The ONE

The Opportunistic Network Environment simulator.

Information

The ONE is a simulation environment that is capable of

- generating node movement using different movement models
- routing messages between nodes with various DTN routing algorithms and sender and receiver types
- visualizing both mobility and message passing in real time in its graphical user interface.

ONE can import mobility data from real-world traces or other mobility generators. It can also produce a variety of reports from node movement to message passing and general statistics.

The simulator is written in Java (1.6). More documentation is available in form of javadocs.

Acknowledgments

The ONE simulator has been developed in the SINDTN and CATDTN projects supported by Nokia Research Center (Finland) and in the TEKES ICT-SHOK Future Internet project.

Referring to the ONE simulator

If you have used the ONE simulator in your research, please use the SIMUTools paper ([PDF] [BibTeX]) as the reference.

News

31.1.2011 New version (1.4.1) is available

18.3.2010 New version (1.4.0) is available

16.3.2009 New section at the home page: Questions & Answers

19.1.2009 New version (1.3.0) is available

25.8.2008 New version (1.2.0) with a new movement model framework is available

18.8.2008 New section in the homepage: user contributions

6.5.2008 A beta version of the next release (1.1.0) is now available

Download

You can get the source code tar-ball for the **latest version** (1.4.1) from here.
For Windows users, there's a zip packet available here.

Old versions

Description	.tar.gz	.zip	javadoc
The ONE version 1.3.0	download	download	browse
The ONE version 1.2.0	download	download	browse
The ONE version 1.1.0	download	download	browse
The ONE version 1.0.1	download	download	browse

Sample scenarios

Here you can download some additional scenarios for the ONE that are not included in the distribution package. The field "ONE version" tells you which version(s) of the ONE the scenario is (at least) suitable for. You can download the file by clicking the filename at the "download" column. The entry in the contact column tells you where you can ask questions or give comments about the scenario.

name	description	ONE version	contact	download
Epidemic TTL test	Sample scenario of testing the effect of Time to Live (TTL) to Epidemic routing protocol's performance. The package contains also the resulting report files, so you can use this to check if you managed to install and run the ONE properly.	1.0 - 1.1	The ONE mailing list	epidemic_ttl.zip
RWP Epidemic	Simple scenario of 200 nodes doing Random Waypoint movement with Epidemic routing (similar to the 3rd screenshot).	1.0 - 1.2	The ONE mailing list	rwp_epidemic.zip

User contributions

Here you can find add-ons and scripts for the ONE that the users of the ONE have created.

name	description	ONE version	made by	download
BonnMotion converter	This perl script can convert mobility traces created with the BonnMotion to a form that is suitable for the ONE as external movement model input.	1.0 -	Vinicius Mota	orderedNs2Parser.pl
Spray and Focus router module	An implementation of Spray and Focus DTN routing as described in *Spray and Focus: Efficient Mobility-Assisted Routing for Heterogeneous and Correlated Mobility* by Thrasyvoulos Spyropoulos et al.	1.1 -	PJ Dillon	SprayAndFocusRouter.java
osm2wkt	A program for converting OpenStreetMap maps into WKT files that are compatible with the ONE simulator.	1.0 -	Christoph P. Mayer	osm2wkt - openstreetmap to wkt conversion
RAPID router module	Implementation of the RAPID DTN routing protocol.	1.4 -	Wolfgang Heetfeld and Christoph P. Mayer	RapidRouter-v0.1.tar

Routebuilder	Simple tool for building routes and points-of-interest files	1.3 -	PJ Dillon	routebuilder.zip
ONE Contributions	Various extensions to the ONE from PJ Dillon	1.3 -	PJ Dillon	ONE Contributions

Contact

For questions about the simulator you can subscribe to theONE user community email list at our mailman

This list is for discussion and announcements for the ONE simulator. The users of the ONE can report bugs, share experiences and code, and give hints to each other on this list. New releases of the ONE are also announced on this list.

License

The program is released under GPLv3 license. Copyrights of the included map data of Helsinki downtown are owned by Maanmittauslaitos.

Running (a really quick help)

Download the program. Compile it using your favourite IDE or compile.bat (should work in Linux, Windows and Mac OS X).

Start a simulation by typing (in Linux/Unix/OS X)
`./one.sh`
or (in Windows)
`one.bat`

After a short while, the GUI should start and a simulation should be up and running.

Every simulation run uses the settings from `default_settings.txt`, if one exists. You can give an additional configuration file(s) as a parameters to define new settings or override the ones defined in default settings. For example:

```
./one.sh epidemic_settings.txt
```

That would use the (included) epidemic settings configuration file and change the router for all nodes to epidemic (default is "passive router", i.e., no routing logic). See `default_settings.txt` for information about the different settings.

If you don't wish to use the GUI, you can run simulations in batch mode using `-b` option. In batch mode you can also define the number of runs using different run indexes. For example:

```
./one.sh -b 22 snw_comparison_settings.txt
```

That would run spray and wait comparison using 11 different message copy counts and with binary and normal mode. See Settings class' javadoc for details about run indexing.

To create a local copy of the javadoc documentation, run the `create_docs.sh` script in the `doc` folder.

See the included README.txt for more information.

Publications

Ari Keränen, Jörg Ott and Teemu Kärkkäinen: The ONE Simulator for DTN Protocol Evaluation. SIMUTools'09: 2nd International Conference on Simulation Tools and Techniques. Rome, March 2009. [PDF] [BibTeX]

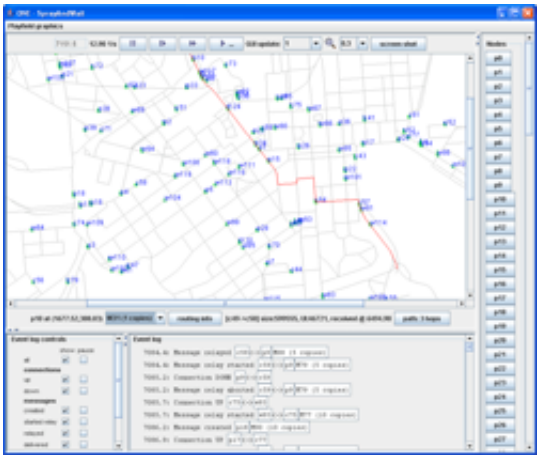
Jouni Karvo and Jörg Ott: Time Scales and Delay-Tolerant Routing Protocols. Proceedings of the ACM MobiCom CHANTS Workshop, September 2008. San Francisco, September 2008. [PDF] [BibTeX]

Frans Ekman, Ari Keränen, Jouni Karvo, and Jörg Ott: Working Day Movement Model. 1st SIGMOBILE Workshop on Mobility Models for Networking Research, Hong Kong, May 2008. [PDF] [BibTeX]

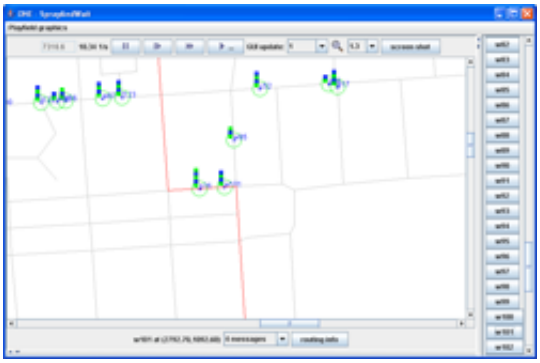
Ari Keränen: Opportunistic Network Environment simulator. Special Assignment, Helsinki University of Technology, Department of Communications and Networking, May 2008. [PDF]

Ari Keränen and Jörg Ott: Increasing Reality for DTN Protocol Simulations. Technical Report, Helsinki University of Technology, Networking Laboratory, July 2007. [PDF]

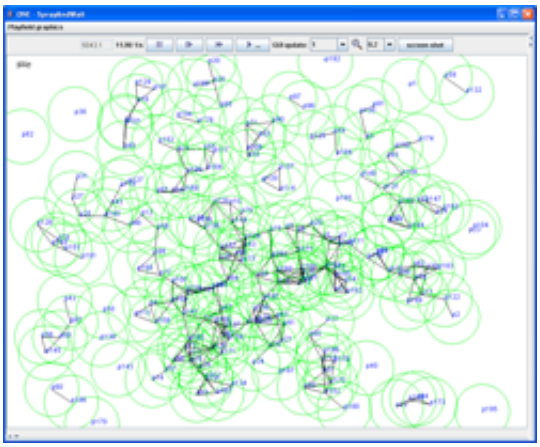
Screenshots



Simulator running with 100 nodes, map-based movement and Spray and Wait routing



Zoomed view of the simulation



Random waypoint with 200 nodes and 250m radio range

Adjacency graph generated from a report (with some help from Graphviz)

Message passing graph (only messages from h1 to h2)