

The American University in Cairo

School of Sciences and Engineering

Internet of Things: Networking Protocols

Course Project

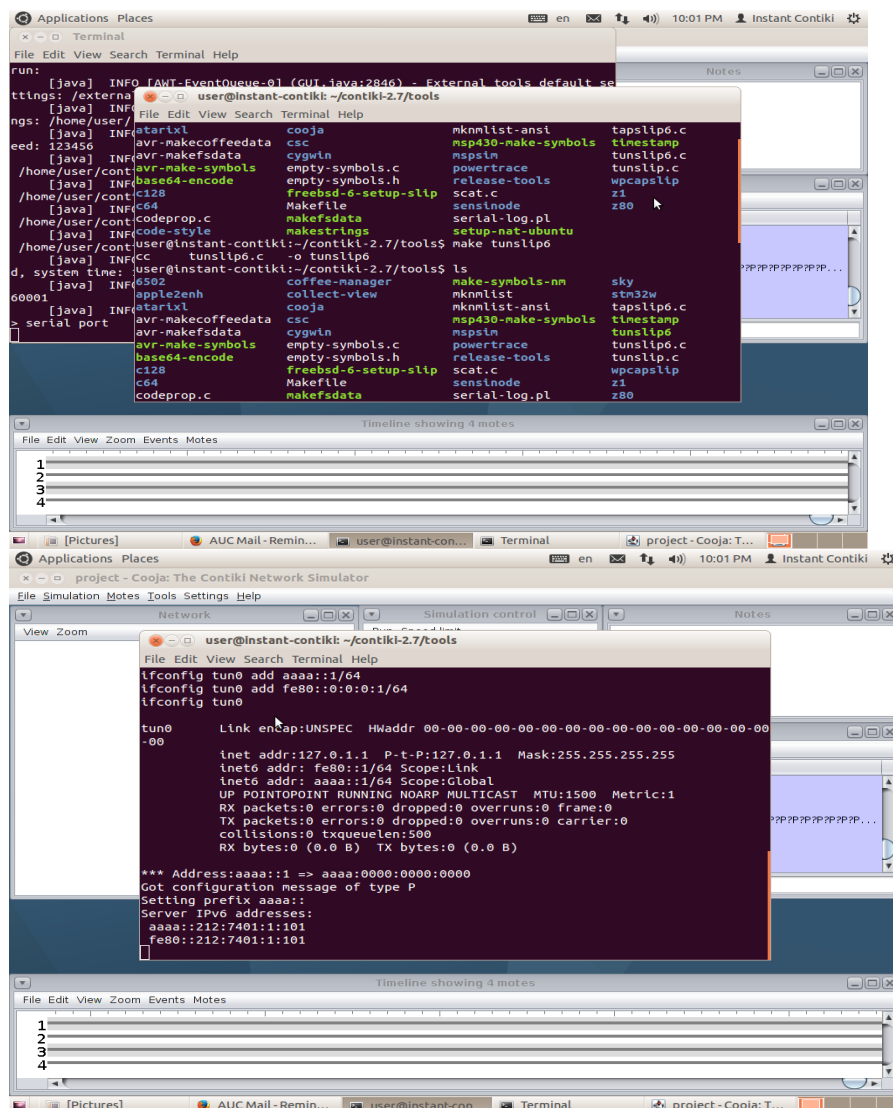
Dr: Tamer ElBatt

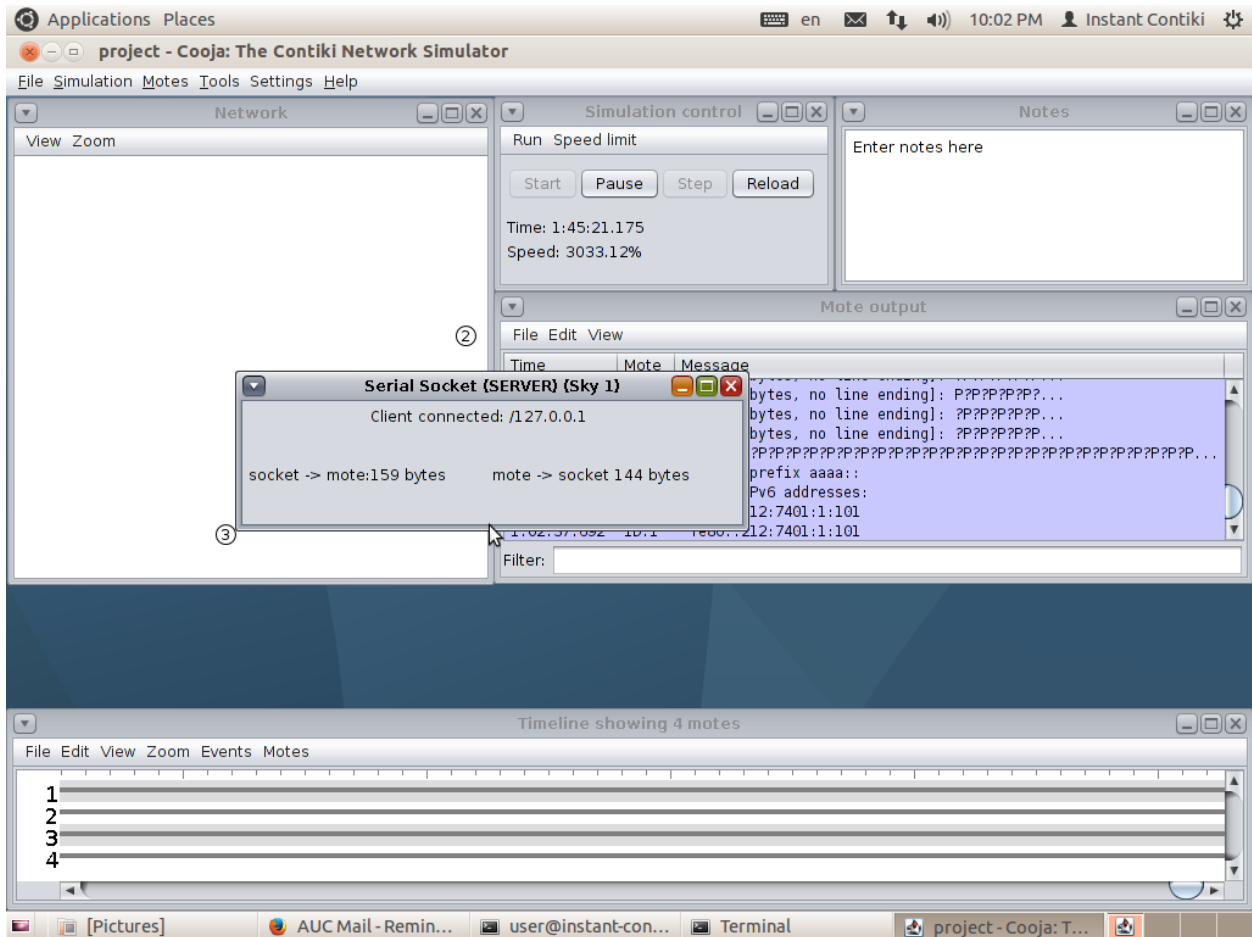
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Before we start the simulation we need to make sure that the border router and the UDP Server are ready to be used. We added 1 of the border router, which enables the network of lot devices to connect to the internet through ipv6 and to pass the information that it got from the other motes in the network. After that 3 UDP server motes are added we need to start simulation of the network, which is forming the DAG between the motes of the network. The next step is to open the Serial Socket Server for border route which shows us the information about the bytes received and the port it is listening on.





ContikiRPL

← [aaaa::212:7401:1:101]

Neighbors

```
fe80::212:7402:2:202
fe80::212:7404:4:404
fe80::212:7403:3:303
```

Routes

```
aaaa::212:7402:2:202/128 (via fe80::212:7402:2:202) 16710810s
aaaa::212:7404:4:404/128 (via fe80::212:7404:4:404) 16710807s
aaaa::212:7403:3:303/128 (via fe80::212:7403:3:303) 16710805s
```

Pinging Devices: Notice difference between first and second ping

The screenshot displays the Cooja: The Contiki Network Simulator interface. The main window is titled "project - Cooja: The Contiki Network Simulator" and shows a "Network" view with a "Simulation control" panel on the right. The "Simulation control" panel includes buttons for "Run", "Speed limit", "Start", "Pause", "Step", and "Reload", along with a "Time" display showing 3:16:25.651 and a "Speed" of 3331.00%.

A terminal window is open, showing the following commands and output:

```
user@instant-contiki: ~/contiki-2.7/tools
File Edit View Search Terminal Help
ifconfig tun0 add aaaa::1/64
ifconfig tun0 add fe80::0:0:0:1/64
ifconfig tun0

tun0 Link encap:UNSPEC HWaddr 00-00-00-00-00-00-00-00-00-00-00-00-00-00-00-00
-00

inet6 address
inet6 address
inet6 address
UP PORT
RX packet
TX packet
collision
RX byte
^C

*** Address:aaaa:
Got configuration
Setting prefix ad
Server IPv6 addre
aaaa::212:7401:1
fe80::212:7401:1

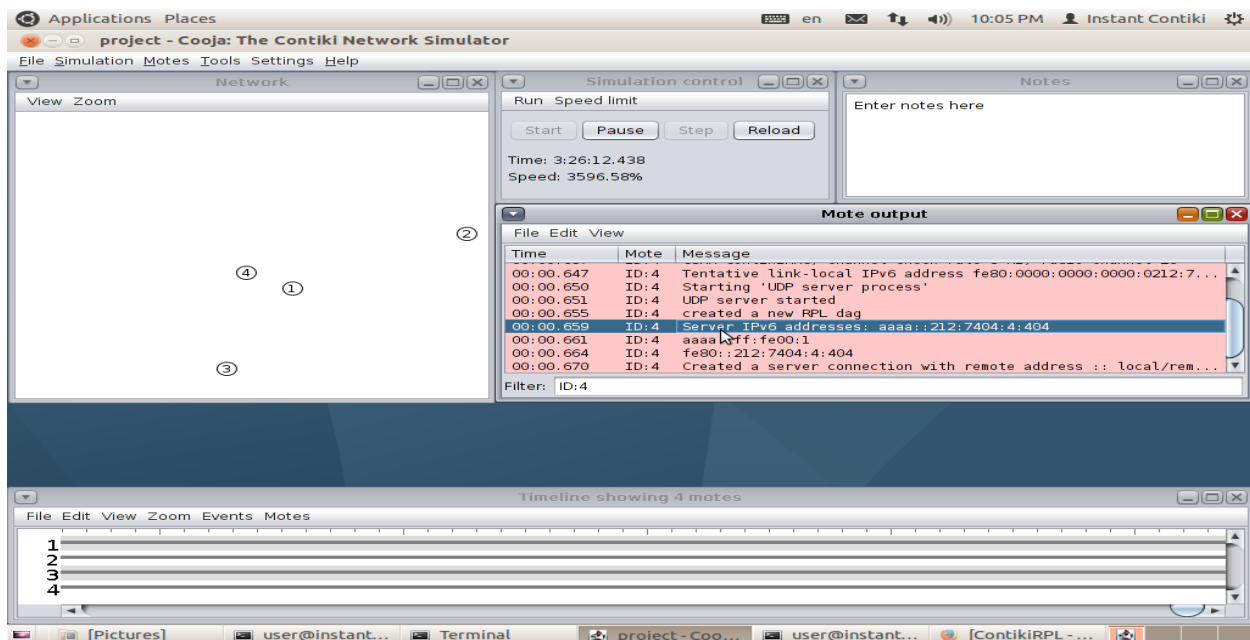
user@instant-contiki:~/contiki-2.7/tools$ ping6 aaaa::212:7401:1:101
PING aaaa::212:7401:1:101(aaaa::212:7401:1:101) 56 data bytes
64 bytes from aaaa::212:7401:1:101: icmp_seq=1 ttl=64 time=4.40 ms
64 bytes from aaaa::212:7401:1:101: icmp_seq=2 ttl=64 time=4.80 ms
64 bytes from aaaa::212:7401:1:101: icmp_seq=3 ttl=64 time=4.49 ms
64 bytes from aaaa::212:7401:1:101: icmp_seq=4 ttl=64 time=4.25 ms
64 bytes from aaaa::212:7401:1:101: icmp_seq=5 ttl=64 time=3.89 ms
^C
--- aaaa::212:7401:1:101 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4037ms
rtt min/avg/max/mdev = 3.895/4.369/4.806/0.307 ms
user@instant-contiki:~/contiki-2.7/tools$ ping6 aaaa::212:7402:2:202
PING aaaa::212:7402:2:202(aaaa::212:7402:2:202) 56 data bytes
64 bytes from aaaa::212:7402:2:202: icmp_seq=1 ttl=63 time=29.8 ms
64 bytes from aaaa::212:7402:2:202: icmp_seq=2 ttl=63 time=27.2 ms
64 bytes from aaaa::212:7402:2:202: icmp_seq=3 ttl=63 time=28.1 ms
64 bytes from aaaa::212:7402:2:202: icmp_seq=4 ttl=63 time=27.1 ms
64 bytes from aaaa::212:7402:2:202: icmp_seq=5 ttl=63 time=28.6 ms
^C
--- aaaa::212:7402:2:202 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4033ms
rtt min/avg/max/mdev = 27.126/28.192/29.807/0.986 ms
user@instant-contiki:~/contiki-2.7/tools$
```

The terminal output shows the results of two ping6 commands. The first ping is to aaaa::212:7401:1:101, and the second is to aaaa::212:7402:2:202. The first ping shows a time of 4.40 ms, while the second ping shows a time of 29.8 ms. This illustrates the difference in ping times between the two devices.

Below the terminal window, a "Mote output" window is visible, showing a list of messages with columns for "Time", "Mote", and "Message". The messages include:

Time	Mote	Message
00:00.535	ID:2	Tentative link-local IPv6 address fe80:0000:0000:0000:0212:7...
00:00.537	ID:2	Starting 'UDP server process'
00:00.539	ID:2	UDP server started
00:00.543	ID:2	created a new RPL dag
00:00.547	ID:2	Server IPv6 addresses: aaaa::212:7402:2:202
00:00.549	ID:2	aaaa::ff:fe00:1
00:00.552	ID:2	fe80::212:7402:2:202
00:00.558	ID:2	Created a server connection with remote address :: local/rem...

The "Mote output" window also includes a "Filter" field set to "ID:2".



Commands:

Cd contiki-2.7

Cd tools

cc tunslip6.c -o tunslip6

Sudo ./tunslip6 -a 127.0.0.1 aaaa::1/64

password:user

Part2:

