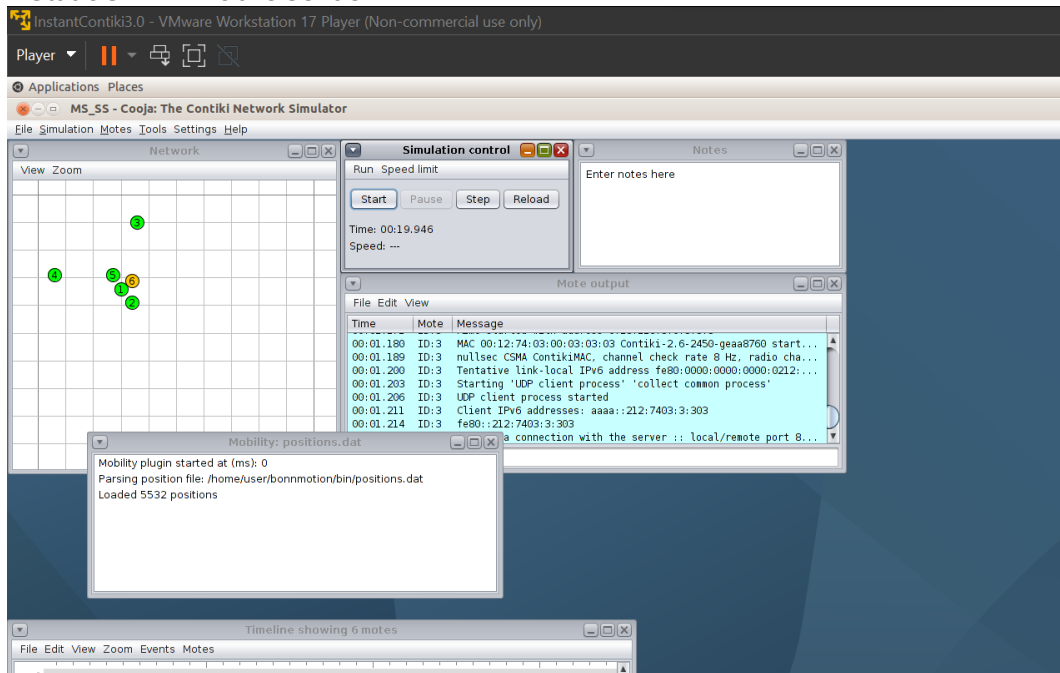
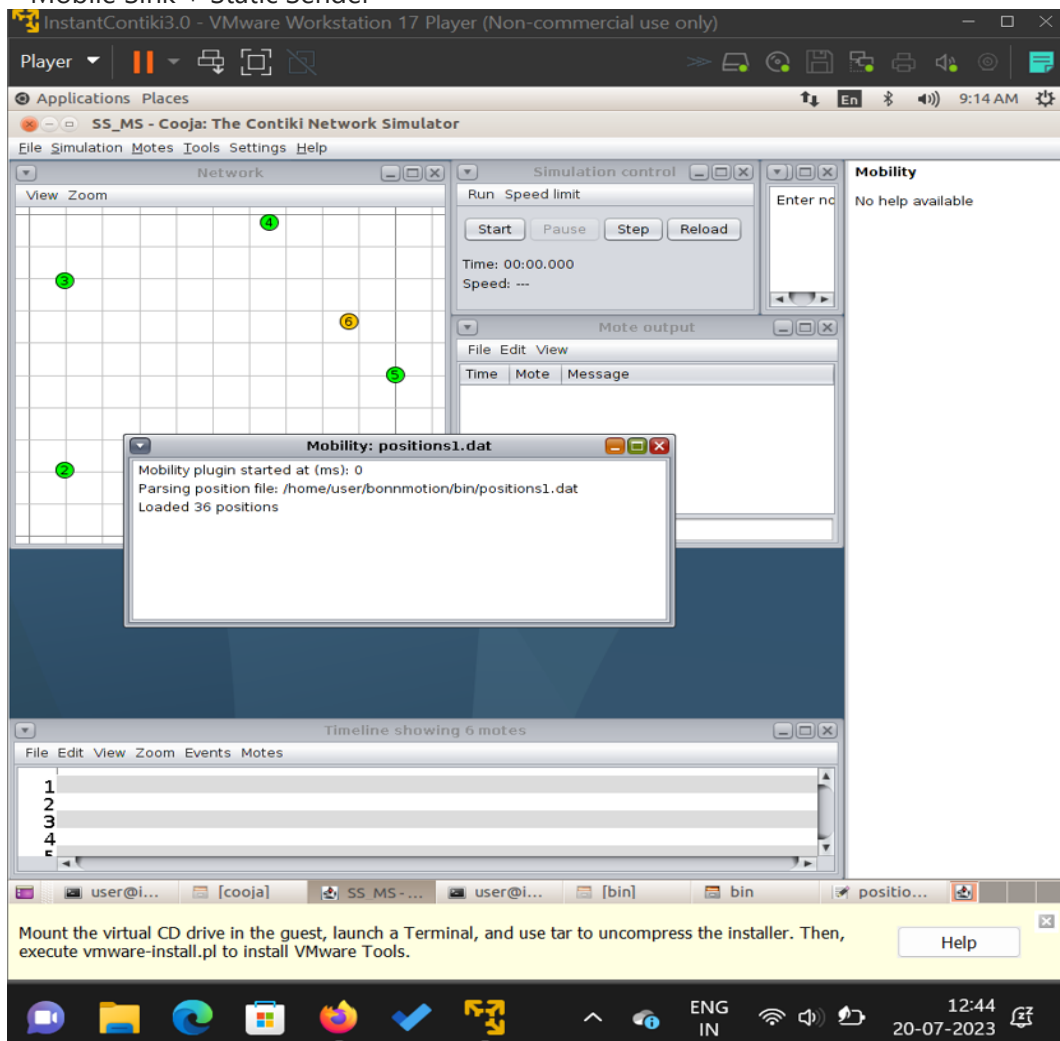


Mobility Scenarios

Static Sink + Mobile Sender



Mobile Sink + Static Sender



Mobile Sink + Mobile Sender

InstantContiki3.0 - VMware Workstation 17 Player (Non-commercial use only)

Player ▾ || ▾ ▢ ▢ ▢ ▢

Applications Places

MS_MS - Cooja: The Contiki Network Simulator

File Simulation Motes Tools Settings Help

Network

View Zoom

Simulation control

Run Speed limit

Start Pause Step Reload

Time: 00:07.321
Speed: 130.48%

Mote output

Time	Mote	Message
00:01.189	ID:13	Starting 'UDP client process' 'collect common...
00:01.189	ID:3	nullsec CSMA ContikiMAC, channel check rate 8...
00:01.191	ID:13	UDP client process started
00:01.196	ID:13	Client IPv6 addresses: aaaa::212:740d:d:d0d
00:01.199	ID:13	fe80::212:740d:d:d0d
00:01.200	ID:3	Tentative link-local IPv6 address fe80:0000:0...
00:01.203	ID:3	Starting 'UDP client process' 'collect common...
00:01.204	ID:13	Created a connection with the server :: local...
00:01.206	ID:3	UDP client process started
00:01.206	ID:3	IPv6 addresses: aaaa::212:7403:3:303
00:01.206	ID:3	12:7403:3:303
00:01.206	ID:3	a connection with the server :: local...

Mobility: positions.dat

Mobility plugin started at (ms): 0
Parsing position file: /home/user/bonnmotion/bin/positions.dat
Loaded 5999 positions

Mobility Models

Random WayPoint

InstantContiki3.0 - VMware Workstation 17 Player (Non-commercial use only)

Player ▾ || ▾ ▢ ▢ ▢ ▢

Applications Places

RandomWaypoint - Cooja: The Contiki Network Simulator

File Simulation Motes Tools Settings Help

Network

View Zoom

Simulation control

Run Speed limit

Start Pause Step Reload

Time: 01:58.564
Speed: 435.38%

Mote output

Time	Mote	Message
00:15.218	ID:6	I am sink!
00:25.514	ID:6	mac: turned MAC off
00:28.139	ID:6	Time offset set to
01:16.414	ID:6	30 55008 22218 0 12
01:18.022	ID:6	30 55008 22220 0 77
01:21.592	ID:6	30 55008 22224 0 51
01:24.417	ID:6	30 55008 22226 0 25
01:37.432	ID:6	30 55008 22239 0 10

Sensor Data Collect with Contiki (connected to <stdin>)

Nodes <All>

Nodes	Battery Indicator	Relative Humidity	Light 1	Light 2	Battery Voltage
1.1	5.5	3.3	2.2	1.1	4.4

Temperature

ManhattanGrid done.

Runtime: 0 sec

user@instant-contiki:~/bonnmotion/bin\$./bnm -f test1 RandomWaypoint -n 6 -d 200 -x 40 -y 40

BonnMotion 3.0.1

OS: Linux 3.13.0-02-generic

Java: Oracle Corporation 1.7.0_79

Starting RandomWaypoint ...

The installed version of VMware Tools is not up to date. Log in to the guest operating system and click "Update Tools."

Update Tools

Random Walk

InstantKontiki3.0 - VMware Workstation 17 Player (Non-commercial use only)

Player ▾ | [Icons]

Applications Places

Random - Cooja: The Kontiki Network Simulator

File Simulation Motes Tools Settings Help

Network View Zoom

Simulation control

Run Speed limit

Start Pause Step Reload

Time: 04:57.243
Speed: 504.95%

File Edit View

Time	Mote	Message
03:04.696	ID:6	30 55008 21999 0 10
03:22.742	ID:6	30 55008 22017 0 12
03:56.973	ID:6	30 55008 22051 0 77
04:10.354	ID:6	30 55008 22064 0 25
04:31.779	ID:6	30 55008 22086 0 51
04:34.092	ID:6	30 55008 22088 0 77
04:47.032	ID:6	30 55008 22101 0 10
04:49.602	ID:6	30 55008 22104 0 12

Filter:

Mobility plugin started at (ms): 0
Parsing position file: /home/user/bonnmotion/bin/positions.dat
Loaded 1806 positions

Collect View (Sky)

CollectView -> Mote: 140 bytes
Mote -> CollectView: 2257 bytes

File Edit View Zoom Events Motes

1 2 3 4

user@instant-kontiki: ~/bonnmotion/bin

```
user@instant-kontiki:~/kontiki/tools/cooja x user@instant-kontiki:~/bonnmotion/bin
user@instant-kontiki:~/bonnmotion/bin$ ./bm -f test RandomWalk -n 6 -d 300 -x 40
-y 40 -l 2 -h 3 -p 60 -s 10
BonnMotion 3.0.1
OS: Linux 3.13.0-62-generic
Java: Oracle Corporation 1.7.0_79
Starting RandomWalk ...
Next RNG-Seed =8398756798546905380 | #Randoms = 11584
RandomWalk done.
Runtime: 0 sec
user@instant-kontiki:~/bonnmotion/bin$ ./bm WiseML -f test -L 1 -I
BonnMotion 3.0.1
```

Sensor Data Collect with Kontiki (connected to <stdin>)

File Tools

Sensors Network Power Node Info Serial Console Network Graph

Node Control Sensor Map

Nodes

<All>

1.1
2.2
3.3
4.4
5.5
6.6

ETX

16.0 16.0 16.0 16.0 16.0

3.3 5.5 4.4 6.6 2.2 1.1

The installed version of VMware Tools is not up to date. Log in to the guest operating system and click "Update Tools."

Update

26° Search [Icons]

Manhattan Grid Mobility

InstantKontiki3.0 - VMware Workstation 17 Player (Non-commercial use only)

Player ▾ | [Icons]

Applications Places

ManhattanGrid - Cooja: The Kontiki Network Simulator

File Simulation Motes Tools Settings Help

Network View Zoom

Simulation control

Run Speed limit

Start Pause Step Reload

Time: 07:31.820
Speed: 536.25%

File Edit View

Time	Mote	Message
05:54.012	ID:6	30 55008 22701 0 771
06:13.808	ID:6	30 55008 22721 0 771
06:27.122	ID:6	30 55008 22734 0 514
06:30.575	ID:6	30 55008 22738 0 257
06:41.836	ID:6	30 55008 22749 0 1028
06:54.445	ID:6	30 55008 22761 0 1285
07:15.390	ID:6	30 55008 22782 0 1285
07:24.482	ID:6	30 55008 22791 0 771

Filter:

Mobility: positions.dat

Mobility plugin started at (ms): 0
Parsing position file: /home/user/bonnmotion/bin/positions.dat
Loaded 1206 positions

Collect View (Sky)

CollectView -> Mote: 280 bytes
Mote -> CollectView: 4143 bytes

File Edit View Zoom Events Motes

1 2 3 4

user@instant-kontiki: ~/bonnmotion/bin

```
user@instant-kontiki:~/kontiki/tools/cooja x user@instant-kontiki:~/bonnmotion/bin
user@instant-kontiki:~/bonnmotion/bin$ ./bm -f test ManhattanGrid -n 6 -d 200 -x
40 -y 40 -u 3 -v 2
BonnMotion 3.0.1
OS: Linux 3.13.0-62-generic
Java: Oracle Corporation 1.7.0_79
Starting ManhattanGrid ...
Next RNG-Seed =119984520693005219 | #Randoms = 6480
ManhattanGrid done.
Runtime: 0 sec
user@instant-kontiki:~/bonnmotion/bin$ ./bm WiseML -f test -L 1
```

Sensor Data Collect with Kontiki (connected to <stdin>)

File Tools

Sensors Network Power Node Info Serial Console Network Graph

Node Control Sensor Map

Nodes

<All>

1.1
2.2
3.3
4.4
5.5
6.6

Average Power

Radio Duty Cycle Instantaneous Power Power History

Average Power Consumption

Power (mW)

1.1 2.2 3.3 4.4 5.5

Nodes

The installed version of VMware Tools is not up to date. Log in to the guest operating system and click "Update Tools."

Update Tools

26° Search [Icons]

Reference point group mobility (RPGM)

```
user@instant-contiki: ~/bonnmotion/bin
File Edit View Search Terminal Help
user@instant-contiki:~/bonnmotion/bin$ ./bm -hm RPGM
BonnMotion 3.0.1

OS: Linux 3.13.0-62-generic
Java: Oracle Corporation 1.7.0_79

== RPGM ==
Version:      v1.1
Description:  Application to create movement scenarios according to the Reference Point Group Mobility model
Affiliation:  University of Bonn - Institute of Computer Science 4 (http://net.cs.uni-bonn.de/)
Authors:     University of Bonn
Contacts:    bonnmotion@lists.iai.uni-bonn.de

App:
-D print stack trace

Scenario:
-a <attractor parameters (if applicable for model)>
-c [use circular shape (if applicable for model)]
-d <scenario duration>
-l <number of seconds to skip>
-n <number of nodes>
-x <width of simulation area>
-y <height of simulation area>
-z <depth of simulation area>
-R <random seed>
-J <2D, 3D> Dimension of movement output

RandomSpeedBase:
-h <max. speed>
-l <min. speed>
-p <max. pause time>

RPGM:
-a <average no. of nodes per group>
-c <group change probability>
-r <max. distance to group center>
-s <group size standard deviation>

user@instant-contiki:~/bonnmotion/bin$
```

```
model=RPGM
ignore=3600.0
randomSeed=1282049094929
x=200.0
y=200.0
duration=3000.0
nn=20
circular=false
groupsize_E=3.0
groupsize_S=2.0
pGroupChange=0.0
maxdist=2.5
minspeed=0.5
maxspeed=1.5
maxpause=60.0
```

```
user@instant-contiki: ~/bonnmotion/bin
File Edit View Search Terminal Help

-R <random seed>
-J <2D, 3D> Dimension of movement output

RandomSpeedBase:
-h <max. speed>
-l <min. speed>
-p <max. pause time>

RPGM:
-a <average no. of nodes per group>
-c <group change probability>
-r <max. distance to group center>
-s <group size standard deviation>

user@instant-contiki:~/bonnmotion/bin$ ./bm -f rpgm RPGM -n 20 -d 3000 -i 3600 -
x 200 -y 200 -h 1.5 -l 0.5 -p 60 -s 2.5 -R 1282049094929
BonnMotion 3.0.1

OS: Linux 3.13.0-62-generic
Java: Oracle Corporation 1.7.0_79

Starting RPGM ...
Next RNG-Seed =1894150455339232187 | #Randoms = 2888
RPGM done.
Runtime: 1 sec
user@instant-contiki:~/bonnmotion/bin$
```

InstantContiki3.0 - VMware Workstation 17 Player (Non-commercial use only)

Player ▾ | [Icons]

Applications Places

File Simulation Motes Tools Settings Help

Network View Zoom

Simulation control: Run Speed limit Start Pause Step Reload Enter no

Time: 00:55.964 Speed: 166.55%

Mote output

Time	Mote	Message
00:01.214	ID:3	fe80::212:7403:3:303
00:01.219	ID:3	Created a connection w...
00:05.575	ID:20	I am sink!
00:07.797	ID:20	mac: turned MAC off (ke...
00:08.954	ID:20	Time offset set to 3605...
00:09.255	ID:10	I am sink!
00:13.520	ID:10	mac: turned MAC off (ke...
00:14.304	ID:10	Time offset set to 3605...

Filters:

Mobility: rpgmPositions.dat

Mobility plugin started at (ms): 0
Parsing position file: /home/user/bonnemotion/bin/rpgmPositions.dat
Loaded 48318 positions

Collect View (Sky ...)

CollectView -> Mote: 280 bytes
Mote -> CollectView: 649 bytes

Collect View (Sky ...)

CollectView -> Mote: 280 bytes
Mote -> CollectView: 645 bytes

File Edit View Zoom Events Motes

1 2 3 4

Sensor Data Collect with Contiki (connected to <stdin>)

Nodes	Sensors	Network	Power	Node Info	Serial Console	Network Graph					
<All>	Node Control			Sensor Map							
1.1	Node	Received	Dups	Lost	Hops	Rtmetric	ETX	Churn	Beacon Interval	Reboots	CPU Power
2.2	1.1	0	0	0	0.000	0.000	0.000	0		0	0.000
3.3	2.2	0	0	0	0.000	0.000	0.000	0		0	0.000
4.4	3.3	0	0	0	0.000	0.000	0.000	0		0	0.000
5.5	4.4	0	0	0	0.000	0.000	0.000	0		0	0.000
6.6	5.5	0	0	0	0.000	0.000	0.000	0		0	0.000
	6.6	0	0	0	0.000	0.000	0.000	0		0	0.000
	Avg	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000

Sensor Data Collect with Contiki (connected to <stdin>)

Nodes	Sensors	Network	Power	Node Info	Serial Console	Network Graph					
<All>	Node Control			Sensor Map							
1.1	Node	Received	Dups	Lost	Hops	Rtmetric	ETX	Churn	Beacon Interval	Reboots	CPU Power
2.2	1.1	0	0	0	0.000	0.000	0.000	0		0	0.000
3.3	2.2	0	0	0	0.000	0.000	0.000	0		0	0.000
4.4	3.3	0	0	0	0.000	0.000	0.000	0		0	0.000
5.5	4.4	0	0	0	0.000	0.000	0.000	0		0	0.000
6.6	5.5	0	0	0	0.000	0.000	0.000	0		0	0.000
	6.6	0	0	0	0.000	0.000	0.000	0		0	0.000
	Avg	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000

The installed version of VMware Tools is not up to date. Log in to the guest operating system and click "Update Tools."

Update

Foren6 Features

InstantContiki3.0 - VMware Workstation 17 Player (Non-commercial use only)

Player ▾ | [Icons]

Applications Places

File Layout Data Window Help

Start [Icons] Manage Sources [Icons] Toggle node movement [Icons] Clear [Icons] Toggle node info [Icons] Link/Unlink Dialogs [Icons]

Overlay: Normal

Packet

Data

- Frame 898: 102 bytes on wire (816 bits), 100 bytes captured
- IEEE 802.15.4 Data, Src: NitLab_01:00:01:01:01:01, Src: NitLab_01:00:01:01:01:01
- 6LoWPAN
- Internet Protocol Version 6, Src: fe80::212:7405:5:505 (fe80::212:7405:5:505)
- Internet Control Message Protocol v6

Informations

Filter:

Type	Version	Message
Node	724	Node updated, wpan id = 127404000a0a0a
Packet	723	Type: RPL DIO src:127404000a0a0a dst: 12740100010101 frame
Node	723	Node updated, wpan id = 127404000a0a0a
Packet	724	Type: RPL DIO src:127404000a0a0a dst: 0 frame: 897
Node	724	Node updated, wpan id = 127404000a0a0a
Packet	725	Type: RPL DIO src:12740500050505 dst: 12740100010101 frame

Timeline: [Icons] 726/726 (R) 1972.44 sec

Layout: user@instant-contiki: Foren6: A 6LoWPAN

The installed version of VMware Tools is not up to date. Log in to the guest operating system and click "Update Tools."

Update Tools Remind Me Later Never Remind Me

25°C Mostly cloudy Search [Icons] 18:02 21-07-2023