A Remote Interface for Live Interaction with OMNeT++ Simulations

Maximilian Köstler and Florian Kauer

OMNeT++ Community Summit 2017
September 8th, 2017
Motivation - IEEE 802.15.4 DSME

DSME promises wireless multi-hop communication without collisions.
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DSME promises wireless multi-hop communication without collisions.

M. Köstler, F. Kauer, T. Lübkert, V. Turau, *Towards an Open Source Implementation of the IEEE 802.15.4 DSME Link Layer.*
Proceedings of the 15. GI/ITG KuVS Fachgespräch Sensornetze, 2016

Demonstration at the International Conference on Networked Systems, 2017
An Interactive Demonstration
Situation and Requirements

An Interactive Demonstration
An Interactive Demonstration

The OMNeT++ GUI is made for *developing* and not for *presenting*.
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- Very detailed information
- Deep menu trees
- Attached to a single simulation
Situation and Requirements

An Interactive Demonstration

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⇒ Not designed for demonstrations
⇒ Can not aggregate live data from multiple sources
Requirements

Remote Interaction / Visualisation for Demonstrations

- View Events / Results
- View / Manipulate Topology
- Change Parameters
- Select Presented Data
- Prepare Topologies
- Choose Parameters

visitor

owner
Requirements

- Merge data from multiple simulations
- Move interface to different (possibly mobile) device
Software Architecture

OMNeT++ Simulation

- Mobility Module
- Traffic Module

Live Interaction with OMNeT++ Simulations

Node Positioning

- DSNE Traffic Statistics
- DSNE Node Statistics

Send Interval: 0.3 s
Software Architecture

OMNeT++ Simulation
- Mobility Module
- Traffic Module
- Live Recorder

WAMP Server

Live Recorder

OMNeT++ Simulation
WAMP Server
Live Recorder

M. Köstler, F. Kauer
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WAMP Server

RPC

RPC

Pub/Sub
Simple and Modular User Interface
Contribution

- Framework for exchanging data between OMNeT++ simulations and front ends
- Uses existing protocols (WAMP)
- Enables modular GUI based on web technology
- Repositories at https://github.com/openDSME/
  - opplive
  - inet-dsme
Discussion

- Could be done the same way for any other simulator
- Goal: Move functionality into OMNeT++
- Introduce generic result recording and parameter manipulation
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![Diagram of OMNeT++ front end]
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<div id="power_chart_container" class="draggable ui-widget-content">
  <div class="handle">
    <h2>Total Power Consumption [mW]</h2>
  </div>
</div>

<script>
var dsme_wsuri = "ws://localhost:9002";
var csma_wsuri = "ws://localhost:9003";

var power_statistics = new PowerStatisticsModule(
  "power_chart_container",
  [dsme_wsuri, csma_wsuri],
  ["DSME", "CSMA"]);
</script>