# Low Latency Network Emulator Web UI

## User Guide

Version 1.001

Date: March 26, 2018.

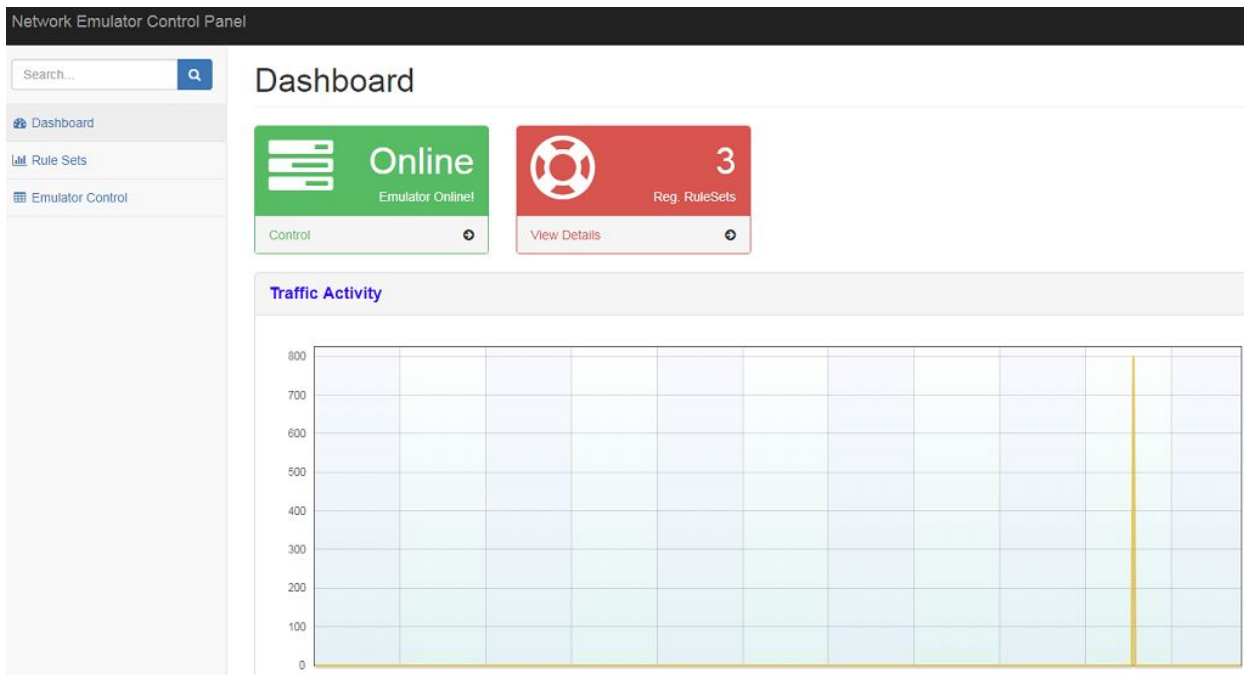# 1. Emulator Main Control Panel

     a.   Checking Emulator Status

     b.   Re-Starting Emulator

     c.   Loading and Activating Rule set

# 2. Rule Set Configuration Guide

     a.   Listing Rule Sets in the system

     b.   Adding new Rule Set

     c.   Editing Existing Rule Set

     d.   Deleting Rule set

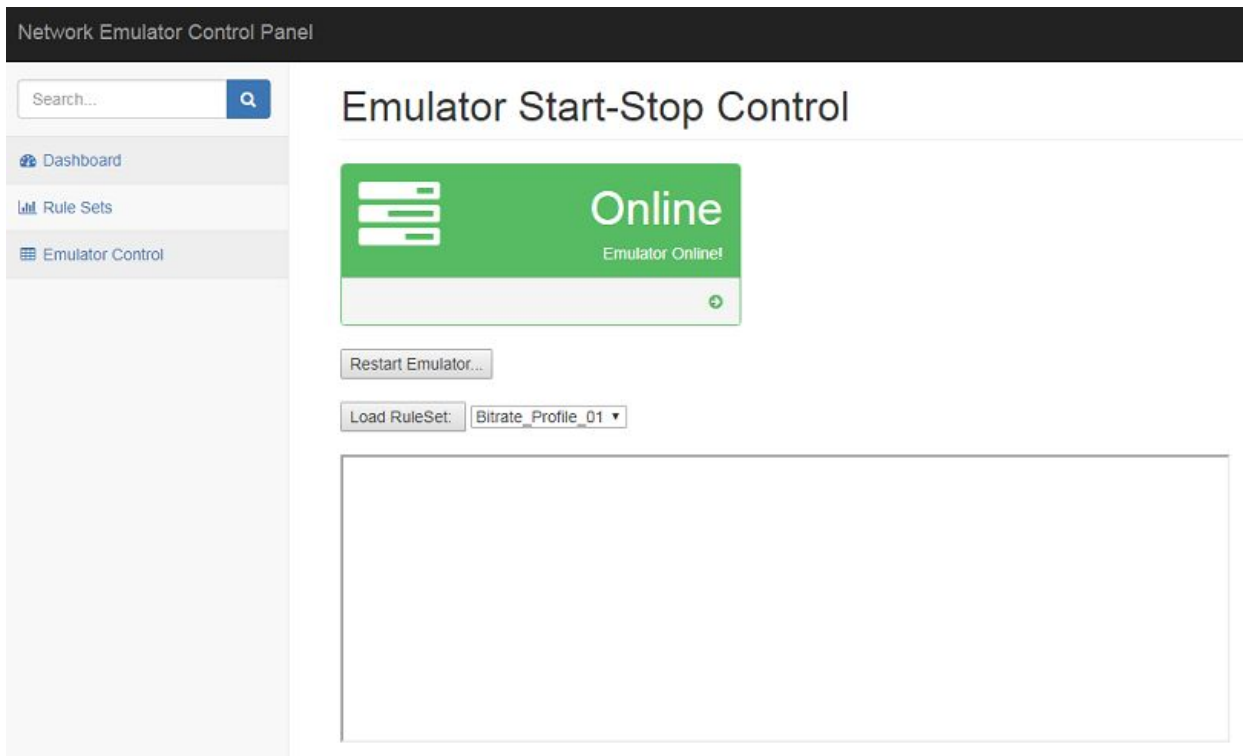# 3. How to upload Bandwidth profiles for use

Emulator Dashboard



The web UI Dashboard panel shows the online status of the emulator and counts the number of registered rulesets in the system.

The Traffic Activity part shows the real time network traffic bitrate across the emulator bridge, that is, across the em1 and em2 data interfaces.

Emulator Main Control Panel



The Emulator status widget allows you to check the current status of the emulator. If shows either Online or Offline.

In any time if you want to re-start the emulator you can click on the "Restart Emulator" button on this page. You will be asked to confirm and the emulator will be restarted according to your choice.

On this page you can also load the pre-defined rulesets into emulator. The dropdown box list all the predefined rulesets. Choose the one you want to load and activate and click on the "Load Ruleset" button to load it. Response message will be shown on the lower result panel.

Rule Set Configuration Guide



On the left menu, click on The "Rule Sets" menu item will bring you to the List of rulesets defined in this system.

On each row, you can choose:

"Show Details…" to show further the pipes defined inside individual ruleset

"Delete" to delete a ruleset

You can also create a new ruleset by typing a new ruleset name and clicking on the "Add New Ruleset…" button

View Ruleset Details



By clicking on the "Show Details…" button on individual ruleset row, you can explore the pipes defined within the ruleset as shown.

Columns shows the pipe ID, probability, matching protocol, source IP and destination IP address ranges.

The last column shows the configuration apply to the matching traffic flows. They include the:

-   Bandwidth limit
-   Delay added
-   Packet loss probability

The bandwidth limit is either specified as a fixed value of kilo bits per second, or as a variable bandwidth profile file. This bandwidth profile is located inside the "/home/bwprofs" folder inside the emulator and can be replaced with your own profile by uploading using sftp or scp tools.

The bandwidth profile file name is pre-defined in a "bwNNNN.txt" format, where NNNN is the serial number of the file. Currently the system supports at most 100 different bandwidth profiles so the name of them range from "bw0001.txt" to "bw0100.txt".

Please note when you upload your own bandwidth profile you MUST follow the same name format to replace the existing ones, otherwise the emulator system will not be able to pick up the right file for your pipe.

On this ruleset detail page you can click the "Edit Ruleset…" button to start making changes to the pipe definitions.

Editing Ruleset Details



Inside the Ruleset editor, all the pipes definition of the ruleset is shown and changeable with different available options.

First of all, you can mark delete a specific pipe by clicking on the "Delete Pipe" button next to the pipe ID.

The other fields can be changed by replacing the current values with your desired ones or by choosing a new value on dropdown lists.

For the bandwidth limit part, you have to choose between Fixed value mode or Profile mode. Click on the radio button to choose between these two modes and input / select the corresponding kbps value / profile filename.

Beside editing existing pipes, you can also add new pipe to the end of the list by clicking on the "Add New Pipe…" button on top of the table. A new pipe definition will be appended to the last position of the ruleset and you can edit it for the desired values.

You can save the changes to the ruleset definition by clicking the "Save Changes on Ruleset…" button on top of the table.

Please note newly added pipe and mark deleted pipes are not yet effected before you confirm to save the changes. So if you abort or switch to other functions any time the add or delete action will NOT be executed.

How to upload Bandwidth profiles for use

The emulator has a bandwidth profile configuration for individual pipes, which allow you to control bandwidth limit of matching traffic flows according to a bandwidth limit time table. This time table is a csv text file with two columns per row, maximum 100k rows.

| Start time | Bitrate (bit/s) |
|------------|-----------------|
| 0.0000     | 1234567.000     |
| 0.1350     | 2468123.122     |
| 1.2460     | 4352617.988     |
| ...        | ...             |

0.0000, 1234567.000
0.1350, 2468123.122
1.2460, 4352617.988
...
...
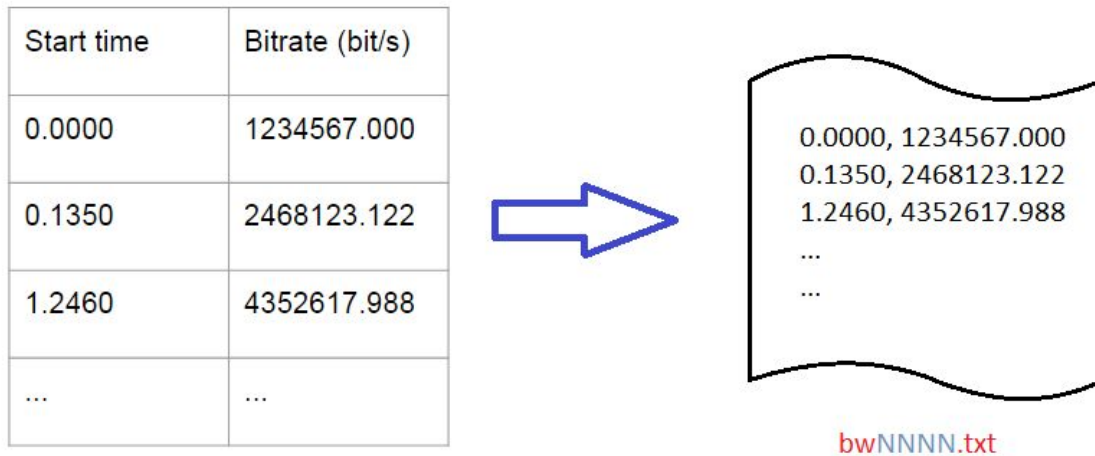
bwNNNN.txt

The emulator system can accommodate 100 bandwidth profiles concurrently. All of such profile files are named in the pattern:

bwNNNN.txt

under the "/home/bwprofs" folder. Where NNNN is the serial number in zero-padded format. For example, "bw0001.txt" is the first allowed profile and "bw0100.txt" is the last one.

In order to upload your own bandwidth profile for use by the emulator, simply use either sftp or scp tools to connect to the emulator via the administration network interface.

```
root@dummynet:~ # sftp mclab@192.168.80.121
The authenticity of host '192.168.80.121 (192.168.80.121)' can't be established.
ECDSA key fingerprint is SHA256:UWBFE844jAzs1LJ8b88muZTThqFV7o1XtvbinIWLCBY.
No matching host key fingerprint found in DNS.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.80.121' (ECDSA) to the list of known hosts.
Password for mclab@dummynet:
Connected to 192.168.80.121.
sftp>
sftp>
sftp> cd /home/bwprofs
sftp> ls
bw0001.txt  bw0002.txt  bw0003.txt  bw0004.txt  bw0005.txt  bw0006.txt  bw0007.txt  bw0008.txt  bw0009.txt  bw0011.txt
bw0012.txt  bw0013.txt  bw0014.txt  bw0015.txt  bw0016.txt  bw0017.txt  bw0018.txt  bw0019.txt  bw0021.txt  bw0022.txt
bw0023.txt  bw0024.txt  bw0025.txt  bw0026.txt  bw0027.txt  bw0028.txt  bw0029.txt  bw0031.txt  bw0032.txt  bw0033.txt
bw0034.txt  bw0035.txt  bw0036.txt  bw0037.txt  bw0038.txt  bw0039.txt  bw0041.txt  bw0042.txt  bw0043.txt  bw0044.txt
bw0045.txt  bw0046.txt  bw0047.txt  bw0048.txt  bw0049.txt  bw0051.txt  bw0052.txt  bw0053.txt  bw0054.txt  bw0055.txt
bw0056.txt  bw0057.txt  bw0058.txt  bw0059.txt  bw0061.txt  bw0062.txt  bw0063.txt  bw0064.txt  bw0065.txt  bw0066.txt
bw0067.txt  bw0068.txt  bw0069.txt  bw0071.txt  bw0072.txt  bw0073.txt  bw0074.txt  bw0075.txt  bw0076.txt  bw0077.txt
bw0078.txt  bw0079.txt  bw0081.txt  bw0082.txt  bw0083.txt  bw0084.txt  bw0085.txt  bw0086.txt  bw0087.txt  bw0088.txt
bw0089.txt  bw0091.txt  bw0092.txt  bw0093.txt  bw0094.txt  bw0095.txt  bw0096.txt  bw0097.txt  bw0098.txt  bw0099.txt
bw0100.txt
sftp>
sftp> put bw0007.txt
```