

SIFRAN User Guide

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1 Introduction

Simulation in Internet of Things is becoming very popular, and the network simulator 3 (NS-3)¹ appears to be one the most adopted simulators in the community. However, it can be hard for non-programmers to benefit from its features. This platform solves the problem by making users able to setup and run NS-3 simulations with an intuitive web interface.

1.1 Target users

- Researchers working on networks simulations.
- Product managers and more generally IoT industrials in the domain of IoT.
- Students for educational purposes.

1.2 Key features

- Setup and run customized IoT scenarios with Wi-Fi or LoRaWAN networks.
- Calculate KPIs like throughput, packet latency, packet delivery, energy consumption and battery lifetime.
- Store simulations and KPIs for accessing it at any time.

2 Getting started

1. When entering the platform, the first page that you land on is depicted in Figure 1.

¹<https://www.nsnam.org/>

PERFORMANCE EVALUATION OF AN IoT SCENARIO

HOME DOCUMENTATION CONTACT REGISTER

Cloud

Gateways

End-devices

SCENARIO

To get started, you can select one of these presets then press the submit button.

☐ Preset1: Telemetry Wi-Fi 5

☐ Preset2: Video-surveillance Wi-Fi 5

☐ Preset3: Webcast Wi-Fi 5

☐ Preset4: Smart metering LoRaWAN

Type of network

Choose network type

Traffic direction

Choose traffic direction

Traffic profile

Choose traffic profile

Number of end-devices

Distance end-devices-gateway, meter

Simulation time, seconds

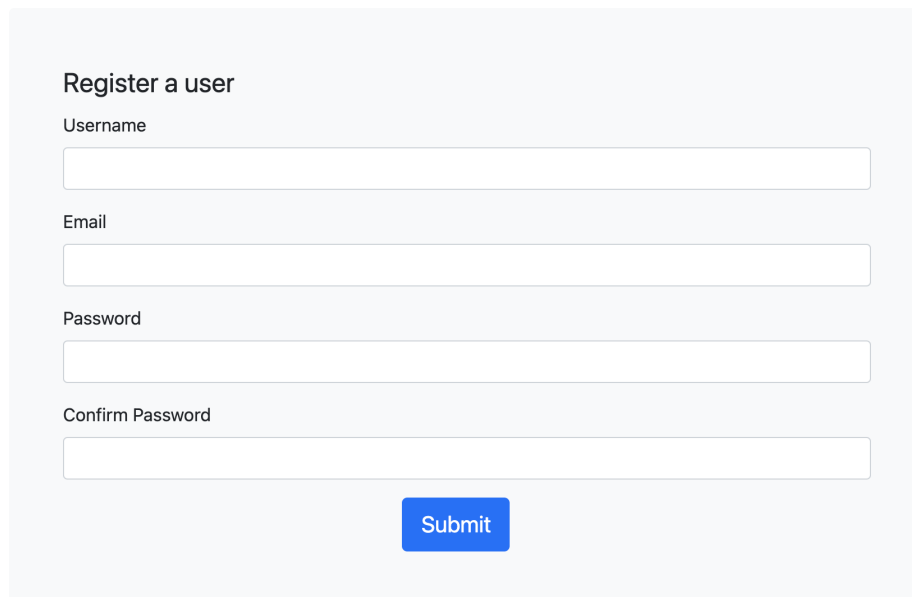
Hidden devices? ☐ Yes ☒ No

☐ Change advanced parameters

Submit

Figure 1: Homepage.

2. From this page, first thing to do is to create an account through the Register button on the top menu. You will be asked to provide a username, a mail address, and a password (Figure 2).

A registration form titled "Register a user" with four input fields for Username, Email, Password, and Confirm Password, followed by a blue Submit button.

Register a user

Username

Email

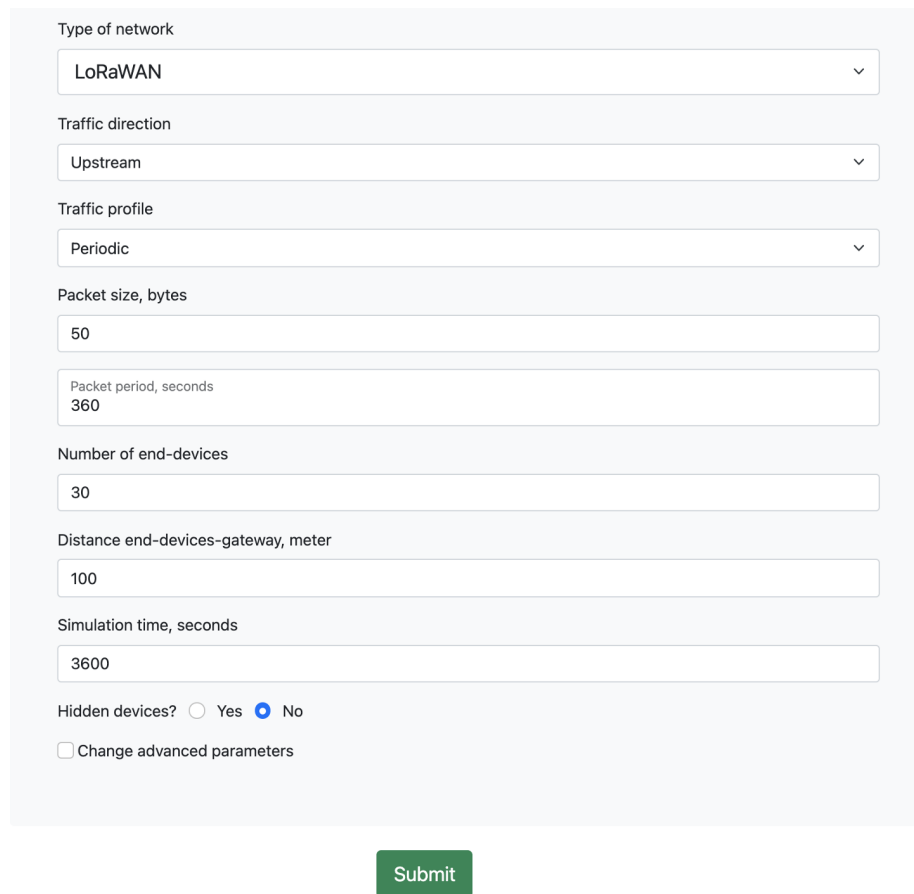
Password

Confirm Password

Submit

Figure 2: Register page.

3. After creating an account, you can define an IoT scenario either by selecting one of the predefined presets, or by filling customized parameters, like shown in Figure 3.



The form is titled 'Type of network' and contains several input fields and checkboxes. The fields are: 'Type of network' (dropdown menu with 'LoRaWAN' selected), 'Traffic direction' (dropdown menu with 'Upstream' selected), 'Traffic profile' (dropdown menu with 'Periodic' selected), 'Packet size, bytes' (text input with '50'), 'Packet period, seconds' (text input with '360'), 'Number of end-devices' (text input with '30'), 'Distance end-devices-gateway, meter' (text input with '100'), and 'Simulation time, seconds' (text input with '3600'). At the bottom, there are two checkboxes: 'Hidden devices?' with radio buttons for 'Yes' and 'No' (where 'No' is selected), and 'Change advanced parameters'.

Type of network
LoRaWAN

Traffic direction
Upstream

Traffic profile
Periodic

Packet size, bytes
50

Packet period, seconds
360

Number of end-devices
30

Distance end-devices-gateway, meter
100

Simulation time, seconds
3600

Hidden devices? ☐ Yes ☒ No

☐ Change advanced parameters

Submit

Figure 3: Scenario form.

A list of advanced parameters specific to each IoT technology can be set, for example Figure 4 shows the advanced parameters for LoRaWAN.

☒ Change advanced parameters

Propagation Delay Model

ConstantSpeedPropagationDelayModel

Propagation Loss Model

LogDistancePropagationLossModel

MCS

Ideal Wi-Fi manager

Bandwidth, MHz

80

Spatial streams

1

Tx current draw, mA

107

Rx current draw, mA

40

Idle current draw, mA

1

CCA_Busy current draw, mA

1

Voltage, volts

12

Battery capacity, mAh

5200

Figure 4: Advanced parameters form.

4. After clicking on the Submit button, if you values are validated in terms of type and range, you will be redirected to the result page, containing a summary of you scenario and the obtained results (Figure 5).

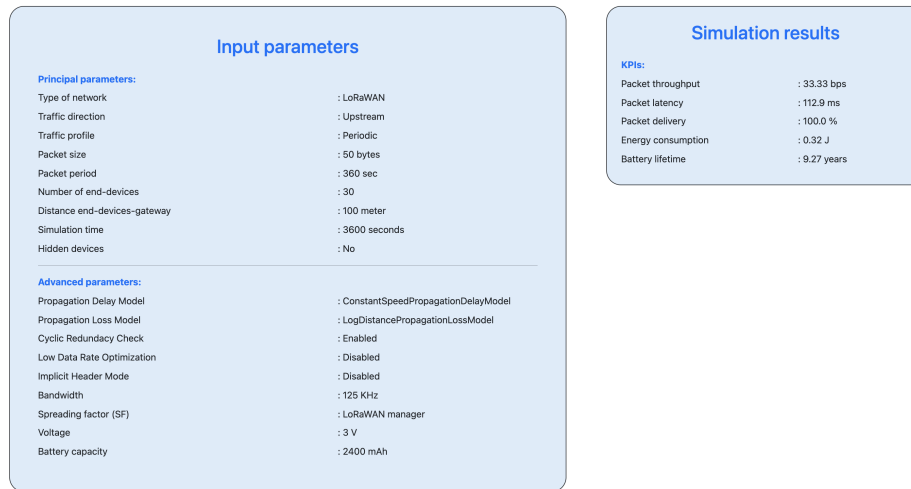


Figure 5: Results page.

5. At any moment, you can get access to your previous simulations using the User button, which will redirect you to a page holding the list of your previous tests, like shown in Figure 6. Each one of the record will redirect you to exactly the same page you obtained after running the corresponding scenario.

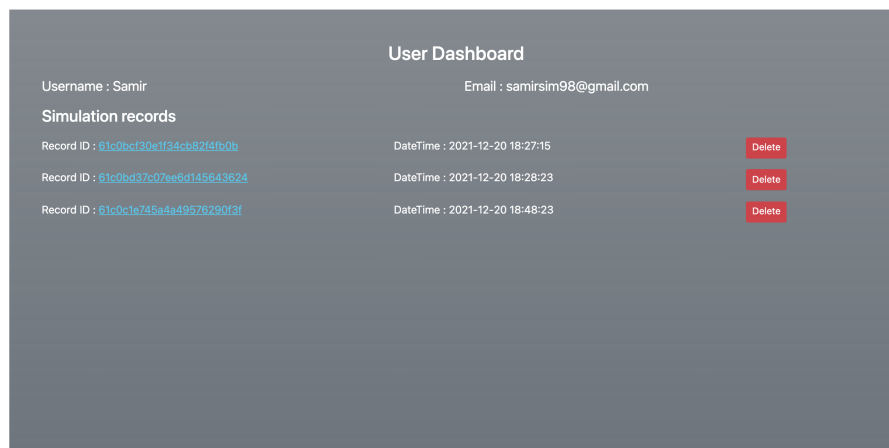


Figure 6: Simulation records page.

6. Beside this, you have access to a contact page through the Contact button in order to send feedback or just contact the authors of the platform.