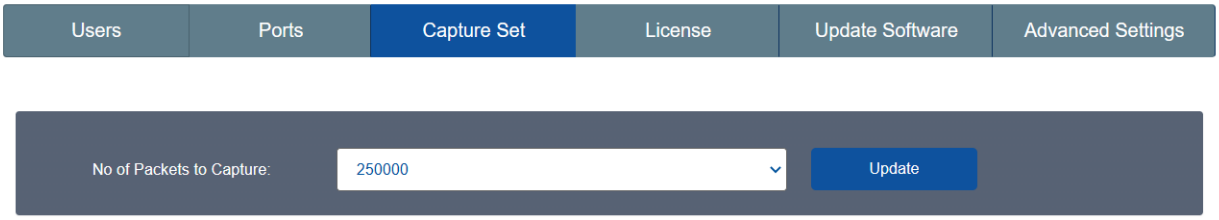

Figure 82: Capture Settings

Click “Update” to initiate these changes and ensure all future packet sessions will capture the specified number of packets.

14.4 License Settings

The License tab will display the license, license type, license validity, and the number of licensed ports. To obtain additional information on how to renew a license, visit https://www.apposite-tech.com/renewals/ to submit a renewal request form.

To add a license key, click the “Browse” button to search for files on your device. After selecting the applicable file, click “Open” in file explorer. Then, proceed by selecting “Upload” to upload the

license key file into the system.

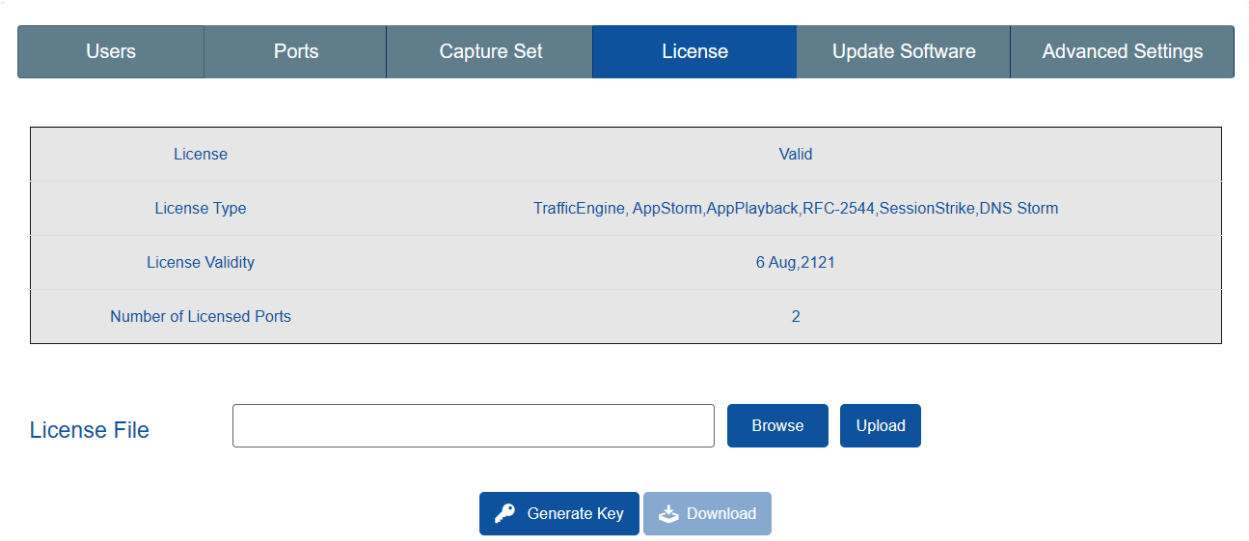

Figure 83: License Tab

14.5 Update Software Settings

The Update Settings tab allows the selection of a BIN file to update the system software. To update the BIN file, select the plus button icon, and select the appropriate file on your PC. After selecting the file, the system will request a system reboot. Select “Yes” to allow the system to apply all necessary patches and updates.

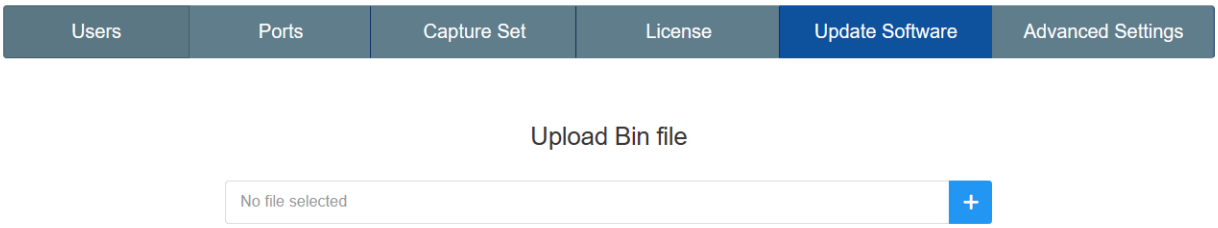

Figure 84: Update Software Tab

14.6 Advanced Settings

The Advanced Settings tab allows management of time zone, signature, binary search, DNS Queries File, Authentication, NAS IP, and Secret Key.

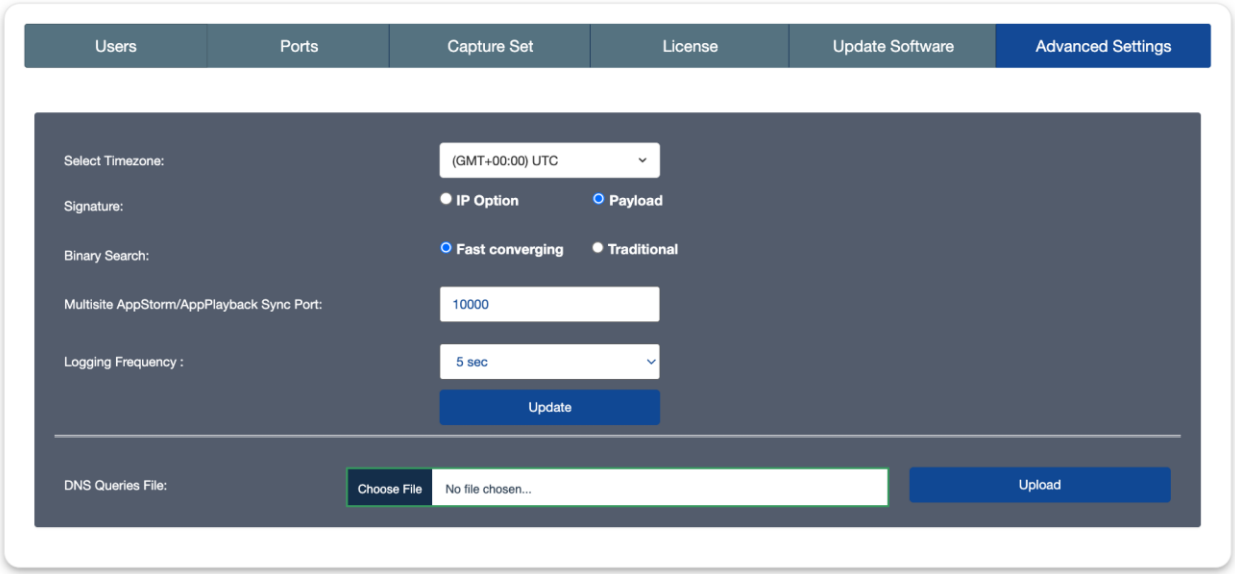

Figure 85: Advanced Settings

14.7 Time Zone

Users can select the time zone of their location. To select the time zone, click the down arrow next to the default time by the “Select Timezone” value.

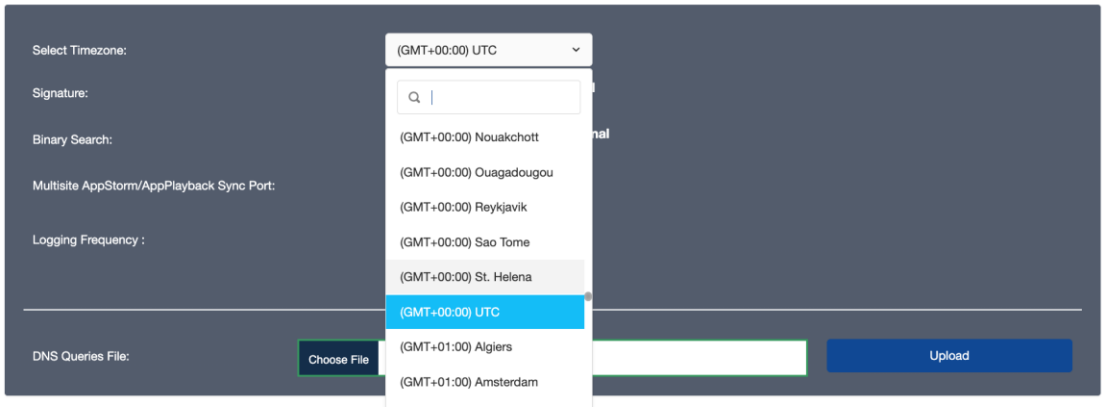

Figure 86: Time Zone

14.8 Signature

The selection determines where the control information used by NTG gets stored in the packets being transmitted.

1. **IP Options:** In this case, the control information is stored in the IP options field in the IP header.

2. **Payload:** In this case, the control information is stored in the IP Payload.

To select one of the two options, select the applicable radio button. Then, click “Update” to complete the change.

Figure 87: Signature

14.9 DNS Queries File

This is the file which consists of the lists of domain names which are used by the DNS Storm feature when sending DNS queries. DNS Storm feature cycles through this list of domain names.

Select “Browse” to choose the appropriate DNS Queries File. Then, click “Update” to complete the change after the file has been selected.

Figure 88: DNS Queries File

15 COMMAND LINE INTERFACE

The Netropy command line interface (CLI) can be accessed via the CONSOLE interface or through a Telnet or SSH connection.

The following are the only features available through the CLI:

- ARP and PING commands
- Reinitialize the unit to factory settings
- Management functions

To access the CLI, log into the device at the prompt as "`admin`" or other configured username.

15.1 CLI Help

The CLI includes several levels of help. The "`help`" command by itself displays a list of commands. "`help`" with a command name displays the syntax and options for the command.

When entering commands, the <Tab> key can be used to complete a partially entered command name. If there are multiple possible completions, pressing the <Tab> key again will display a list of options.

15.2 CLI Top Level Commands

Command	Syntax and Description
arp	`arp show` Displays a table of IP addresses and associated MAC addresses for the MGMT interface.
clock	`clock show` Displays the current system time and date.
help	`{help | ?} [<command>]` Displays a list of available commands or syntax of a specified command. A question mark after any command also displays the syntax for that command.
init	`init config` Returns the configuration to factory default settings. Takes effect upon reboot unless the configuration is saved prior to reboot.
logout	`logout` Logout from the command line interface.

mgmt	`mgmt show`
	Displays the IP address and other management information.
	`mgmt show ntp associations`
	Displays the synchronization state with the configured NTP servers.
	`mgmt set addr {dhcp | addr <addr> netmask <mask>}`
	Sets the IPv4 address and netmask of the MGMT interface either manually or using DHCP. If DHCP is enabled, DHCP sets the default gateway.
	`mgmt set domain <domain>`
	Sets the network domain name of the device.
	`mgmt set gw <addr>`
	Sets a default gateway for the MGMT interface.
	`mgmt set hostname <name>`
	Sets the hostname of the device.
	`mgmt set nameserver <addr> [<addr2> [<addr3>]]`
	Sets up to three DNS servers for the device. This command overrides any nameservers set through DHCP and any DNS servers previously configured.
	`mgmt set ntp server <server> [<server2> [<server3>]]`
	Sets up to three network time protocol servers for the device. This command overrides any NTP servers set through DHCP and any NTP servers previously configured.

mgmt	`mgmt clear nameserver`
	Clears all manually configured DNS servers. Does not change any DNS servers set through DHCP.
	`mgmt clear ntp server`
	Clears all manually configured NTP servers. Does not change any NTP servers set through DHCP.

ping	`ping <ip-address> [<size>]` Pings from the device to the IP `address` with the specified sized packets using the MGMT interface. Use CTRL-C to stop.
reboot	`reboot` Reboots the device. Returns user to the login prompt after reboot.
serialnumber	`serialnumber` Displays the serial number of the unit.
upgrade	`upgrade <upgrade-image-url>` Upgrades the Netropy firmware. FTP, HTTP, and TFTP services are supported. Ex: upgrade ftp://server/netropy-image
version	`version` Displays the operating firmware version.

15.3 RADIUS Management Commands

Command	Syntax and Description
show	`mgmt show radius` Displays the current RADIUS configuration.

set	`mgmt set radius server <server>`
	Identifies the RADIUS server by IP address or host name. Communication to RADIUS server occurs over the default port 1812.
	Ex.: mgmt set radius server radiusserver.example.com
	`mgmt set radius secret <secret>`
	Set the shared secret that the RADIUS server uses to authorize the client.
	Ex.: mgmt set radius secret secret_key
	`mgmt set radius { on | off }`
	Turns RADIUS authentication on or off.

clear	`mgmt clear radius` Turns off RADIUS authentication and clears the RADIUS configuration.

15.4 LDAP Management Commands

Command	Syntax and Description
show	`mgmt show LDAP` Displays the current LDAP configuration.

set	`mgmt set ldap server <server> [port <#>]`
	Identifies the LDAP server by IP address or host name. Optionally specifies a non-standard port to connect to. The default port is 389.
	Ex.: mgmt set ldap server ldapserver.example.com
	`mgmt set ldap basedn <search-base-DN>`
	Identifies the Distinguished Name of the search based in the remote LDAP database. If there are embedded spaces in the base DN string, the string must be enclosed in quotation marks.
	Ex.: mgmt set ldap basedn dc=example,dc=com
	`mgmt set ldap filter attribute <string> [<LDAP-search-string>]`
	Specifies the attribute that contains the username and optionally an additional LDAP search string. The LDAP search string must be compatible with the formal definition found in RFC 4515. If there are embedded spaces in the search string, the string must be enclosed in quotation marks.
	Ex.: mgmt set ldap filter attribute uid & (&(gidNumber=20)(class=Expert))
	The resulting search string will be (&(uid=user) (&(gidNumber=20) (class=Expert))) where “user” is replaced by the login name.
	`mgmt set ldap security {disable | enable}`
	Enable or disable Transport Level Security. TLS is enabled by default.
	`mgmt set ldap bind dn <bind-DN> [password <password>]`
	Specifies a Distinguished Name and password with which to bind to the LDAP server before performing a search operation. If not configured, an anonymous bind will be used.
	Ex.: mgmt set ldap bind dn cn=user, dc=example,dc=com
	`mgmt set ldap { on | off }`
	Turns LDAP authentication on or off.

clear	`mgmt clear ldap` Turns off LDAP authentication and clears the LDAP configuration.

16 SECURITY

16.1 Users and Passwords

Initially, the AppPlayback system has a single user configured with the following credentials:

- Username: admin
- Password: admin

Refer to Section 13 for additional information on proper management and addition of user accounts through the GUI interface.

17 APPOSITE SUPPORT

17.1 Registration

For access to the Netropy Traffic Generation support site with firmware upgrades, documentation, and other support materials, register your unit at: http://www.apposite-tech.com/register.html.

Registered users will receive an email notification whenever new firmware versions are released.

17.2 Customer Support

If you experience any problems with the Netropy Traffic Generation hardware, consult the *Hardware Guide* for your intended model. If you have any questions about the firmware that have not been answered in this *User's Guide*, please check the Apposite Technologies website at http://www.apposite-tech.com for updated firmware and supporting documentation. If the answer to your inquiry is not answered on the website, please contact Apposite Support.

All units with an active product license may receive support and maintenance for the term of the license. This support includes hardware warranty, firmware updates, and customer support. The license expiration date for limited-term licenses is shown in the Administrative portal of the Netropy Traffic Generation system on the info page.

License renewals are available from Apposite or the reseller of your unit.

If you believe the firmware is not functioning properly, please upgrade to the latest firmware release. If the problem persists, please contact Apposite Support at:

- support@apposite-tech.com
- 1.310.477.9955 ext. 2

When contacting Apposite Support, please include the following information with your request:

- Model number
- Serial number
- Your name
- Your e-mail address and phone number

- Installed firmware version
- A detailed description of the problem

Do not attempt to fix any hardware problem yourself. AppPlayback hardware devices do not contain any user serviceable parts. Opening the chassis voids the warranty.

APPENDIX A:
APPOSITE END USER LICENSE AGREEMENT

THIS END USER LICENSE AGREEMENT ("AGREEMENT") IS A LEGAL AGREEMENT BETWEEN YOU AND APPOSITE TECHNOLOGIES LLC ("APPOSITE"). BY DOWNLOADING, INSTALLING, COPYING, ACCESSING, OR USING THIS SOFTWARE, YOU AGREE TO THE TERMS OF THIS AGREEMENT. IF YOU ARE ACCEPTING THESE TERMS ON BEHALF OF ANOTHER PERSON OR COMPANY OR OTHER LEGAL ENTITY, YOU REPRESENT AND WARRANT THAT YOU HAVE FULL AUTHORITY TO BIND THAT PERSON, COMPANY, OR LEGAL ENTITY TO THESE TERMS. IF YOU DO NOT AGREE TO THESE TERMS, ARE NOT AT LEAST 18 YEARS OF AGE, OR DO NOT HAVE AUTHORITY TO ENTER THIS AGREEMENT, DO NOT DOWNLOAD, INSTALL, COPY, ACCESS OR USE THIS SOFTWARE, AND PROMPTLY RETURN THIS SOFTWARE AND PROOF OF ENTITLEMENT TO THE PARTY FROM WHOM YOU ACQUIRED THEM.

1. **DEFINITIONS.**

   a. "Documentation" means published user manuals and other explanatory materials provided by Apposite relating to the Software or the Hardware.

   b. "Hardware" means the Apposite-branded hardware product on which the Software is designed to run.

   c. "Software" means the computer software (regardless of format or media in which distributed) designed to run on the Hardware.

   d. "Modifications" means any applicable upgrades, modified versions, updates, bug fixes, patches, or other modifications to the Software made generally available by Apposite to its customers.

   e. "Product" means the Apposite-branded product comprised of the Hardware, the Software, and the Documentation.

   f. "Legacy Product" means any Product purchased prior to August 1, 2017.

   g. "License Period" means for any Product that is not a Legacy Product, the license period identified on the relevant order form or receipt upon your purchase of the Product or the Software, including any purchased extension thereto.

   h. "Warranty Period" means (a) for any Legacy Product, the period during which you maintain a continuous, active subscription to Apposite maintenance services, or (b) for any Product that is not a Legacy Product, the License Period, unless such Product has a perpetual license, in which case the Warranty Period shall be five (5) years from the date of purchase of the Product from Apposite unless extended by purchase of maintenance services.

2. **LICENSE GRANT.**

   Conditioned upon compliance with the terms and conditions of this Agreement, Apposite hereby grants you the following licenses (collectively, the "License"):

   a. With respect to any Product that is not a Legacy Product, for the relevant License Period, a nonexclusive, nonsublicensable, nontransferable license to use the Software and Modifications solely as embedded in the Hardware, and to use the Documentation solely in conjunction with the Software, Modifications, and Hardware; and

   b. With respect to any Legacy Product, a perpetual, nonexclusive, nonsublicensable, nontransferable license to use the Software solely as embedded in the Hardware, and to use the Documentation solely in conjunction with such Software and Hardware, and to use any Modifications released by Apposite and installed on the Hardware during the Warranty Period.

   This license is not a sale. The Software may contain open source or third-party software, subject to separate license terms. Acknowledgements, licensing terms and disclaimers for such materials are contained in the Documentation, and your use of such material is governed by their respective terms and

not by the License.

3. **OWNERSHIP.** Apposite and its licensors retain ownership of all intellectual property rights in and to the Software and Documentation, including any copies, improvements, enhancements, derivative works, and modifications thereof. The Software and Documentation are protected by United States and international copyright and other intellectual property laws and international trade provisions. Your rights to use the Software and Documentation are limited to those expressly granted by this Agreement. No other rights with respect to the Software or any related intellectual property rights are granted or implied.

4. **RESTRICTIONS.** Except as otherwise expressly provided under this Agreement, you shall not directly or authorize any third party to:

   (i) copy the Software, except as necessary for archival or backup purposes only;

   (ii) transfer, assign, sublicense, rent, lease, lend, or otherwise transfer your license rights to any other person or entity;

   (iii) install or use the Software on any computing device other than the Hardware;

   (iv) modify or adapt the Software or Documentation or create derivative works based upon the Software or Documentation;

   (v) reverse engineer, disassemble, decompile, decrypt, or otherwise attempt to derive the source code of the Software, except to the extent otherwise expressly permitted under applicable law notwithstanding this restriction; or

   (vi) 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, Documentation, or Hardware without the express written authorization of Apposite.

5. **SUPPORT.** Apposite shall have no obligation to support the Software except as provided in Apposite's Customer Support Terms and Conditions, which is incorporated by reference into this Agreement.

6. **LIMITED WARRANTY.** Apposite warrants that, for the duration of the Warranty Period, the Hardware will be free of any defects in materials and workmanship under normal use and the Software will perform substantially in accordance with the Documentation. This limited warranty extends only to the original user of the Product. This limited warranty is void if failure of the Hardware or Software to conform to the warranty has resulted from improper installation, testing, misuse, neglect, accident, fire or other hazard, a virus, or any breach of this Agreement. Apposite and its suppliers' entire liability and your sole and exclusive remedy shall be, at Apposite's sole discretion, to: (i) repair the Software or Hardware; (ii) provide replacement Hardware or Software; or (iii) refund the purchase price and terminate this Agreement. This limited warranty applies only if the Product is returned to Apposite, freight and insurance prepaid, in accordance with Apposite's Return Material Authorization (RMA) procedures. Any repaired or replaced Software or Hardware will be subject to this same limited warranty for the remainder of the original Warranty Period or thirty (30) days, whichever is greater. THE FOREGOING LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, AND APPOSITE DISCLAIMS ANY AND ALL IMPLIED WARRANTIES OR CONDITIONS, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF TITLE, NONINFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY BY JURISDICTION.

7. **LIMITATION OF LIABILITY**. REGARDLESS WHETHER ANY REMEDY SET FORTH HEREIN FAILS OF ITS ESSENTIAL PURPOSE, 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 PRODUCT AND EVEN IF APPOSITE OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY

OF SUCH DAMAGES. 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 PRODUCT. SOME STATES DO NOT ALLOW THE LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. YOU HEREBY WAIVE CALIFORNIA CIVIL CODE SECTION 1542, WHICH SAYS "A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH, IF KNOWN BY HIM MUST HAVE MATERIALLY AFFECTED HIS SETTLEMENT WITH THE DEBTOR."

8. **TERM AND TERMINATION.** This Agreement takes effect upon your use of the Software and remains effective until terminated. You may terminate it at any time by destroying all copies of the Software and Documentation in your possession. The licenses granted by Apposite herein will terminate immediately if you fail to comply with any term or condition of this Agreement. You agree on termination of the licenses to cease all use of the Software and Documentation. In addition, the provisions of the sections "U.S. Government Restricted Rights" and "Export" shall survive termination of this Agreement.

9. **EXPORT.** The Product, 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 Product 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.

10. **U.S. GOVERNMENT RESTRICTED RIGHTS.** All Software and Documentation provided pursuant to this Agreement qualifies as "commercial computer software" and "commercial computer software documentation" pursuant to FAR 12.212 and DFAR 227.7202. The Software and Documentation are 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.

11. **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. Any dispute arising out of or relating to this Agreement shall be subject to the exclusive jurisdiction and venue of the courts sitting in Los Angeles, California. This Agreement shall not be governed by either the Uniform Computer Information Transactions Act (UCITA) or the United Nations Convention on Contracts for the International Sale of Goods (CISG), the application of which is expressly excluded. If for any reason a court of competent jurisdiction finds any provision of this Agreement, or any 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 Product 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 are binding unless in writing and signed by Apposite.

Apposite® Technologies LLC
4223 Glencoe Ave, Suite B121
Marina Del Rey, CA 90292 USA
1.310.477.9955
info@apposite-tech.com
www.apposite-tech.com