

Developing Next-Gen IoT Solutions with Contiki OS and Cooja Simulator

Submissions – Day 3 (10th July 2024)

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1. Heterogeneous Traffic

```
#define UDP_EXAMPLE_ID 190

#define DEBUG DEBUG_PRINT
#include "net/lp/uiplib-debug.h"

#ifndef PERIOD
#define PERIOD 15
#endif

#define START_INTERVAL (15 * CLOCK_SECOND)
#define SEND_INTERVAL (PERIOD * CLOCK_SECOND)
#define SEND_TIME (random_rand() % (SEND_INTERVAL))
#define MAX_PAYLOAD_LEN 16

static struct uip_udp_conn *client_conn;
static uip_ipaddr_t server_ipaddr;

/*-----*/
PROCESS(uip_client_process, "UDP client process");
AUTOSTART_PROCESSES(&uip_client_process);
/*-----*/

static void
tcpip_handler(void)
{
    char *str;

    if(uip_newdata()) {
        str = uip_appdata;
        str[uip_datalen()] = '\0';
        printf("DATA rcv '%s'\n", str);
    }
}

/*-----*/
static void
send_packet(void *ptr)
{

```

```
#include <string.h>

#define UDP_CLIENT_PORT 8765
#define UDP_SERVER_PORT 5678

#define UDP_EXAMPLE_ID 190

#define DEBUG DEBUG_PRINT
#include "net/lp/uiplib-debug.h"

#ifndef PERIOD
#define PERIOD 60
#endif

#define START_INTERVAL (15 * CLOCK_SECOND)
#define SEND_INTERVAL (PERIOD * CLOCK_SECOND)
#define SEND_TIME (random_rand() % (SEND_INTERVAL))
#define MAX_PAYLOAD_LEN 48

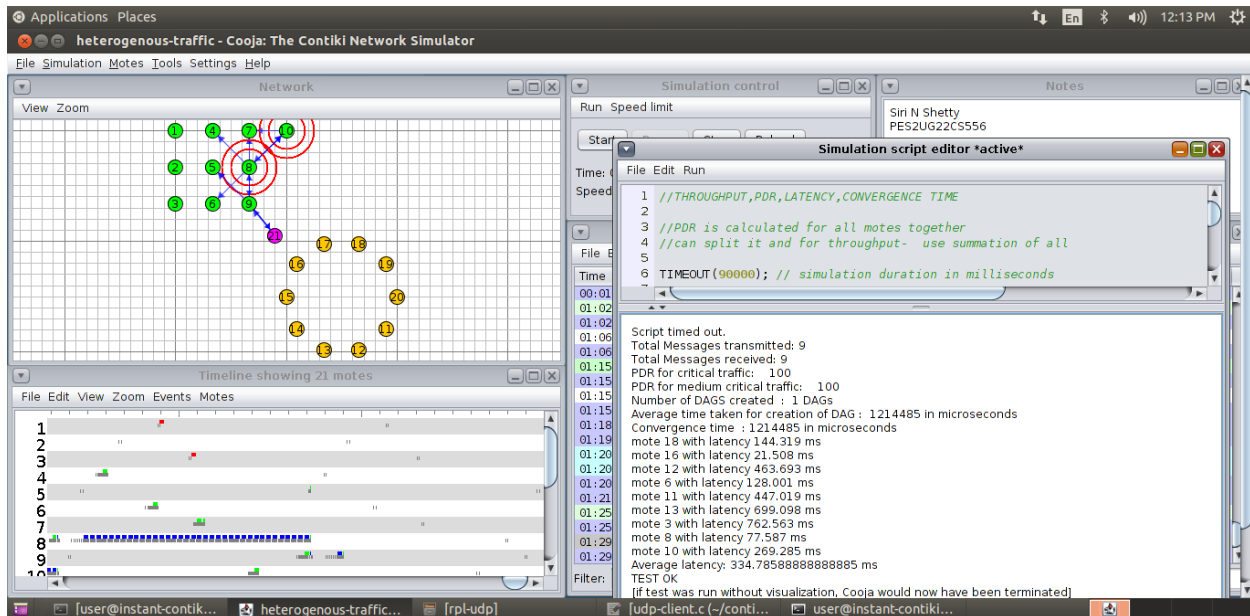
static struct uip_udp_conn *client_conn;
static uip_ipaddr_t server_ipaddr;

/*-----*/
PROCESS(uip_client_process, "UDP client process");
AUTOSTART_PROCESSES(&uip_client_process);
/*-----*/

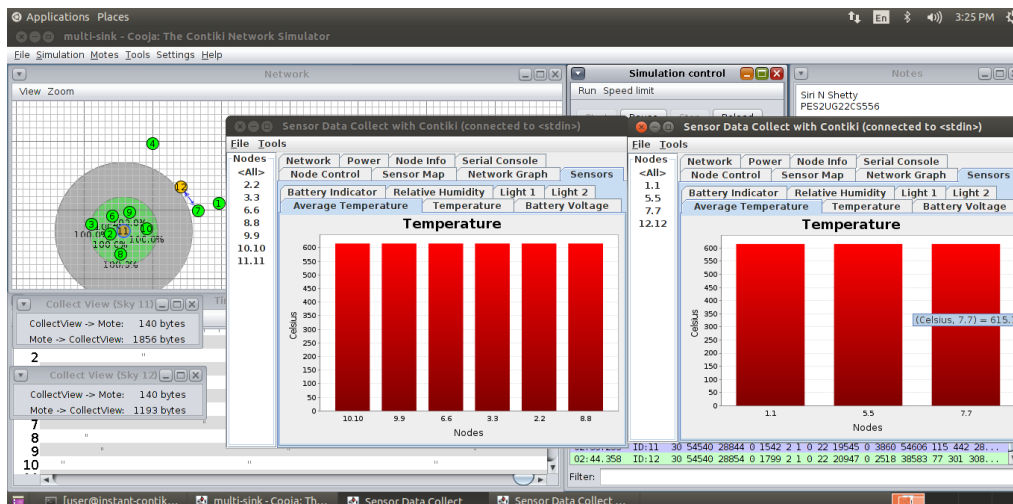
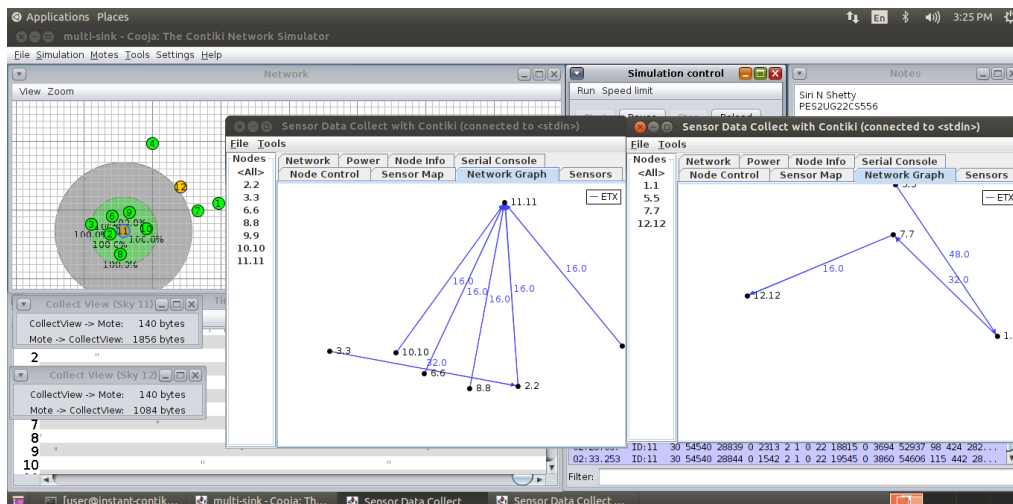
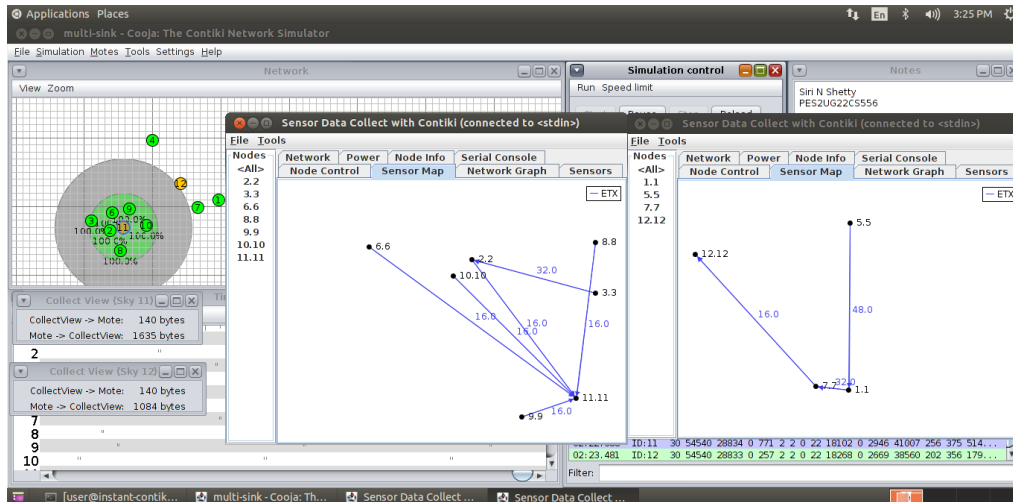
static void
tcpip_handler(void)
{
    char *str;

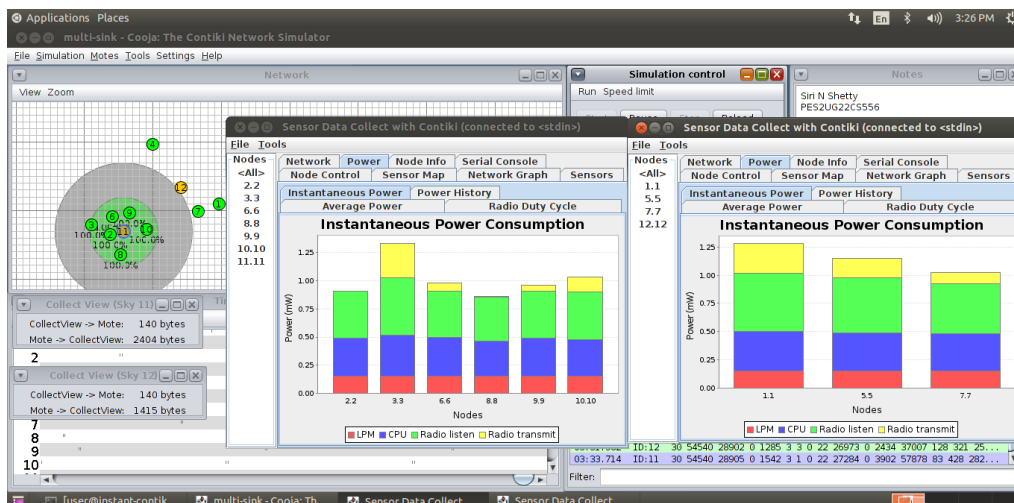
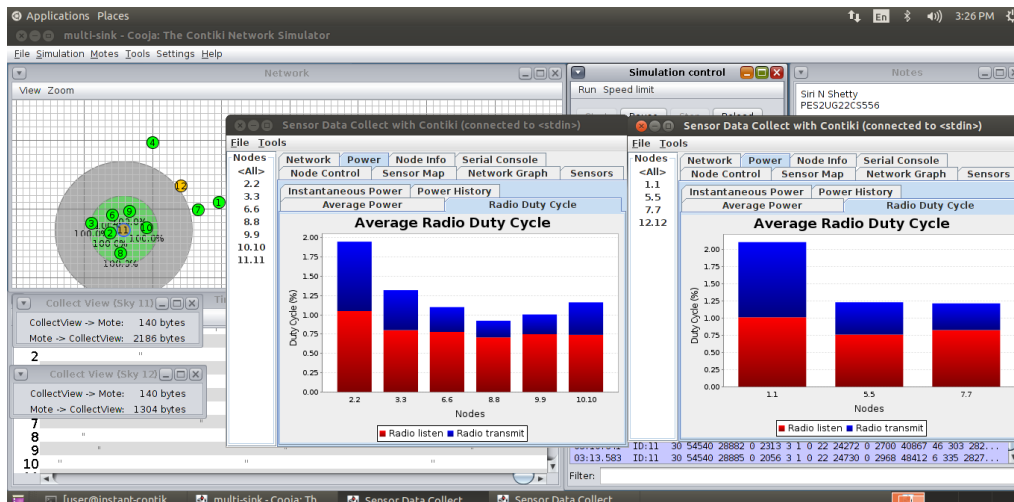
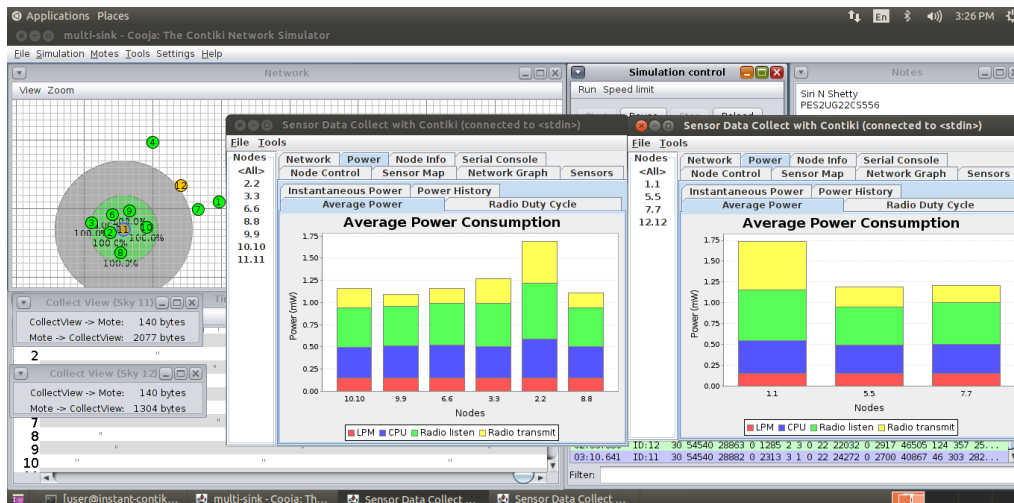
    if(uip_newdata()) {
        str = uip_appdata;
        str[uip_datalen()] = '\0';
        printf("DATA rcv '%s'\n", str);
    }
}

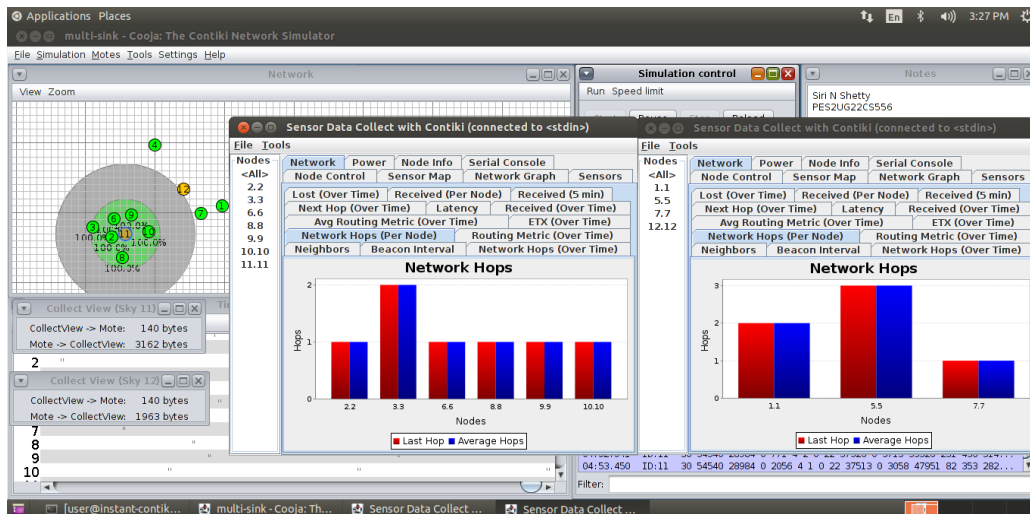
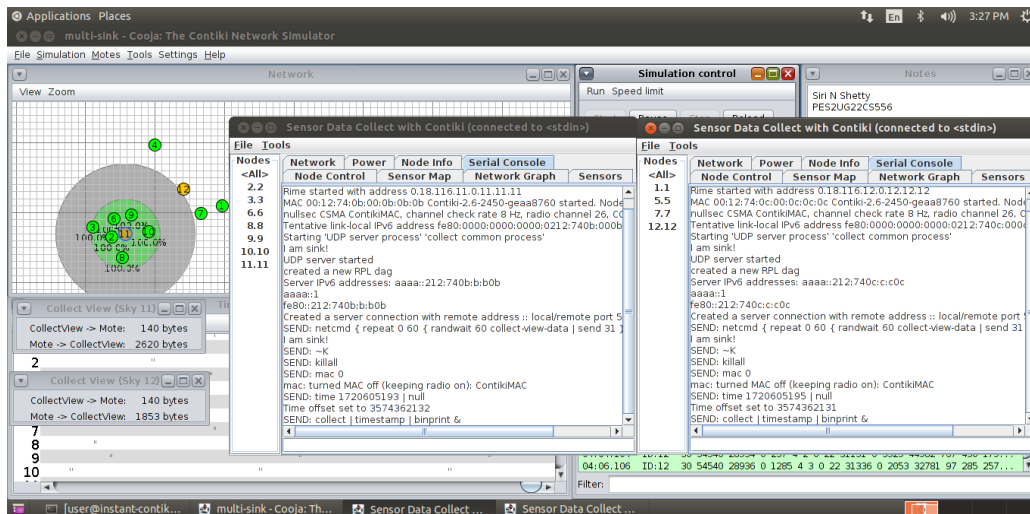
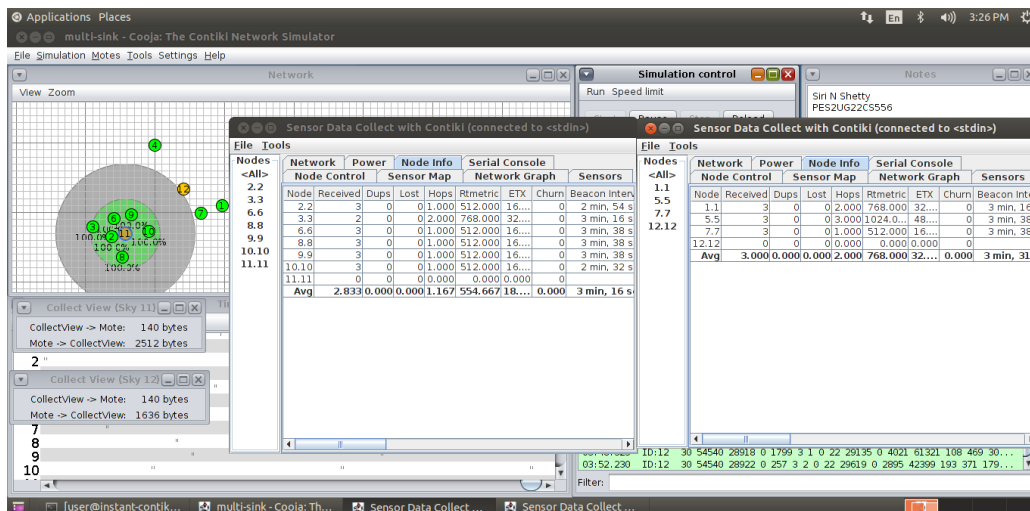
/*-----*/
```



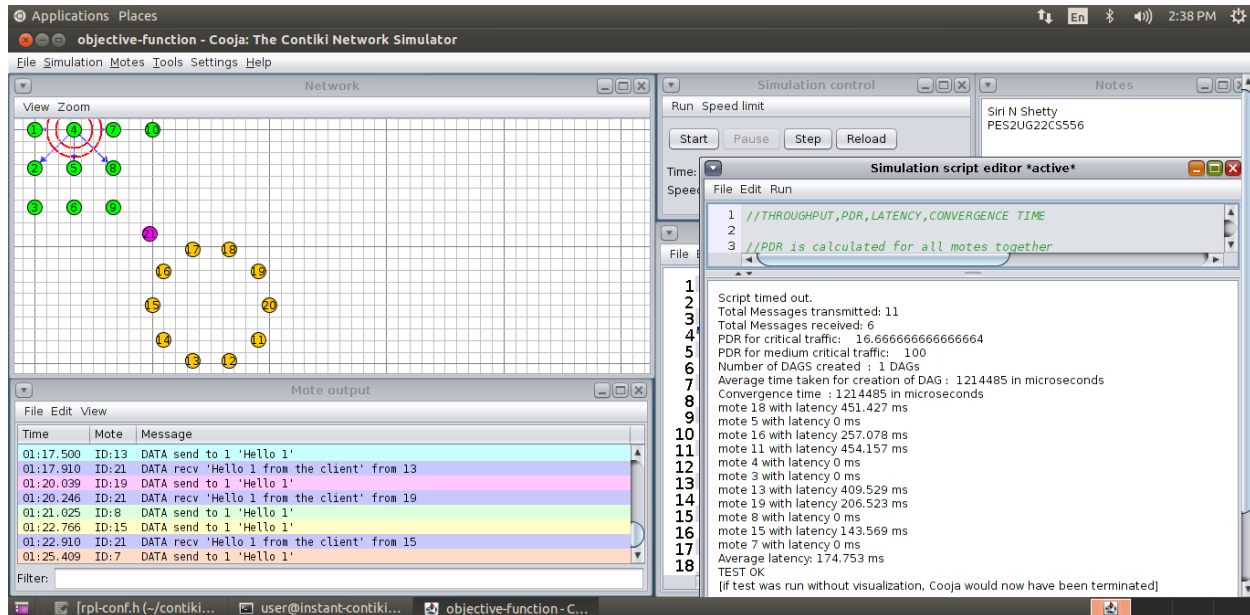
2. Multi Sink







3. Objective Functions



```
rpl-conf.h x
/*
 * The objective function used by RPL is configurable through the
 * RPL_CONF_OF parameter. This should be defined to be the name of an
 * rpl_of object linked into the system image, e.g., rpl_of0.
 */
#ifdef RPL_CONF_OF
#define RPL_OF RPL_CONF_OF
#else
/* ETX is the default objective function. */
#define RPL_OF rpl_of0
```

4. Mobility Scenarios

a. Static Sink + Mobile Sender

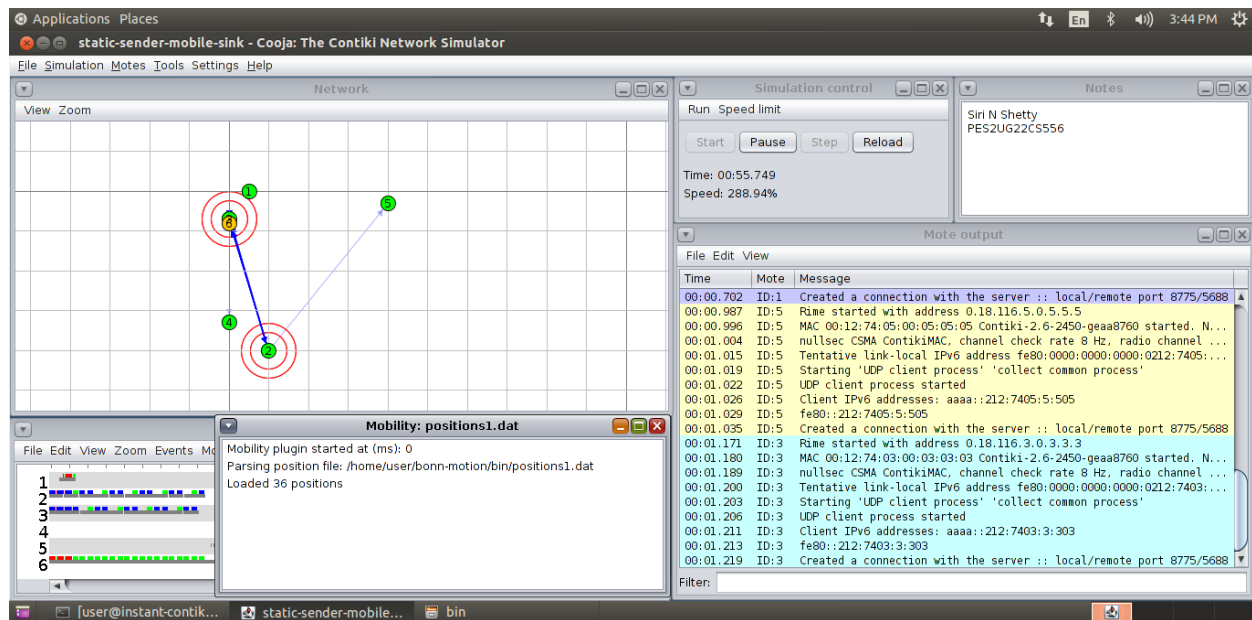
```
user@instant-contiki: ~/bonn-motion/bin
File Edit View Search Terminal Help
user@instant-contiki:~$ cd bonn-motion/bin
user@instant-contiki:~/bonn-motion/bin$ ./bm -f test1 ManhattanGrid -n 6 -d 5 -x 40 -y 40 -u 3 -v 2
BonnMotion 3.0.1

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

Starting ManhattanGrid ...
Next RNG-Seed =8365890775929106909 | #Randoms = 6144
ManhattanGrid done.
Runtime: 0 sec
user@instant-contiki:~/bonn-motion/bin$ ./bm WiseML -f test1 -L 1
BonnMotion 3.0.1

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

Starting WiseML ...
randomSeed (String):1720606110113
randomSeed (Long):1720606110113
WiseML done.
Runtime: 0 sec
user@instant-contiki:~/bonn-motion/bin$ ./wml2dat test1.wml positions1.dat
user@instant-contiki:~/bonn-motion/bin$
```



b. Mobile Sink + Static Sender

```

user@instant-contiki: ~/bonn-motion/bin
File Edit View Search Terminal Help
user@instant-contiki:~$ cd bonn-motion/bin
user@instant-contiki:~/bonn-motion/bin$ ./bm -f test2 ManhattanGrid -n 6 -d 5 -x
.40 -y 40 -u 3 -v 2
BonnMotion 3.0.1

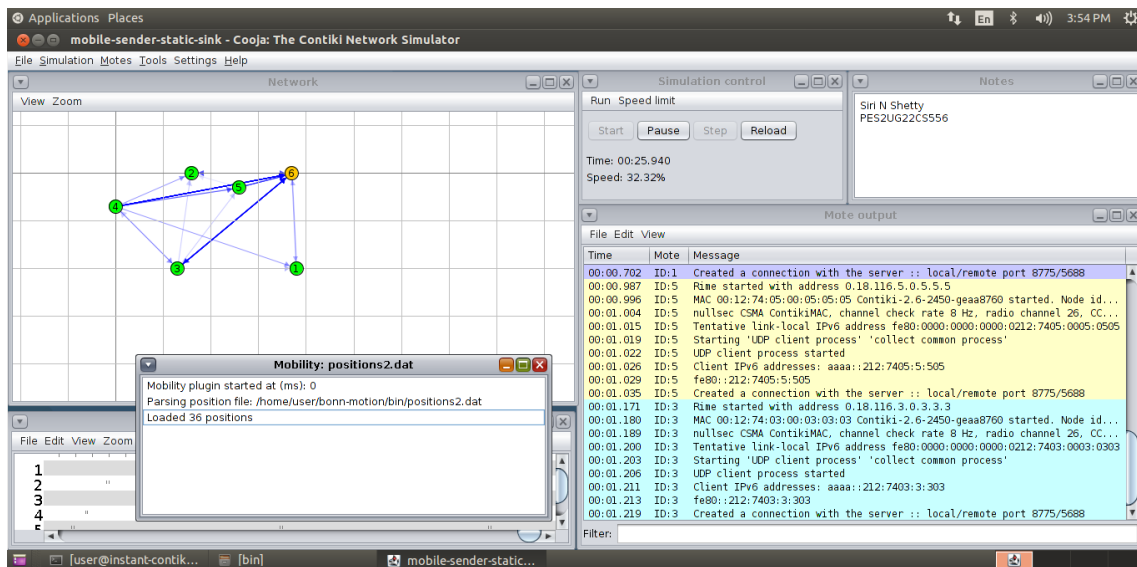
OS: Linux 3.13.0-62-generic
Java: Oracle Corporation 1.7.0_79

Starting ManhattanGrid ...
Next RNG-Seed =4262715109823864112 | #Randoms = 6226
ManhattanGrid done.
Runtime: 0 sec
user@instant-contiki:~/bonn-motion/bin$ ./bm WiseML -f test2 -L 1
BonnMotion 3.0.1

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

Starting WiseML ...
randomSeed (String):1720606918295
randomSeed (Long):1720606918295
WiseML done.
Runtime: 0 sec
user@instant-contiki:~/bonn-motion/bin$ ./wml2dat test2.wml positions2.dat
user@instant-contiki:~/bonn-motion/bin$

```

c. Mobile Sink + Mobile Sender

