



LTE Web Interface

Version: 2024-12-13

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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 communicate using WebSocket for real time analysis.

It also interacts with LTE UE simulator to generate and execute scenarios.

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:

- An up and running web Server to host pages (Ex: Apache).
- Chrome or Firefox web browser (Other browser have not been tested)

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
```

4.1.2 Client

Use your HTTP server URL.

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

4.1.3 Troubleshoot

If you are not familiar with Linux and web servers, you may need to look on the web for information on how to setup a web server correctly (Depending on your Linux flavour, there are too many possible environment, which is out of the scope of this document).

However, if you use Apache with Fedora, here are the common things you can try:

- Check your web server is started:

```
sudo service httpd status
```

 If it is inactive, you may start it:

```
sudo service httpd start
```
- Check and update filesystem permissions to grant Apache access to the pages.
- SELinux may prevent apache to host pages properly. You may disable it this way:

```
sudo setenforce 0
```

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.

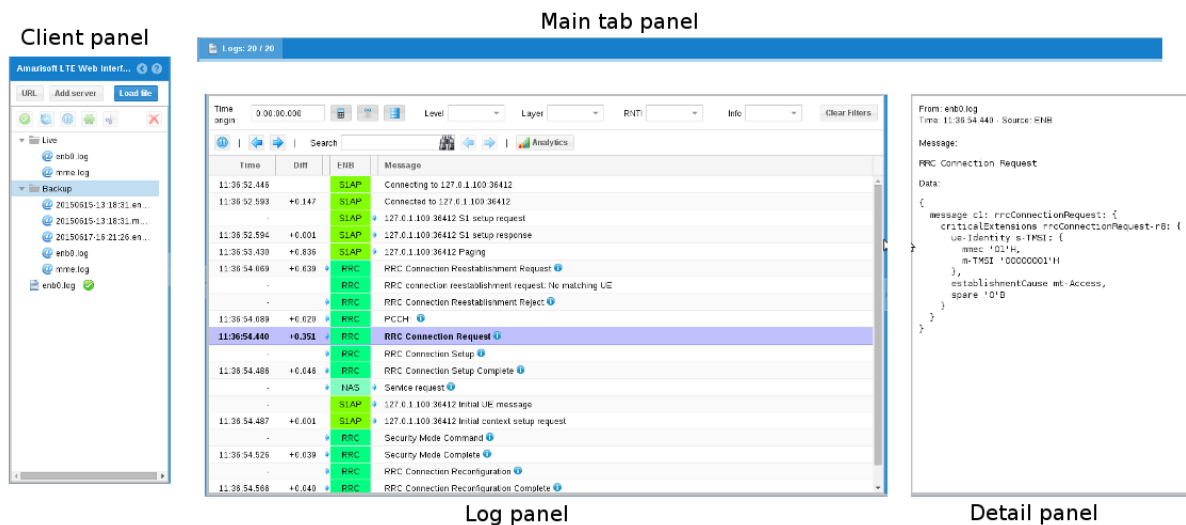
4.2.3 Wireshark

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.

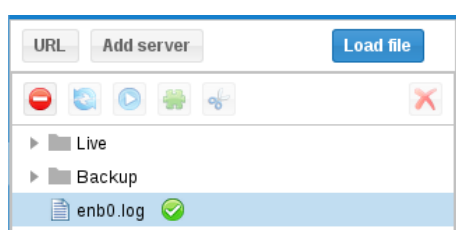
5 Manage your clients

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.



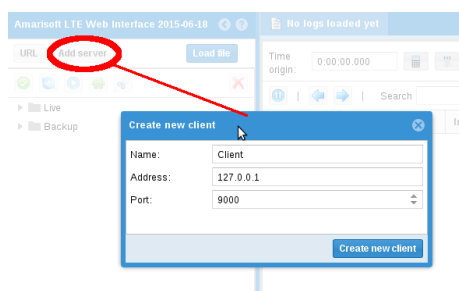
The green tick means the client is enabled and logs are displayed. When selecting a client, a list of actions will be available on the top toolbar (See [Client action], page 7).

5.2 WebSocket

To create a WebSocket client, you first need to enable remote API on Amarisoft software component (MME, eNB, IMS, 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:

Layer	Filter	Level	Max size
PHY	warn	debug	5
MAC	warn	error	0
RLC	warn	error	0
PDCP	warn	error	0
RRC	debug	debug	1
NAS	debug	debug	1
S1AP	warn	debug	0
GTPU	warn	error	0
X2AP	warn	error	0




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.

Each time the client connects to the component, it applies the configuration defined here, overriding its current log level configuration. The log files locally generated by each component are also affected. The components configuration file remain unchanged.

- 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 connecting and  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, IMS and/or UE logs.

Time	Diff	ENB	MME	RNTI	Message
-	-		SIAP		New connection from 127.0.1.1:33930
16:55:39.103	+0.146	SIAP			Connected to 127.0.1.100:36412
-	-	SIAP			127.0.1.100:36412 S1 setup request
-	-		SIAP		127.0.1.1:33930 S1 setup request
-	-		SIAP		127.0.1.1:33930 S1 setup response
16:55:39.104	+0.001	SIAP			127.0.1.100:36412 S1 setup response
16:55:40.011	+0.907	SIAP			127.0.1.100:36412 Paging
-	-		SIAP		127.0.1.1:33930 Paging
16:55:40.499	+0.488	RRC		0x3d	RRC Connection Reestablishment Request
-	-	RRC		0x3d	RRC connection reestablishment request: No matching UE
-	-	RRC		0x3d	RRC Connection Reestablishment Reject
16:55:40.599	+0.100	RRC		0xffe	PCCH:
16:55:40.894	+0.295	RRC		0x3e	RRC Connection Request
-	-	RRC		0x3e	RRC Connection Setup
16:55:40.956	+0.062	RRC		0x3e	RRC Connection Setup Complete
-	-	NAS		0x3e	Service request
-	-	SIAP			127.0.1.100:36412 Initial UE message
-	-		SIAP		127.0.1.1:33930 Initial UE message
-	-		NAS	0x74	Service request
-	-		SIAP		127.0.1.1:33930 Initial context setup request
16:55:40.957	+0.001	SIAP			127.0.1.100:36412 Initial context setup request


Each line represent a log.

Columns are:

- Time. Log time (- means same as previous log).
- Diff. Time difference with previous log
- RAN, CN, IMS, 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).

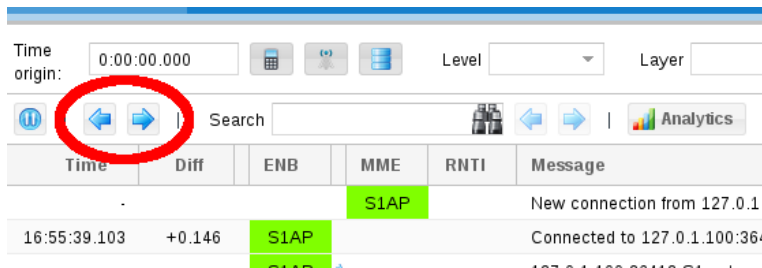
- ID. RNTI for PHY, MAC, RRC and RLC layers.
- Info. More information depending on layer.
- IMSI. Optional column displayed when IMSI based filtering is possible.
- IMEI. Optional column displayed when IMEI based filtering is possible.
- Message. Log text message.



If the log has detailed informations, i.e. `max_size` has been set for its layer, a  icon will be displayed.

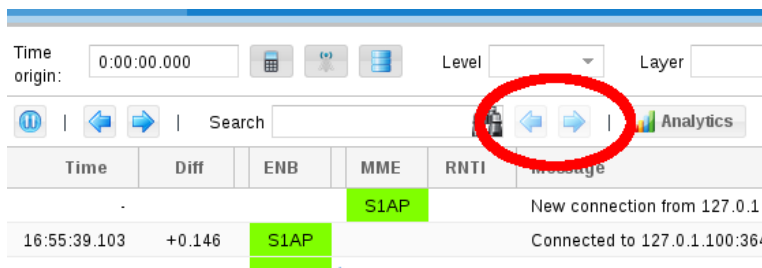
When clicking on the line, details will appear on right panel.

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:

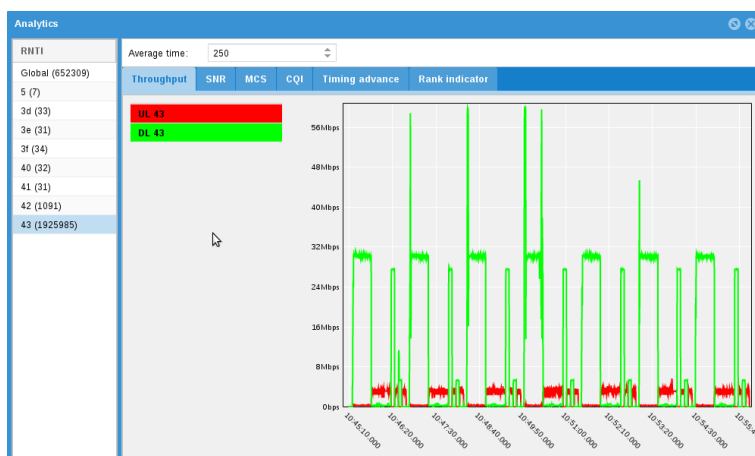


6.3 Filtering

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.

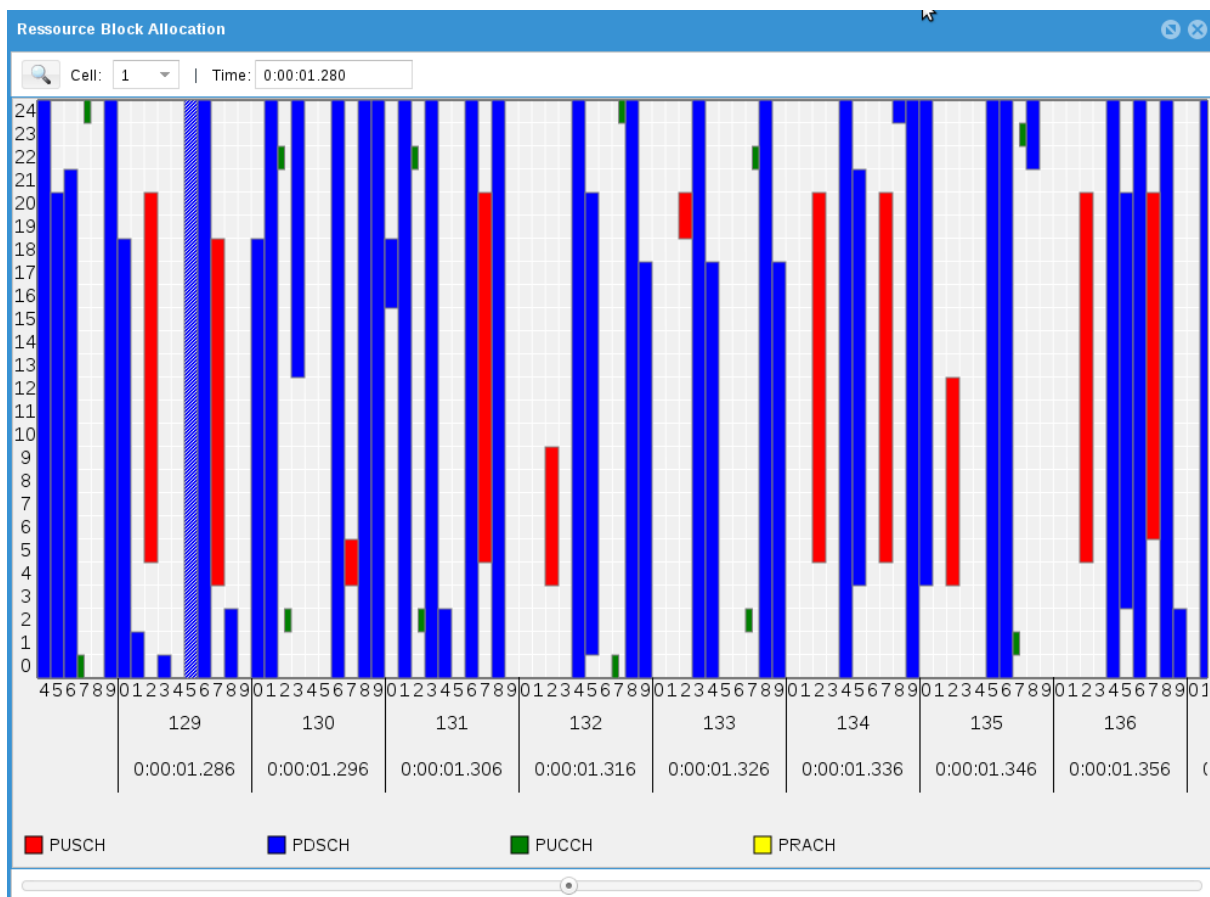
It will display statistics in charts. Average time parameter allow smoothing curves.

6.5 Display resource block allocation

If your logs have physical layer included, you can display resource block allocation by clicking



button:



Use mouse wheel to scale.

Drag and drop to move inside allocations.

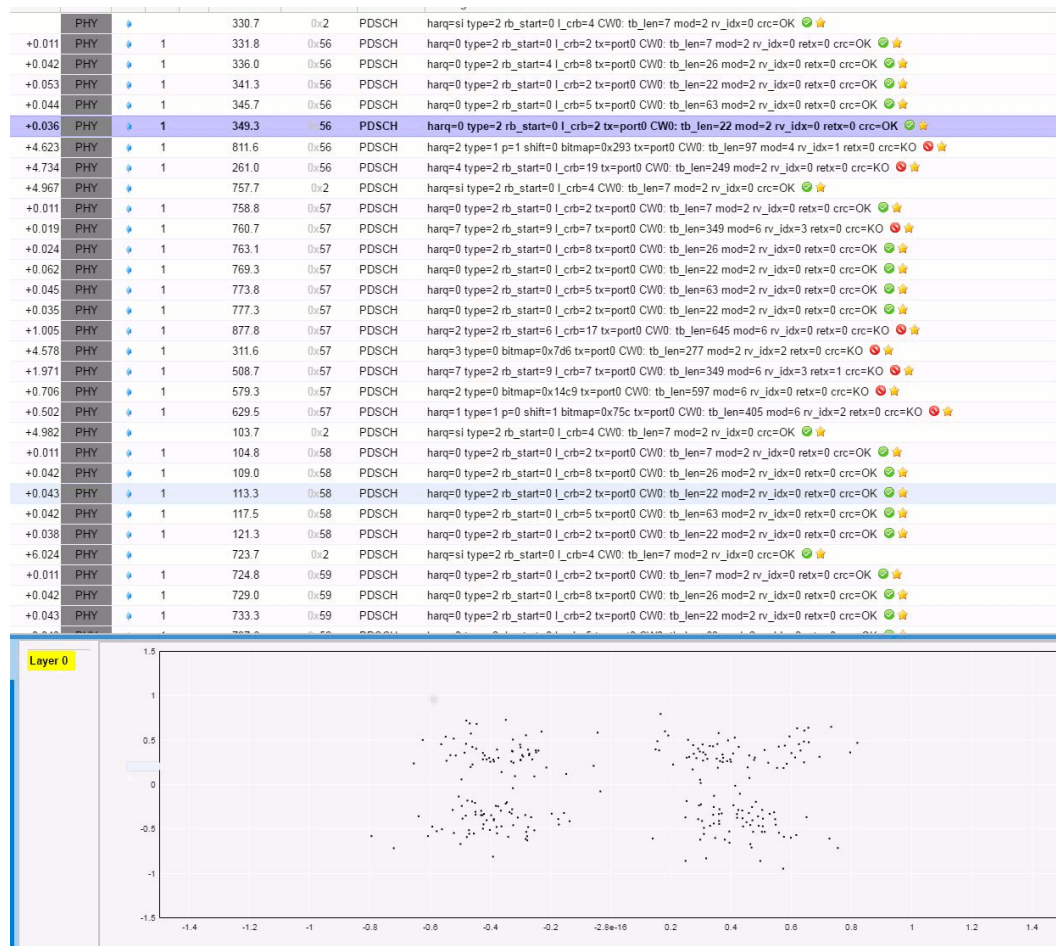
Hashed block are not acknowledged packet.

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 displayed, 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 Change history

7.1 Version 2024-12-13

- Added dataset export for graphs
- Added graph axis manual configuration
- Added UE selection filter to eNB server tab
- Added IPv6 support for UE scenario IP simulations
- Added reconnect all server button
- Added attach PDN type to UE scenario

7.2 Version 2024-09-13

- Added power on and power off button for UE tab
- Added option to remove all UEs before launching UE scenario
- Added cell merging for RB diagram

7.3 Version 2024-06-14

- Added reference signal power handling in enb RF config window
- Added ue-scenario-player.js to play GUI UE scenario from command line

7.4 Version 2024-03-15

- Added UE multi scenario management
- Added NAS type for UE scenario

7.5 Version 2023-12-15

- Added SSB in resource block diagram
- Added support of 3 digits MNC in UE scenario

7.6 Version 2023-09-08

- Added multi rat configuration in UE scenario
- Added an ASN.1 editor to be used for the lteenb program configuration

7.7 Version 2023-06-10

- Added more channel simulations to UE scenario
- Added support of mathematical formula for external application args parameter in UE scenario
- Set keep config as default for new WebSocket servers
- Added log config flags configuration in WebSocket server configuration window
- Added S72 layer support

7.8 Version 2023-03-17

- Added UE tracking upon MME/eNB logs, allowing IMSI/IMEI filter in eNB
- Added graph navigation:
 - Press `ctrl` then maintain `left click` to select x range
 - Press `ctrl + shift` then maintain `left click` to select x and y ranges
 - Press `ctrl + left click` to reset x and y ranges
 - Maintain `left click` to move selected ranges
 - Use `mouse wheel` to zoom in/zoom out

7.9 Version 2022-06-17

- Added real time bler graph for eNB
- Added instant values in analytics graph
- Added filename selection for log export
- Added log markers in exported logs
- Added PDCCH detection for PUSCH logs
- Caps below 1 are now allowed in UE scenarii

7.10 Version 2022-03-18

- WebSocket servers can be configured to keep configuration instead of overriding it at connection establishment
- In UE scenario, number of connections per second can be set below 1

7.11 Version 2021-12-17

- UE scenario can now be exported/imported to store and share them accross different machines

8 License

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