LTE Web Interface

Version: 2018-07-10

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1 Introduction

LTE Web Interface is a HTML5 graphical user interface.
It allows to analyze Amarisoft LTE software logs and get information from the system.
It can communicates using WebSocket for real time analysis.
It also interact with LTE UE simulator to generate and execute scenario.

Using node webkit, it is possible to use it as a standalone application and associate it with your log files in your file browser.

2 Features

- Display logs from files.
- Display logs in real time through WebSocket.
- Display physical layer statistics in charts.
- Display resource block allocation.
- Support of real time constellation display.
- Display of HFN in logs.
- Support and display of per cell analytics.
- Support of ZIP files for opening and exporting logs.
- Support of wireshark for extended message decoding (SMS, IP).
- Configure UE simulation scenario and execute them.

3 Requirements

3.1 Software requirements

3.1.1 Web server mode

Mandatory:

- Web Server to host pages.
- Chrome or Firefox web browser

Optional:

- PHP support on web browser.

3.1.2 Standalone mode

Node Webkit must be installed on your system.

4 Installation

4.1 Web server mode

4.1.1 Server side

Simply copy all file to a HTTP server directory.

For apache:

```
cp -r <directory> /var/www/html/lte
```

NB: check and update if necessary file permissions.

4.1.2 Client

Use your HTTP server URL.

For apache, `http://<server name>/lte/`

4.2 Standalone mode

You may use the GUI as a standalone application.
For this, you need Node WebKit to be installed on your machine.

4.2.1 Linux

To install it on Fedora:

```
sudo dnf install nodejs npm
sudo npm install -g nw --unsafe-perm=true
```

Then, copy directory wherever you want, and you can use it this way:

```
<directory>./logview.sh <file1.log> <file2.log> ...
```

4.2.2 Windows

On windows, follow `https://nwjs.io/` to download archive.
Extract it to `<nw-dir>`.

You may place it to `c:\Program Files\nwjs`

If you want to place it elsewhere, you will have to edit logview.bat to change path

To open application, you just need to double click on `logview.bat` file.
You may open it with log file as command line argument.

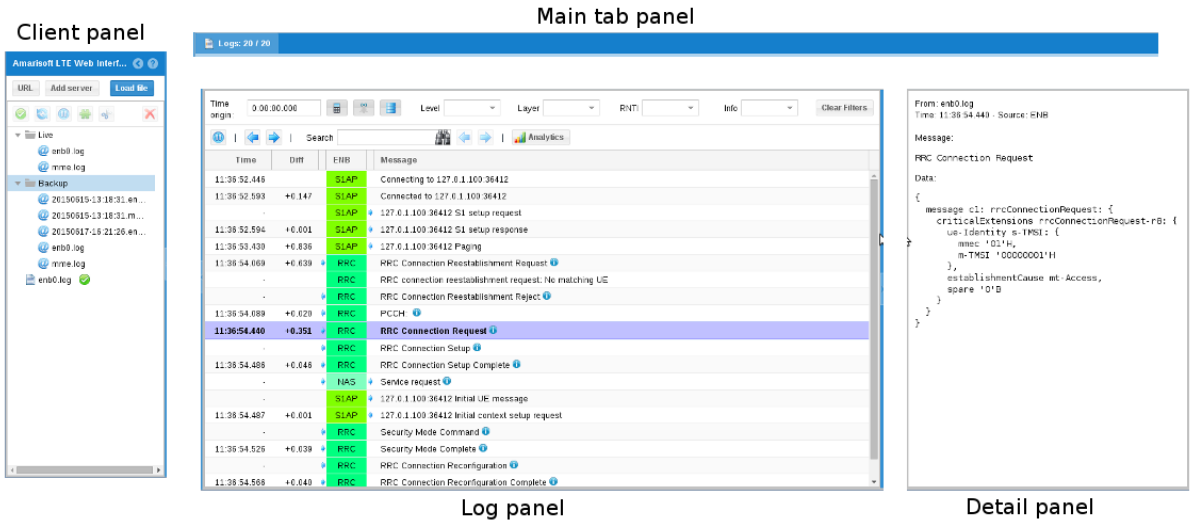
4.2.3 Wireshark

If wireshark is installed on your system, you will benefit advanced logs for different layers.

On windows system, you may update `tshark` path by editing `TSHARK_WIN32` or `TSHARK_LINUX` variables in `client.js` according to your system.

4.3 GUI definition

The GUI is divided into several panels.



- Client panel. This is where you add, remove and configure your sources (See [Manage your clients], page 5).

- Main tab panel. In this tab panel you can select:
  - log panel
  - stats panel
  - for each WebSocket client, its own panel
  - UE Simulation panel
- Log panel. This is where all logs from all clients will be displayed.
- Detail panel. Display selected log detailed information.

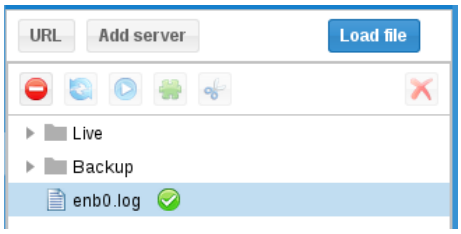
5 Manage your clients

To display log and/or interact with Amarisoft software, you need to add a client.
The list of your client is displayed on left panel of the interface.

5.1 Log files

You can display logs generated by an Amarisoft LTE software by clicking on `Load file` button in client panel and selecting the log file.

A entry will be added on client panel and logs will be parsed and displayed on log panel.

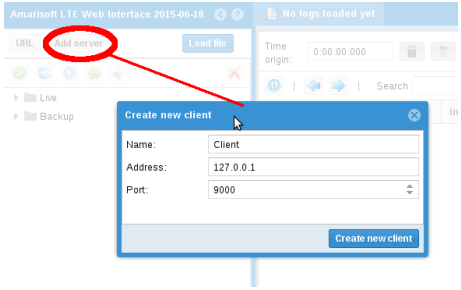


The green tick  means the client is enabled and logs are displayed.
When selecting a client, a list of actions will be available on the top toolbar (See [Client action], page 7).

5.2 WebSocket

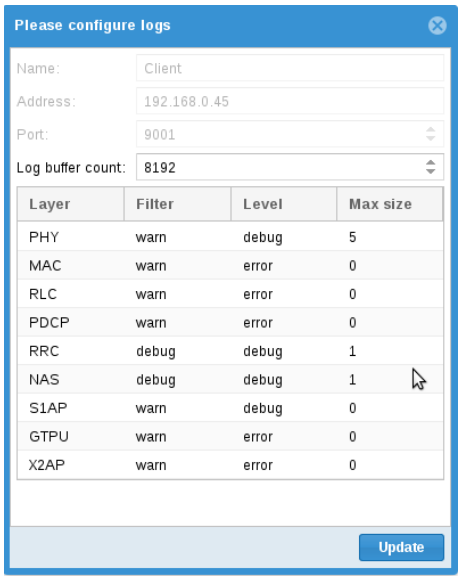
To create a WebSocket client, you first need to enable remote API on Amarisoft software component (MME, eNB, UE Simulator).
This is done via `com_addr` parameter. Please refer to the component documentation for more detail.

Then click on `Add server` button:



Enter name that will appear on client panel and the address you entered as `com_addr`.

After clicking on update button, the client will try to connect.
If connection is successful, the configuration window will appear so that you configure logs:



For each layer you can define:

- Filter. This is the level of log that will be downloaded to the GUI.
- Level. This is the level of log on the component, as defined in `log_options` of its configuration file) and will override its configuration.
  As a result, each time the client connects to the component, it will apply the configuration, overriding its current config.
- Max size. Log data size as defined in `log_options` of its configuration file.

Of course, you can keep default configuration and simply click on Update.

The  icon means the client is not connected whereas  means the client is connected.
When connected, a new tab will appear in main tab panel and provide you advanced features.

5.3 URL

You can retrieve a log from any URL with this client.
Click on `URL` button and enter parameters.

The  icon means the log file was not loaded whereas  means it has been successfully parsed.

5.4 Client action

Here are the action you can perform on a client

-  to open configuration window.
-  to enable or disable a client. (You can also double click on the client line to toggle state).
-  to force WebSocket client reconnection.

-  to start or stop real time log update on WebSocket client.
-  to display resource block allocation (Physical layer logs are required).
-  to clear logs on WebSocket client.
-  to remove client.

5.5 Server store

You can store your log files on the Web Server to access it through the interface.
You need to put your log files in `store` directory on the server.
NB: Subdirectories are allowed.

Then expand the store node in client panel, and you'll have access to all the files. Select them and click on enable button (or double click) to display logs.

Note that your HTTP server requires php support.

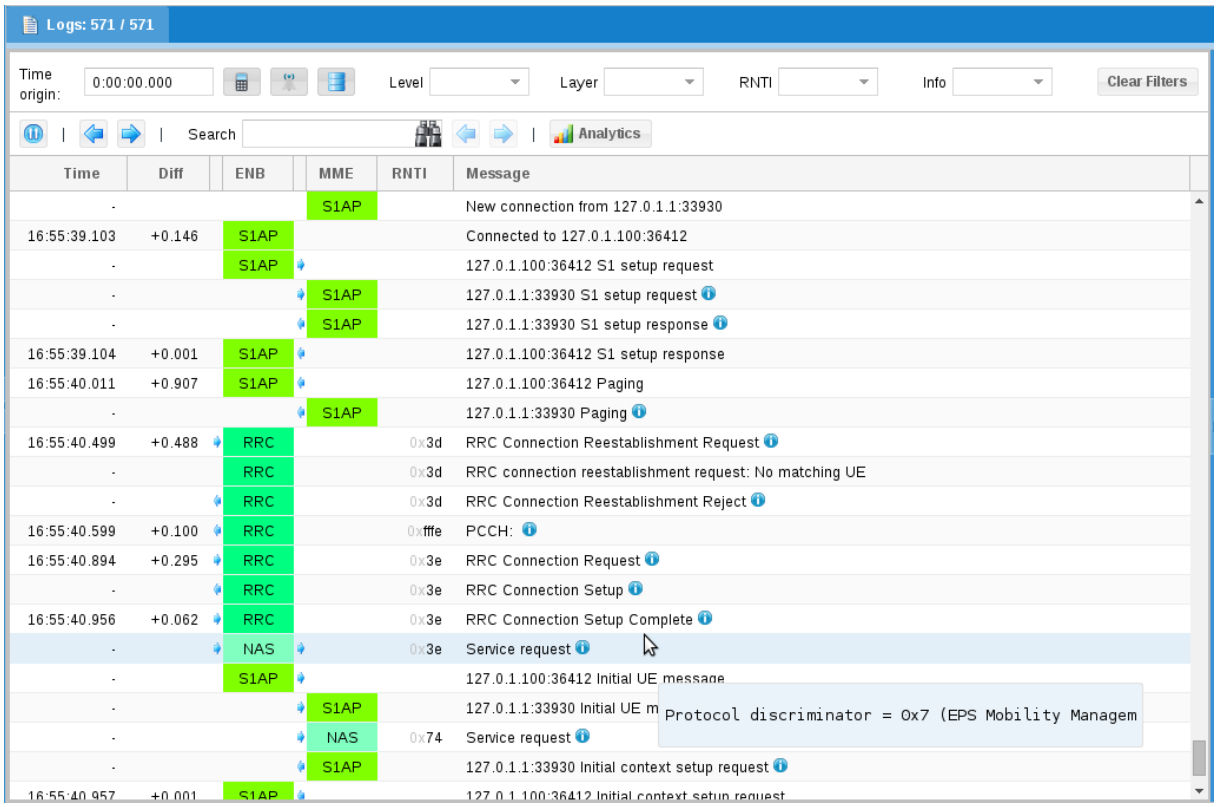
5.6 Configure your clients

You can change the configuration of URL and WebSocket clients.
Select client line click on configuration button.
Update config as wanted and click on Update button.

6 Log display

6.1 Introduction

When a client is enabled, logs appear on log panel.
You can enable multiple client together to mix logs. This may be useful to mix MME, eNB and/or UE logs.



Each line represent a log.

Columns are:

- Time. Log time (- means same as previous log).
- Diff. Time difference with previous log
- ENB, MME, UE. One of this column is filled with the layer name and provides origin of the log.

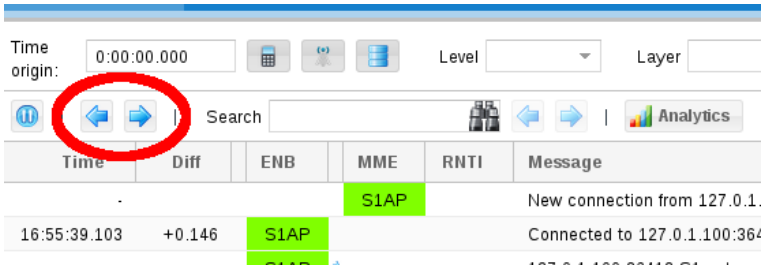
  The  and  icons represent, if present the log direction (Uplink or Downlink).
- ID. RNTI for PHY, MAC, RRC and RLC layers.

- Info. More information depending on layer.
- Message. Log text message.

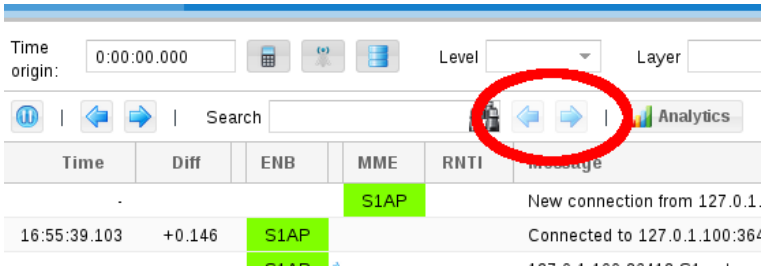
  If the log has detailed informations, i.e. `max_size` has been set for its layer, a  icon will be displayed.
  When clicking on the line, details will appear on right panel.

6.2 Navigating

When a log line is selected, use  and  buttons to highlight previous or next log of same layer:



Fill search field to search in messages, ID, info and details. Use  and  buttons to highlight previous or next match:

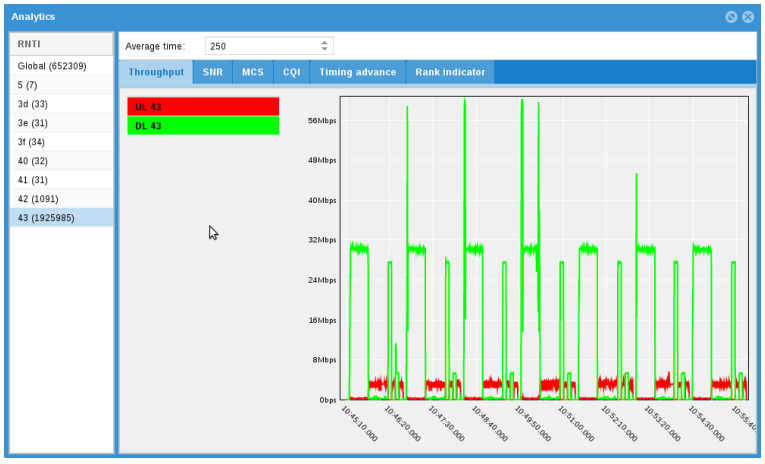


6.3 Filtering

TBD

6.4 Display physical layer statistics

If your logs have physical layer included, you can display statistics.
Click on Analytics button to open window.

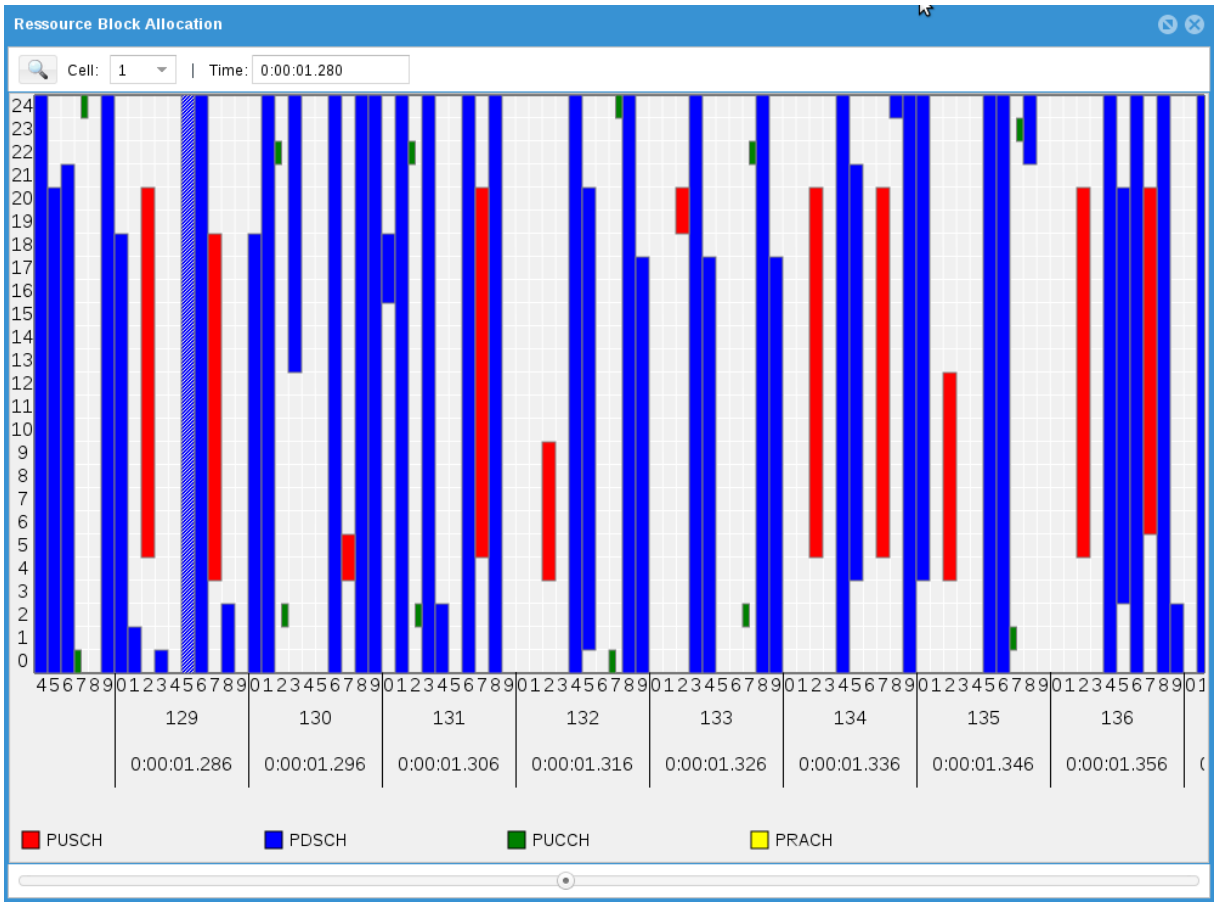


On left, you will have the list of radio connections.
You can select one or several by maintaining shift key.

It will display statistics in charts.
Average time parameter allow smoothing curves.

6.5 Display resource block allocation

If your logs have physical layer included, you can display ressource block allocation by clicking  button:

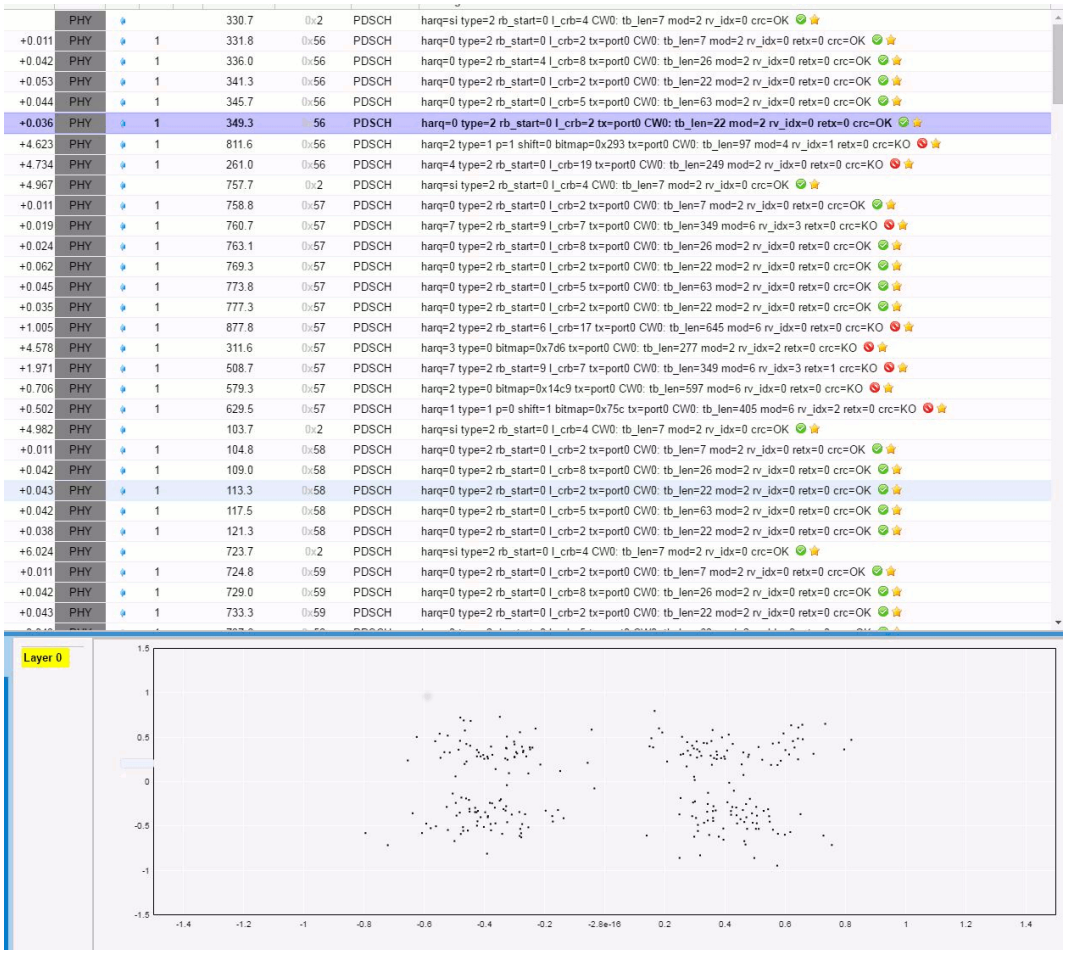


Use mouse wheel to scale.
Drag and drop to move inside allocations.
Hashed block are not acknowledged packet.
You can select allocated blocks, this will also select associated log in log panel.

6.6 Display constellation and channel response time

If your logs have physical layer included with signal level activated (phy.signal=1), you can display the QAM constellation and the channel response time.

You should take a look at PHY layer logs. When a yellow star is diplayed, click on it and a bottom panel should appear.



6.7 Miscellaneous

6.7.1 Time origin

This field allow logs time to be relative to it.
You can set it manually or by right clicking on a log line and selecting `Set time origin`

6.7.2 Pause log update

You can click on  to pause log update.
This may be useful when a WebSocket client is constantly adding logs.

7 License