



A Framework for Benchmarking Link Quality Estimators

Using DataAnIApp application (on windows)

Note:

If DataAnIApp runs on another computer different than the computer on which run the ExpCtrApp, then do this extra-step:

1. Import **backup**¹ database
 - a. Put **backup.sql** into: MySQL Server 5.0\bin\ folder
 - b. Open the MySQL shell window and run:

```
$create database any_informative_name
```
 - c. Run

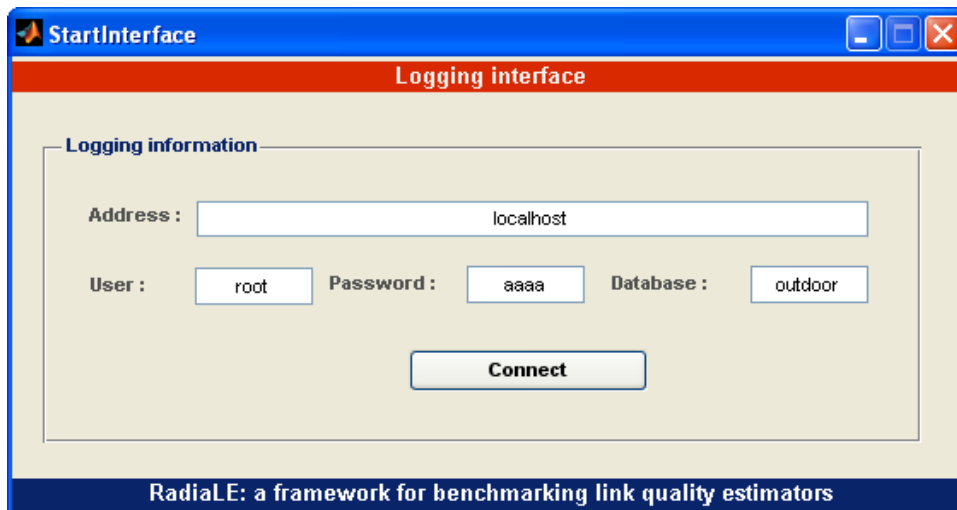
```
$use any_informative_name
```
 - d. Run

```
$source backup.sql
```
-

DataAnIApp application provides **four different interfaces** that will be explored in the rest of this tutorial.

1. Logging using the **Logging interface**: Using this interface, the user can connect to an existent MySQL database:

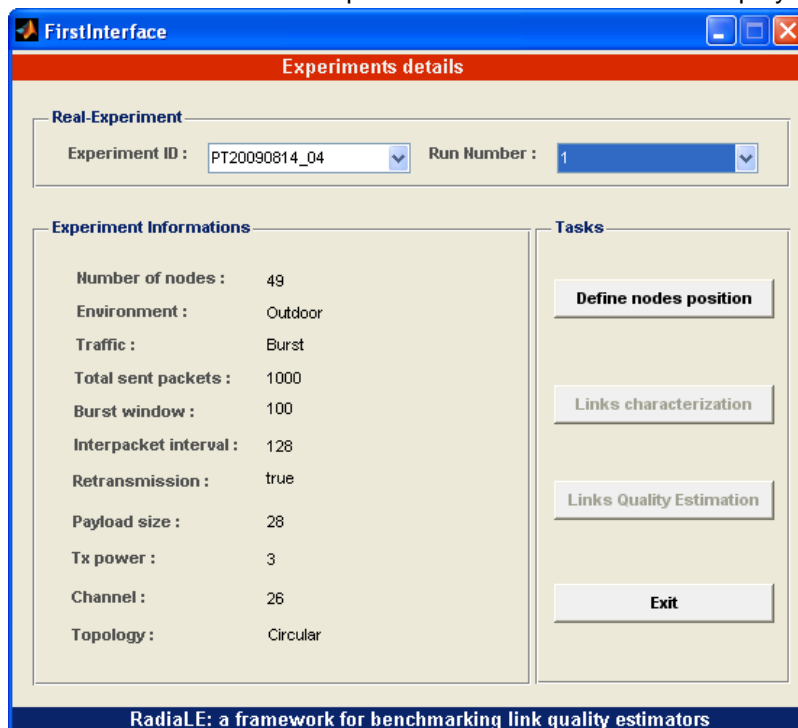
¹ Backup database is filled by ExpCtrApp. If you did not perform experiments yet, Backup database would be empty.



2. In the **Experiment details interface**, select the experiment ID and the run number

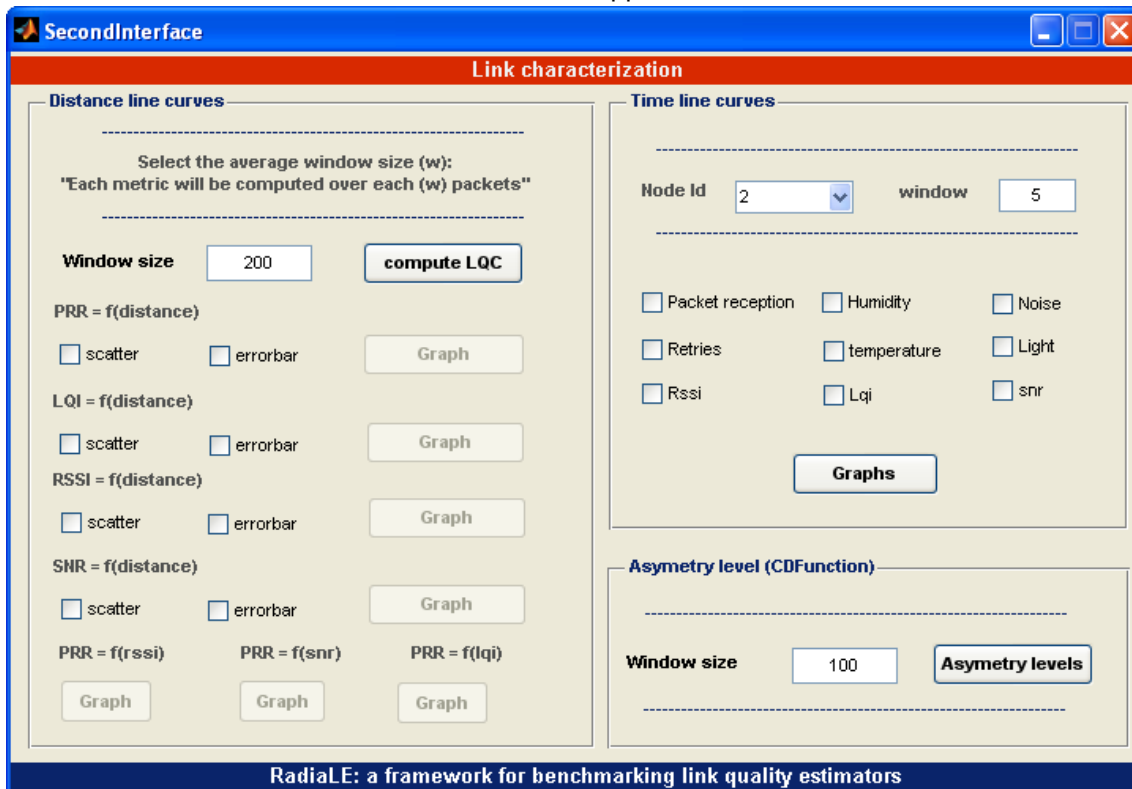


3. Information related to the select experiment and the run are then displayed.



4. The user is asked to define nodes positions vector. These positions are defined relatively to the central mote N1
5. Chose either **experiment link characteristics** to analyze the channel behavior, or **link quality estimation** to evaluate the performance of Link Quality Estimators.

6. You can start by selecting **experiment link characteristics**.
The **Link Characterization interface** will appear:

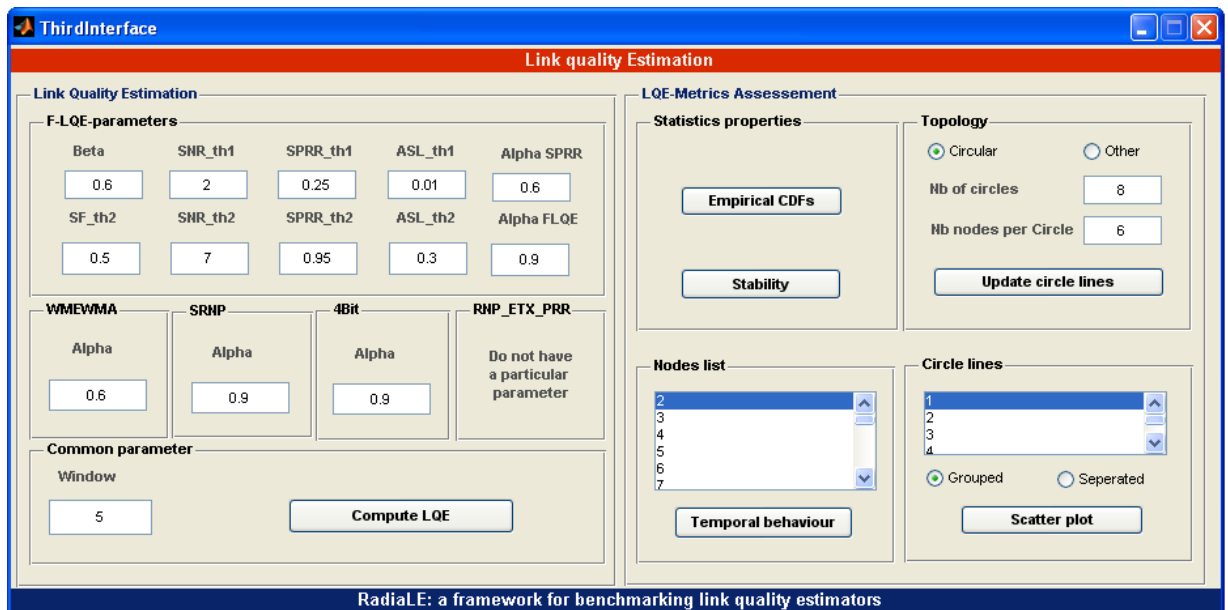


With this interface, the user can study spatial and temporal characteristics of the underlying links.

A set of interesting graphs can be generated:

- PRR-RSSI-LQI-SNR=f(distance) (scatter or error-bar style)
- PRR=f(RSSI-LQI-SNR) (scatter style)
- PRR-RSSI-LQI-SNR=f(t) (per node)
- Humidity-Temperature-Noise-Light=f(t) (per node)
- Percentage of links asymmetry degree (CDF plot)

7. Turn back to the experiment details interface and select **link quality estimation**
The **interface Link Quality Estimation** appears:



This interface implements 5 well known estimators and a recently proposed one.

These estimators are:

- PRR: Packet Reception Ratio
- WMEWMA: Window Mean Exponential Weighted Moving Average
- RNP: Retransmission Packet Number
- ETX: Expected retransmission count
- 4Bit: CTP Tree routing protocol estimator: tinyos2.x/tos/lib/net/4bitle

Using this interface, the user can tune each link quality estimator. A common parameter for all link quality estimators is the sliding window size. NB. More the window size will be small more the computation time will be huge.

Generated Graphs are

- Coefficient of variation of each estimator.
- The empirical cumulative distribution function of each estimator
- The temporal behavior of each estimator
- The distribution of each estimator formulated into a scatter plot