NP HW2 GUIDE

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11.28.2012

Outline

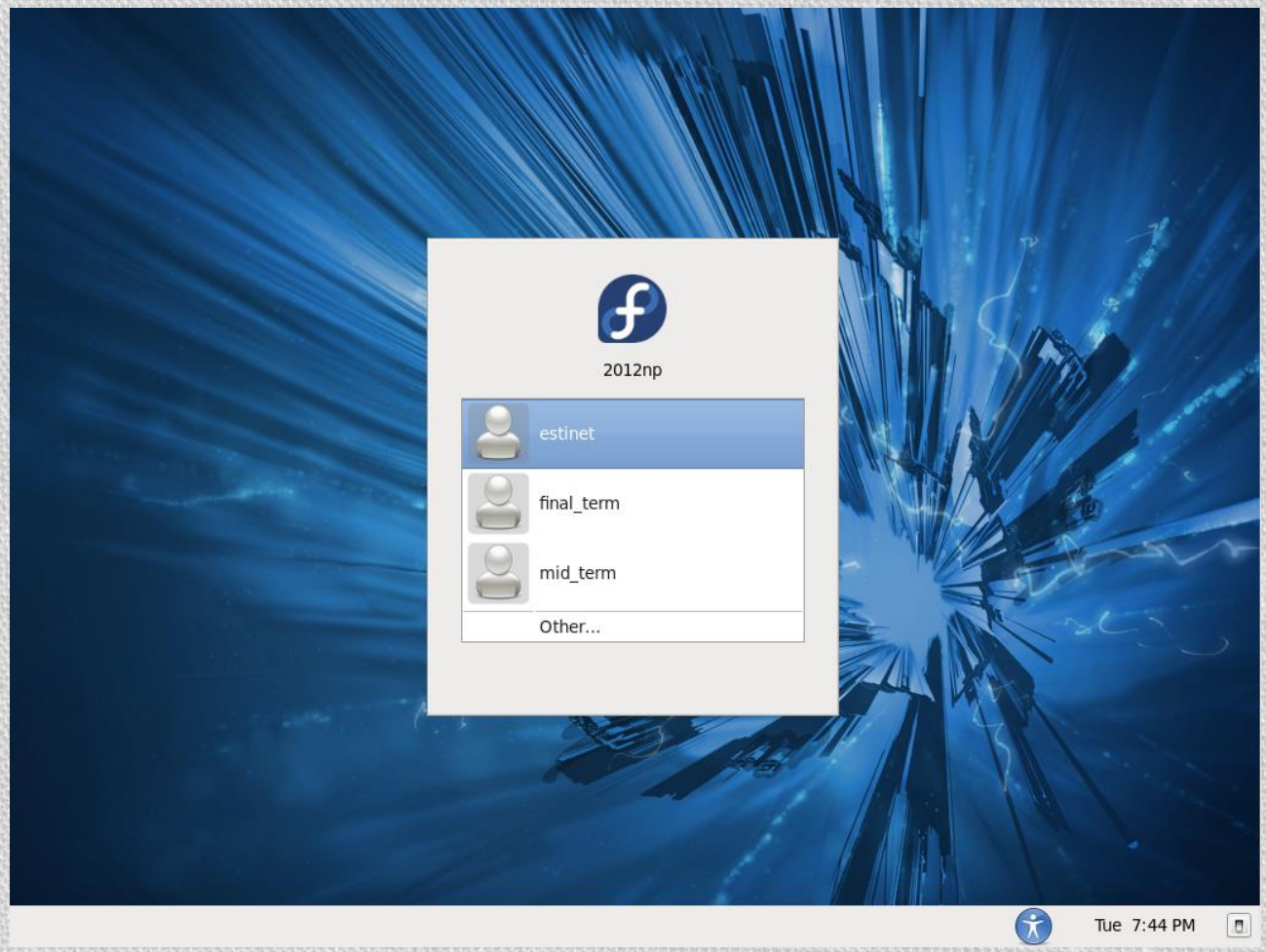
- Login and Environment Setup
- EstiNet Network Simulator
- Simulation Topology Setup
- Run Simulation
- Verifaction
- Other Important issue
- HW2 Grading Policy

Before we start…

- It is suggested that you should make a new directory whenever you login a VM
- Use that directory as your working directory.
- When you're finished, use USB stick/ Network to backup your code
- Delete the working directory when you leave

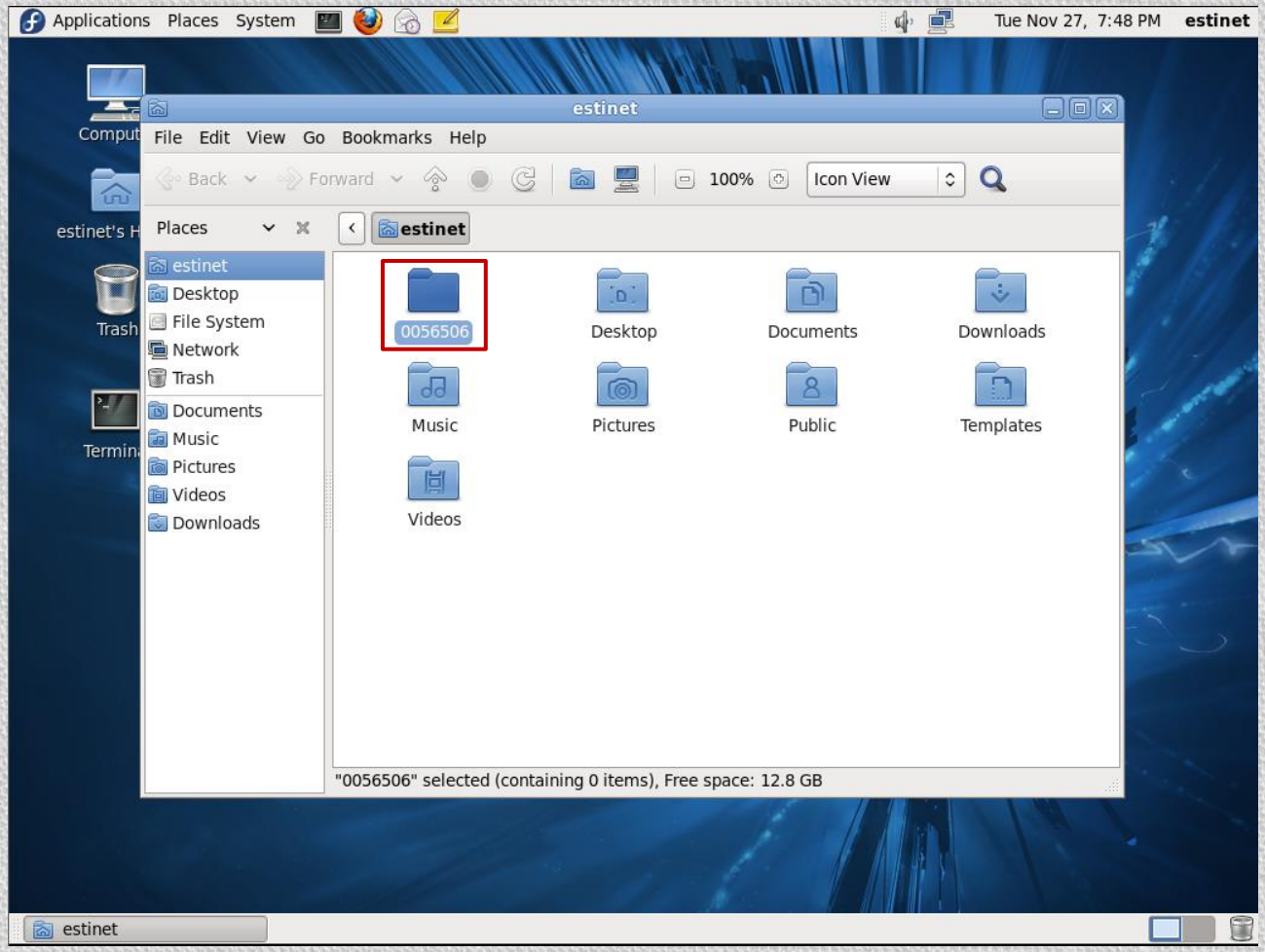
Login

- Account: estinet
- Password: estinet



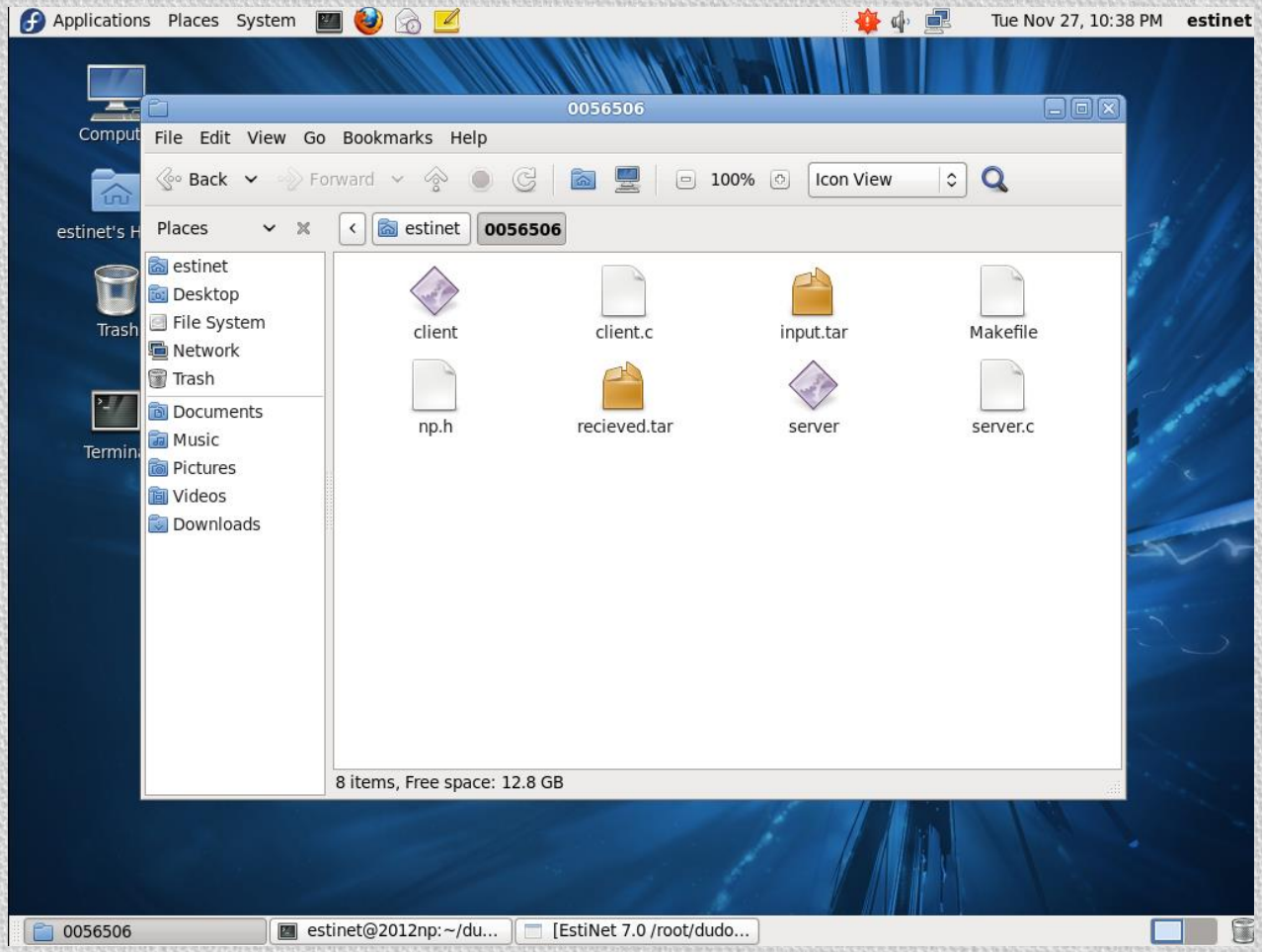
Create your own directory

- You should create your own working directory under /home/estinet



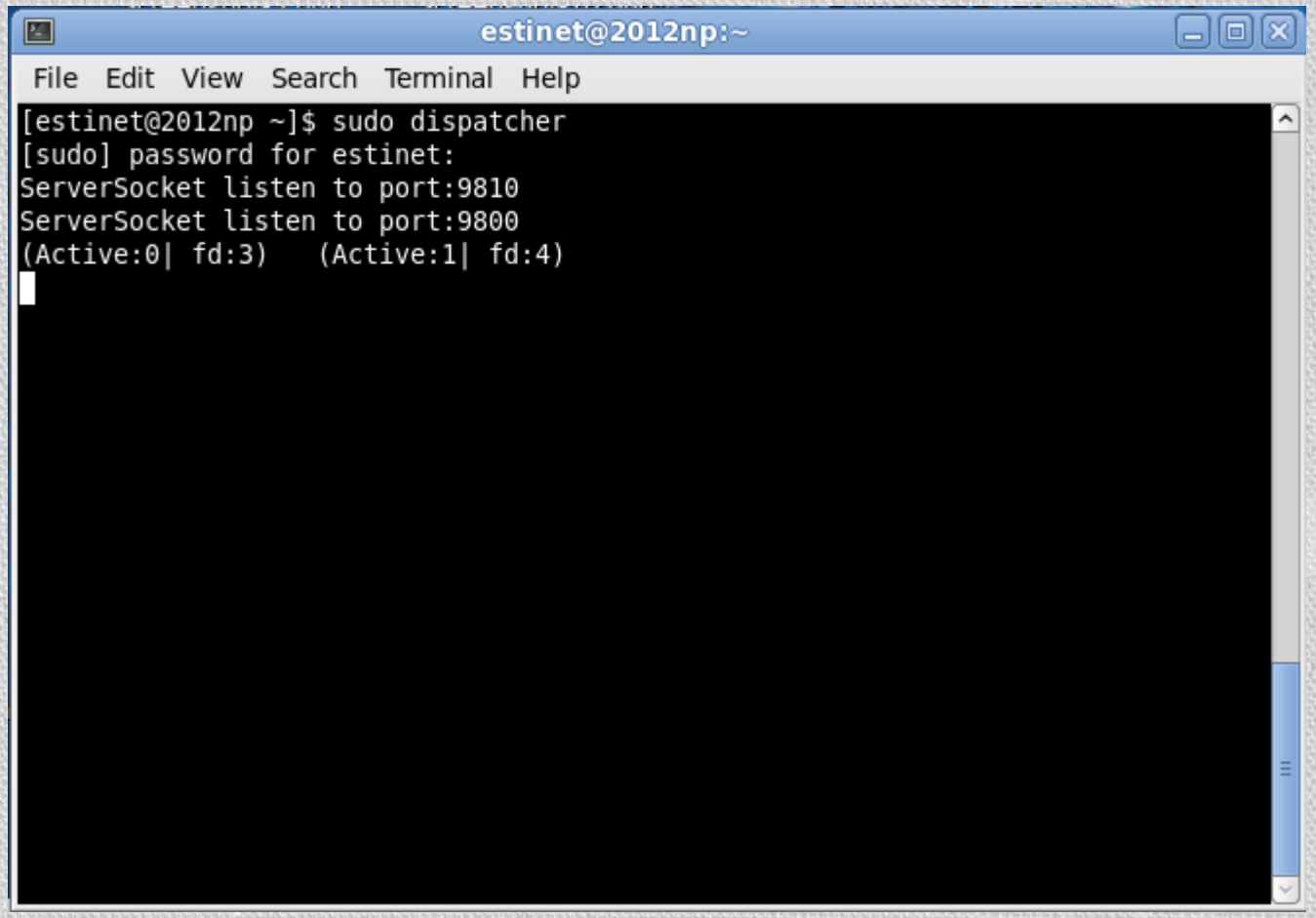
Use your own directory as working env.

- And put all your code in the corresponding directory



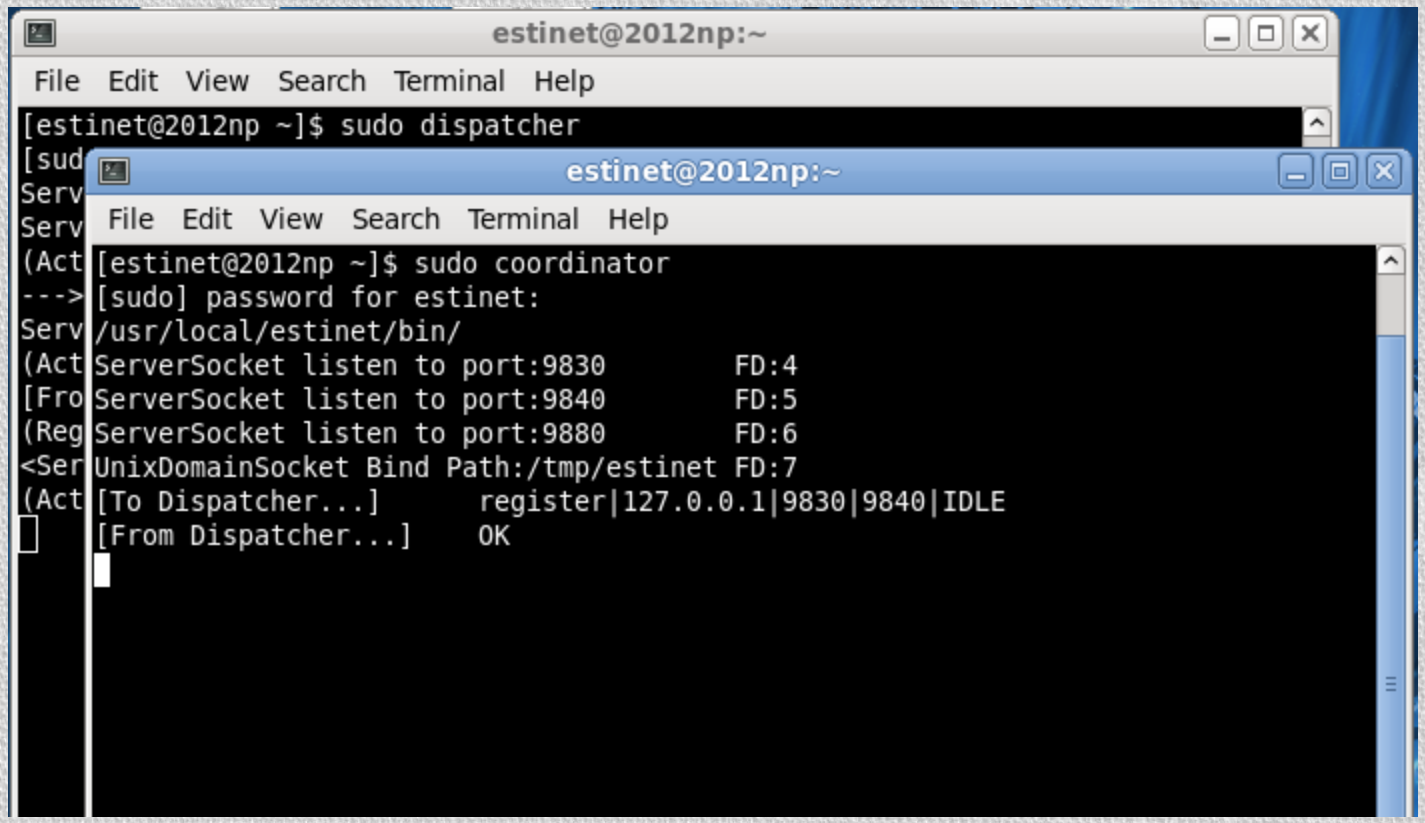
Start dispatcher

- disaptcher is one of the component of EstiNet
- sudo dispatcher



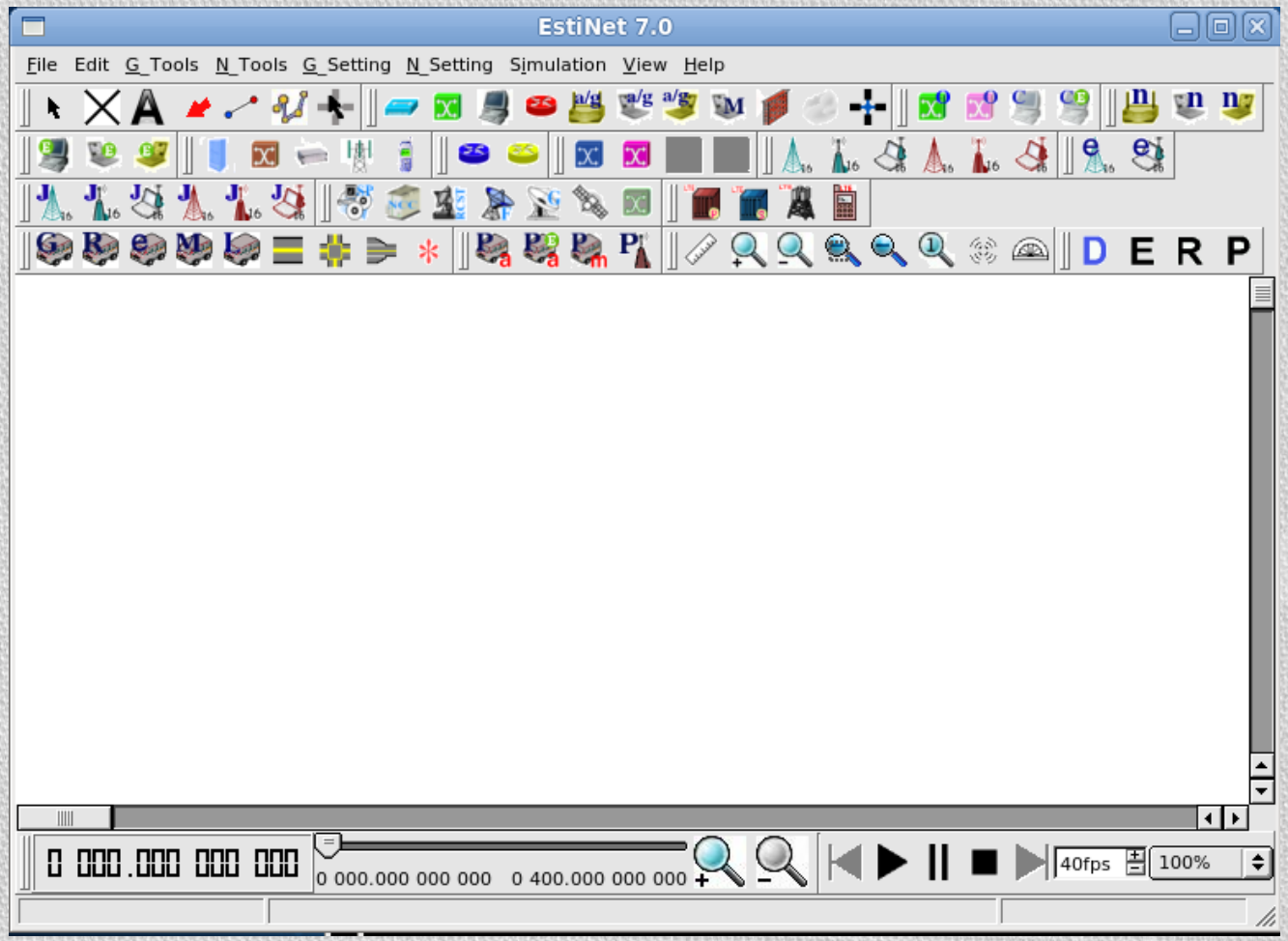
Start coordinator

- coordinator is one of the component of EstiNet
- sudo coordinator



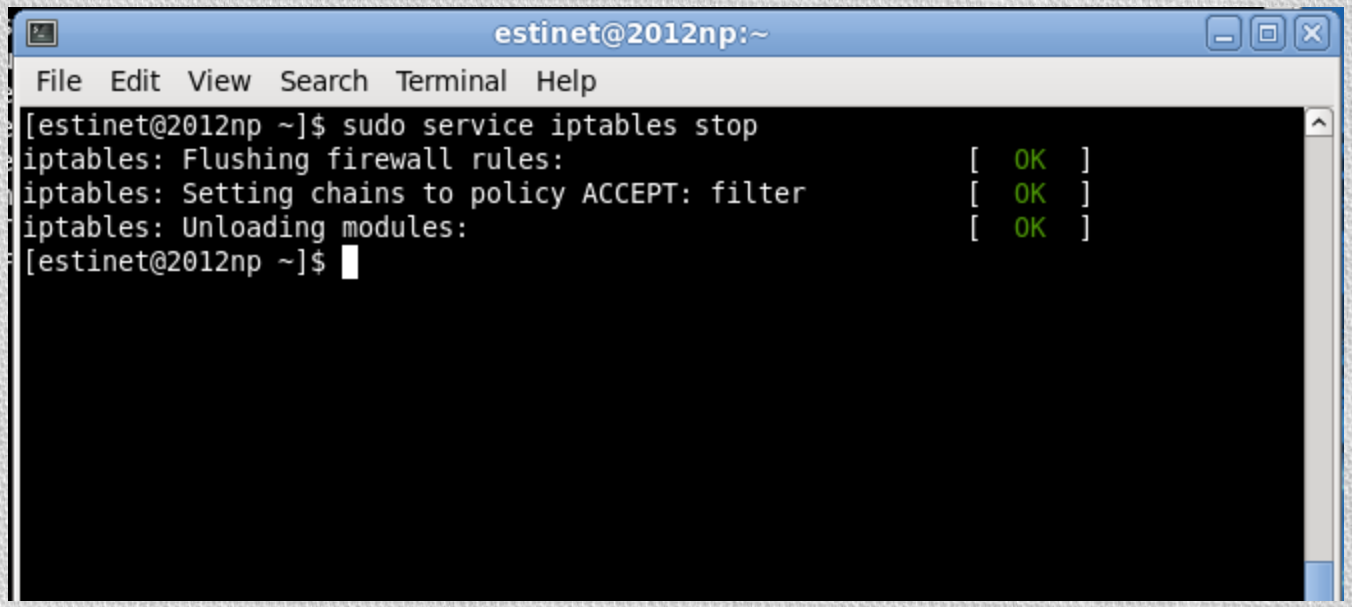
Start estinetgui

- estinetgui is where you can assign your network situation
- sudo estinetgui



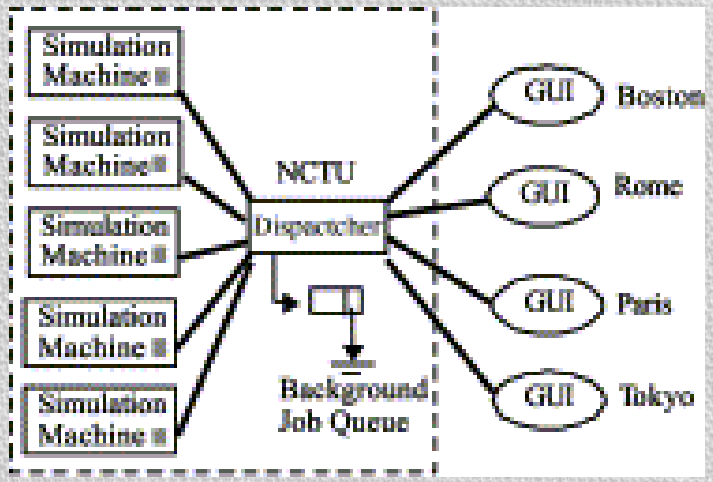
Shutdown iptables service

- Iptables is a default firewall in fedora system. As EstiNet produces real world network flows, iptables will treat these flows as malicious packets and drop.
- sudo service iptables stop



EstiNet

- estinetgui
  - An user interface for network topology setup
- coordinator
  - connect to dispatcher and bring up simulation engine
- dispatcher
  - As there can be more than one simulation engine to be used, the dispatcher manages the simulation engine communication and GUI requests.

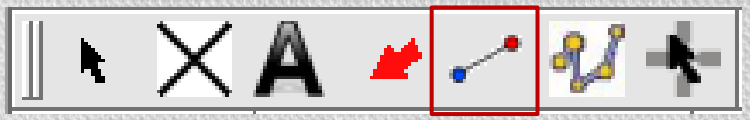


Simulation Topology Setup

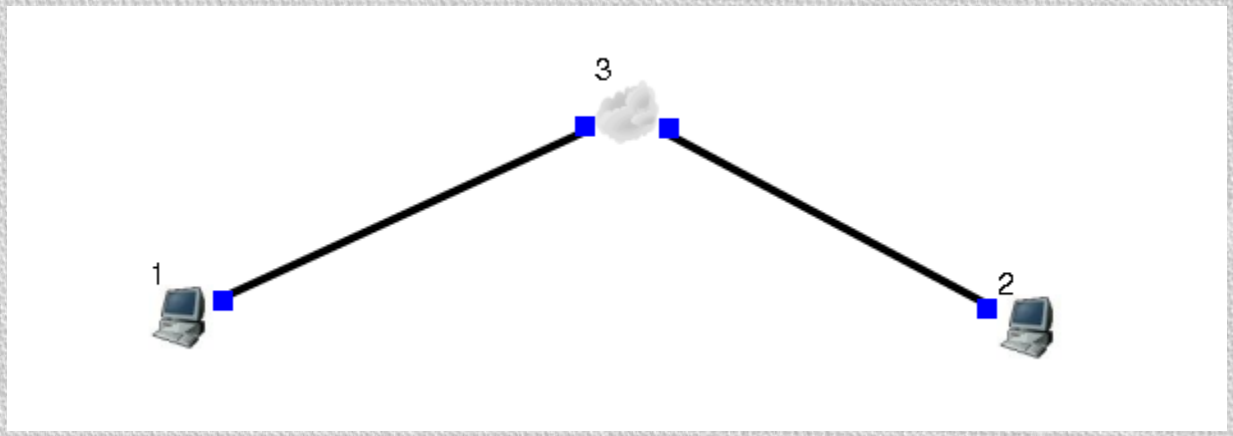
- There are 4 modes in estinetgui
  - Draw, Edit, Run, Play back

- Use draw mode to draw network topology

  - We'll use ethernet for this homework



  - Use 2 host and 1 WAN to create a topology like below



Simulation Topology Setup

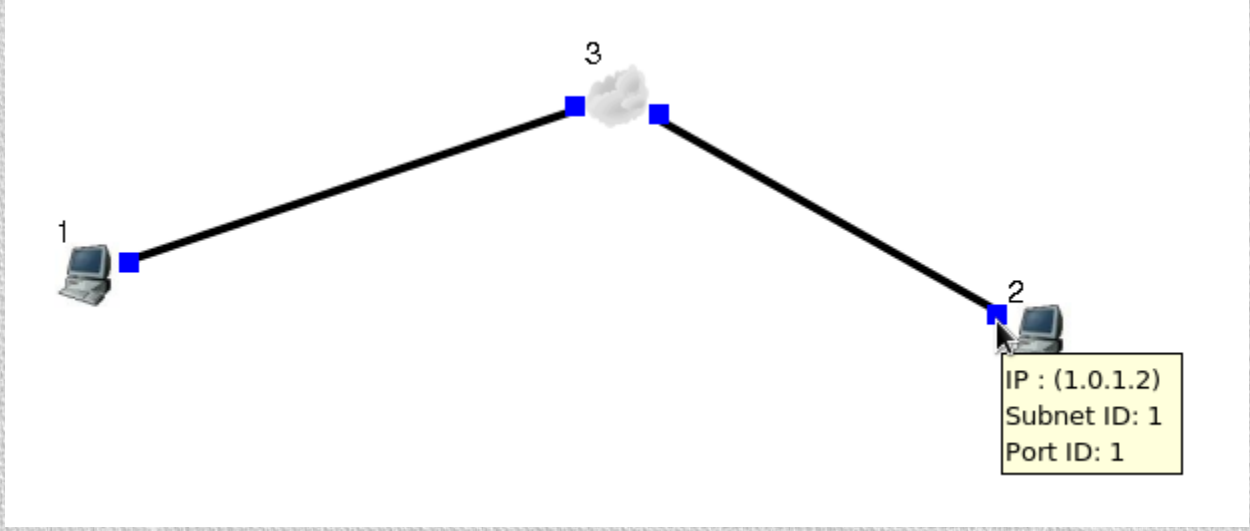
- Switch to E mode
  - This mode can set parameters of the topology we just designed.
- We will need to setup 5 different parameters:
  - Setup the program which will be run on the topology
  - Link delay and link bandwidth
  - Packet loss rate
  - Log the throughput of each node
  - Random number seed

Setup parameters

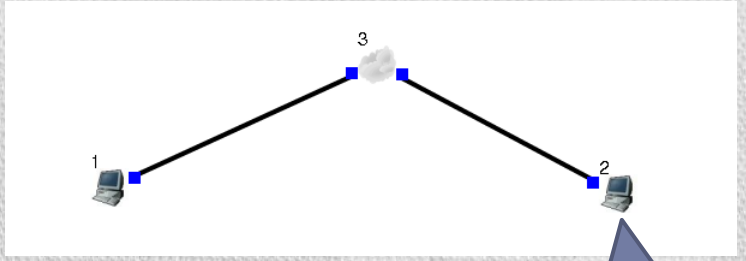
- We don’t need to change any of our code to run simulation in EstiNet
- Copy your executable program to /usr/local/estinet/tools
  - But in this homework, you only need to paste your program in /tmp/np/
    - cp server /tmp/np/
    - cp client /tmp/np/
- Specify the program name of your own, and it will work like a charm

Setup parameters

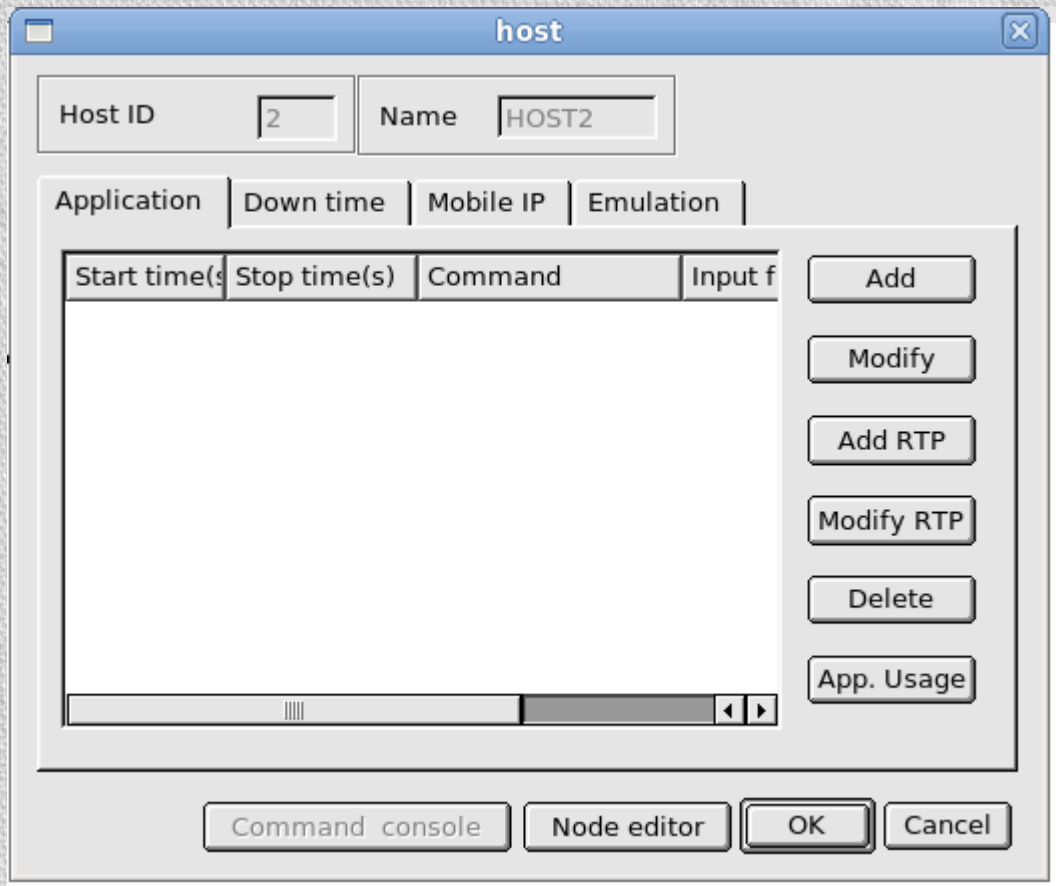
- Hold your mouse on the square beside the host for a moment, you will get the IP of the corresponding host.



Setup parameters

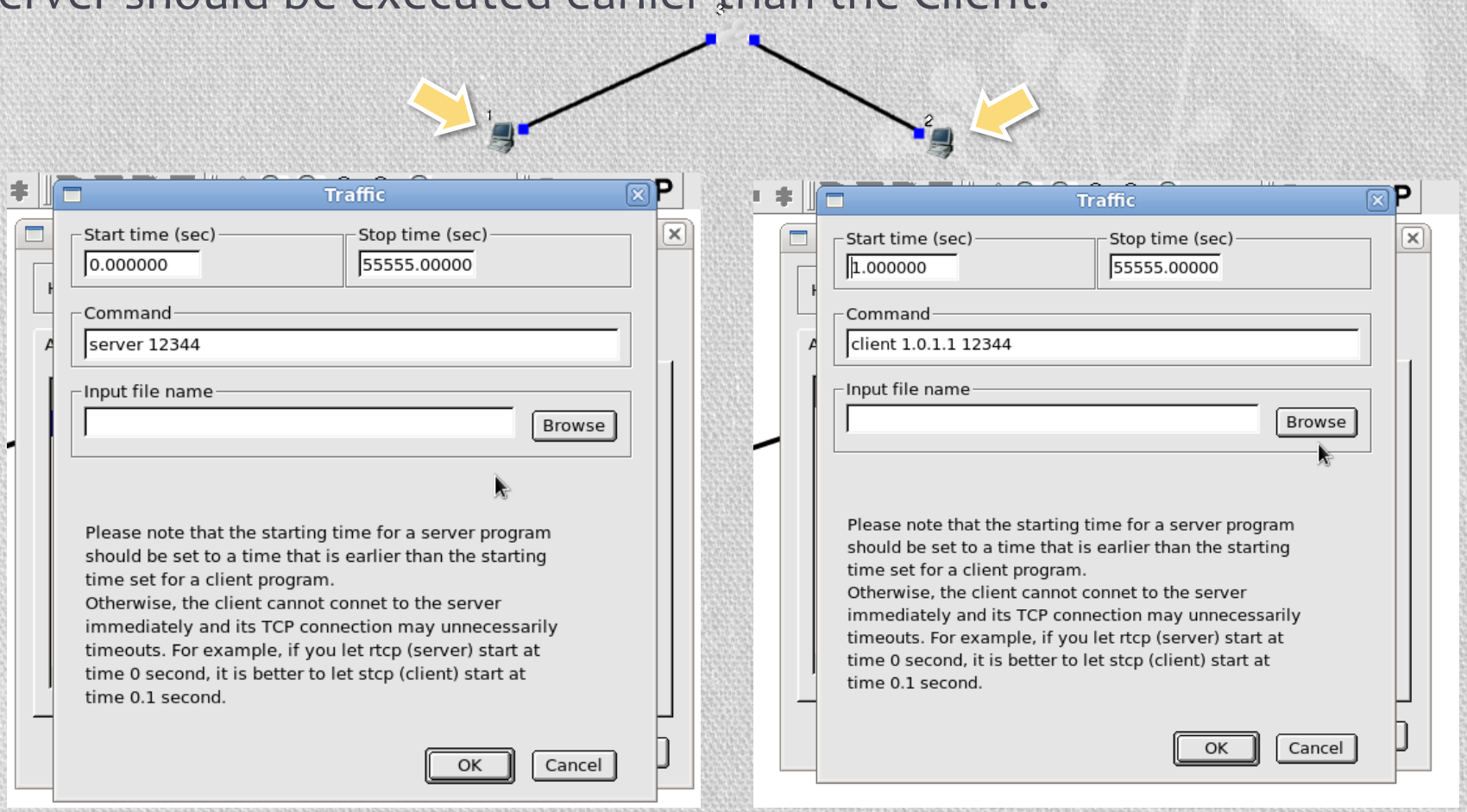


- Double click the host, you will get the window below
- Click Add button



Setup parameters

- You should fill the name of your program on both sides.
- Server should be executed earlier than the Client.

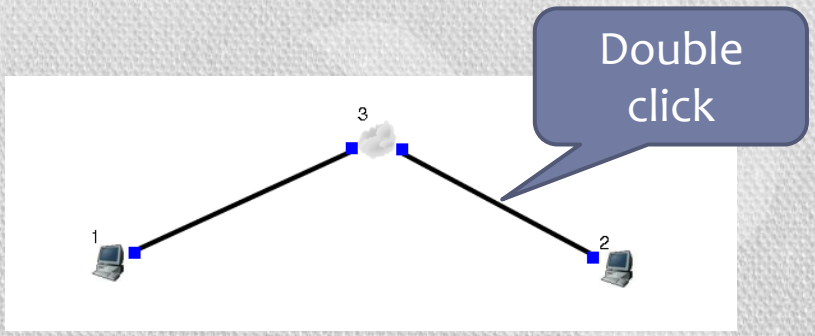


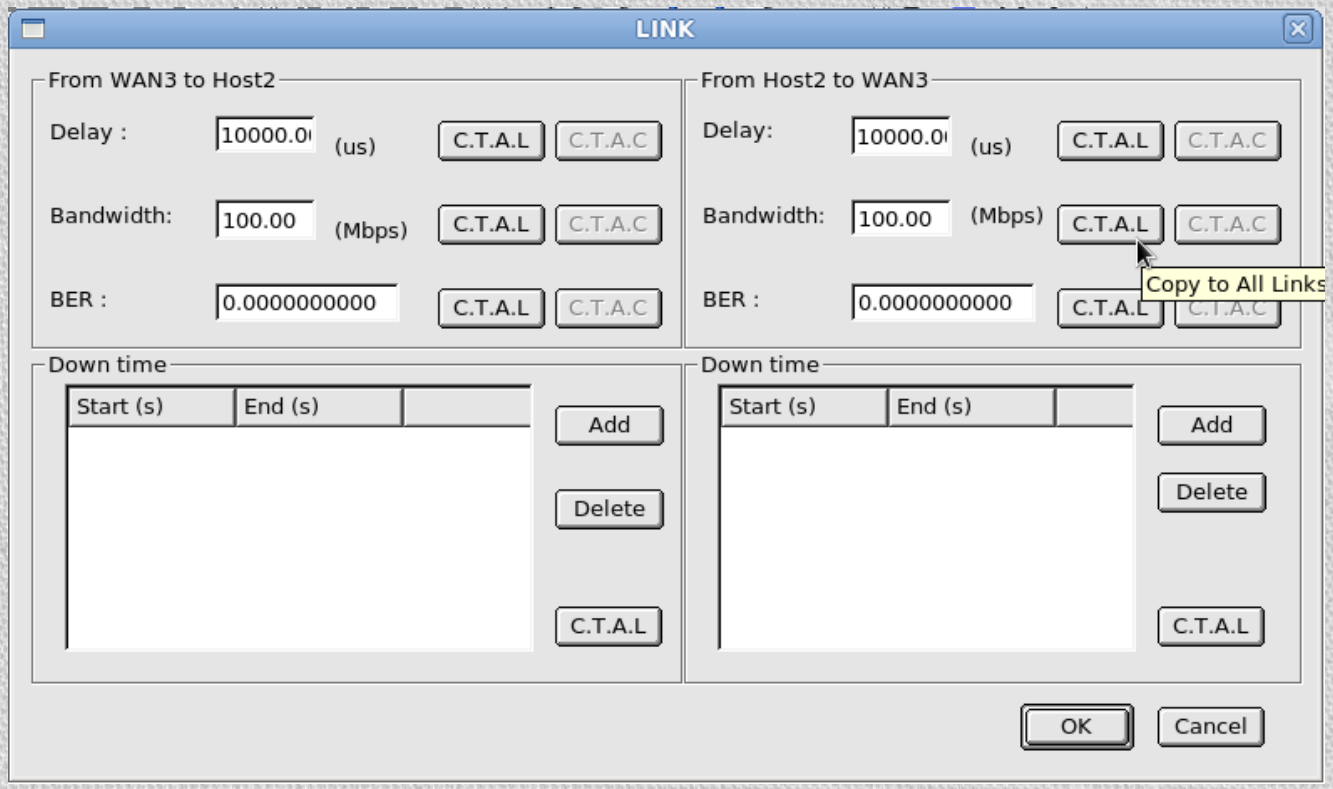
Setup parameters

- We need to specify the network link delay, bandwidth.
- The default link delay is 10 us, bandwidth is 10 Mbps
- Topology we need in this homework are
  - Link delay: 10000 us (10 ms)
  - Link bandwidth: 100 Mbps

Setup parameters

- Double click the link between nodes
- Dealy: 10000 us (10 ms)
- Bandwidth: 100 Mbps
- Click C.T.A.L (copy to all links)



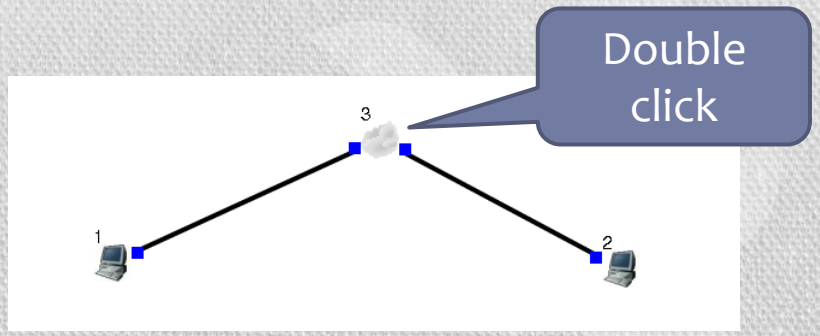


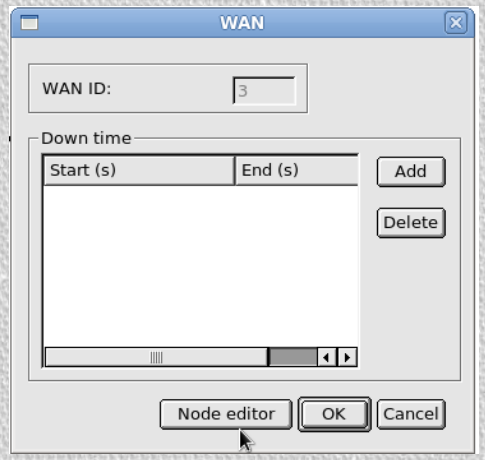
Setup parameters

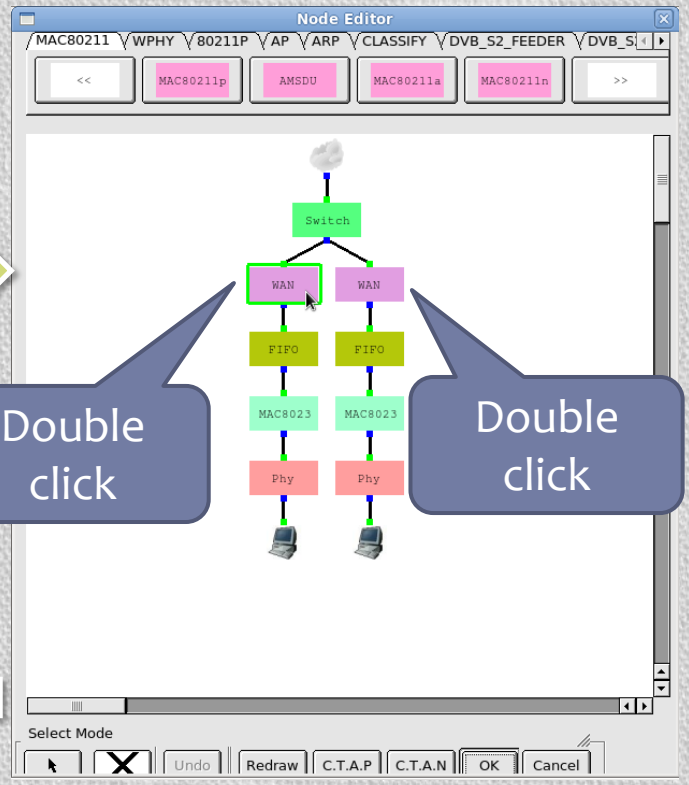
- We will need to setup a packet lost network simulation
- We use cloud(WAN) to archive that need.

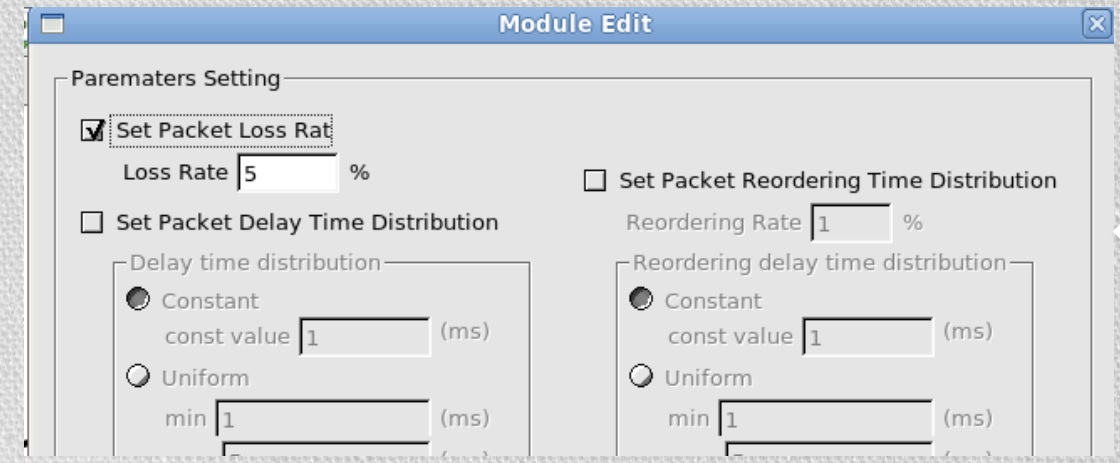
Setup parameters

- Double click the cloud (WAN)
- Click “Node editor”
- Double click “WAN”
- Set Packet Loss Rate
  - You can try different values from 1 to 10%
  - Set on both side





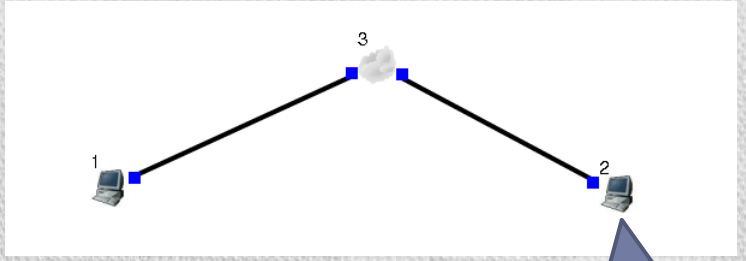




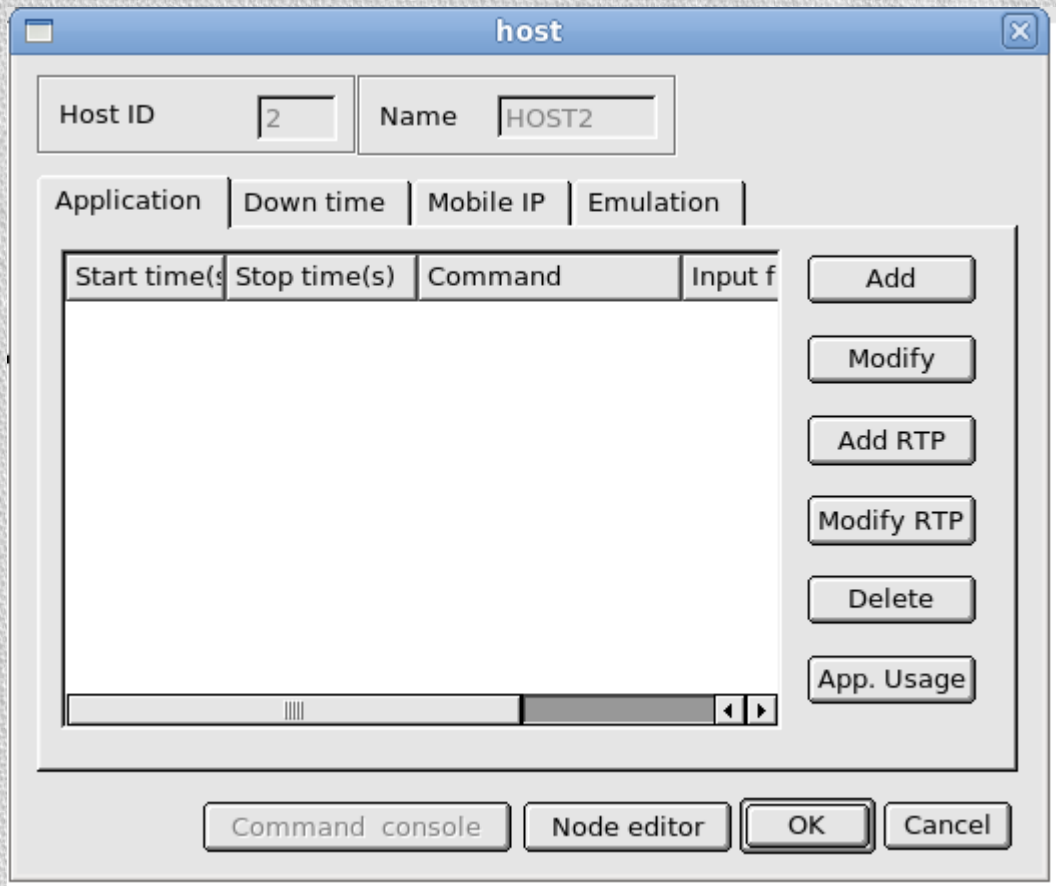
Setup parameters

- We will need to understand how many network resource does your program consume.
- EstiNet has the option to log your throughput during execute time.

Setup parameters

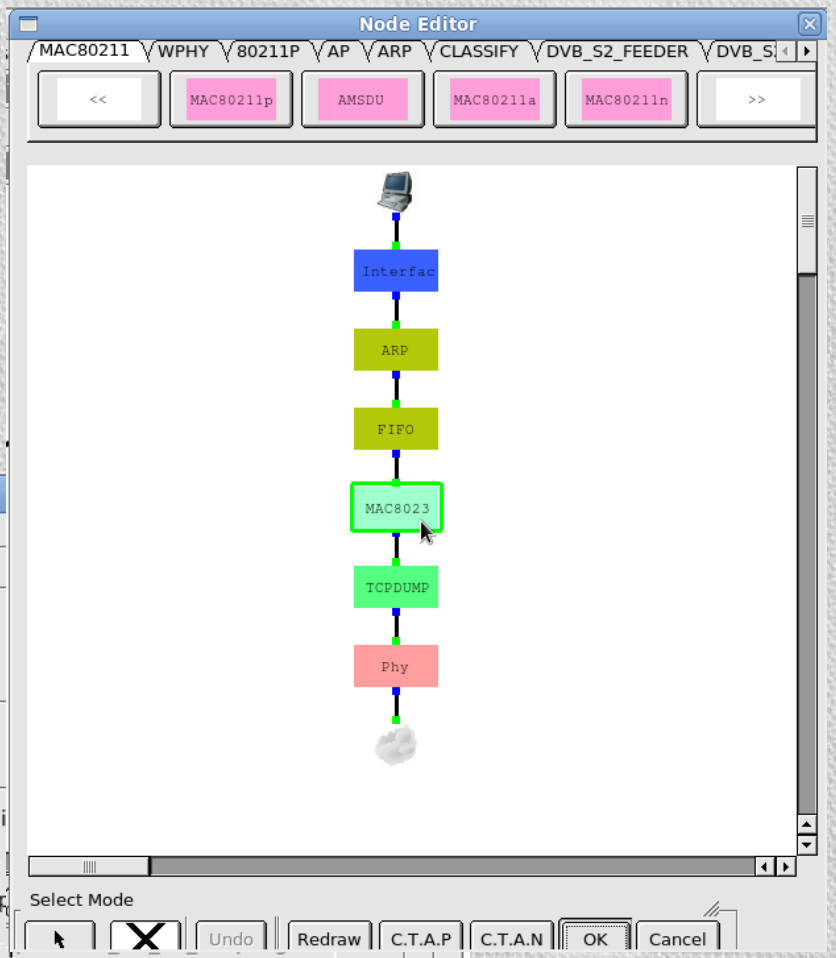


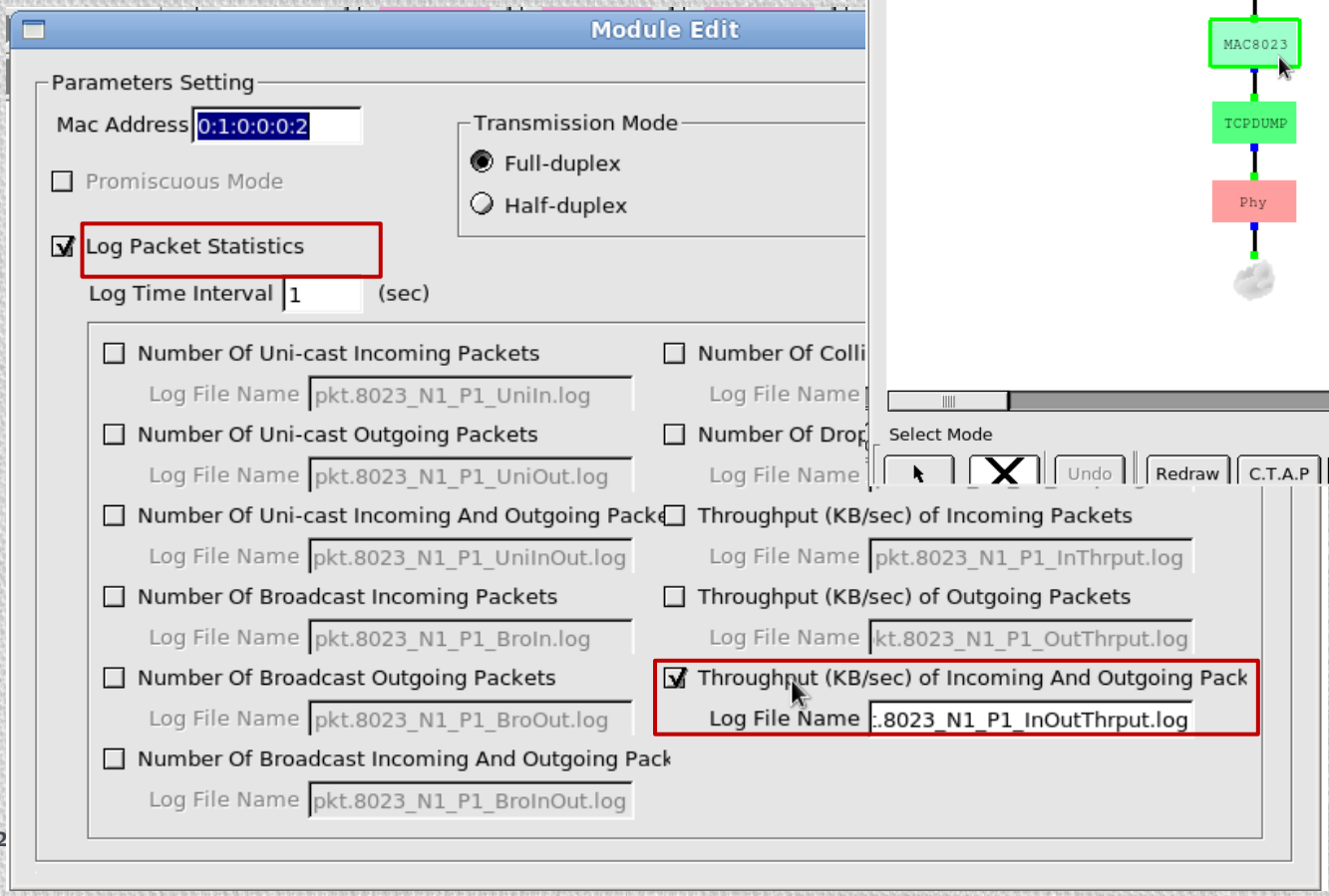
- Double click the host, you will get the window below
- Click “Node editor” button below



Setup parameters

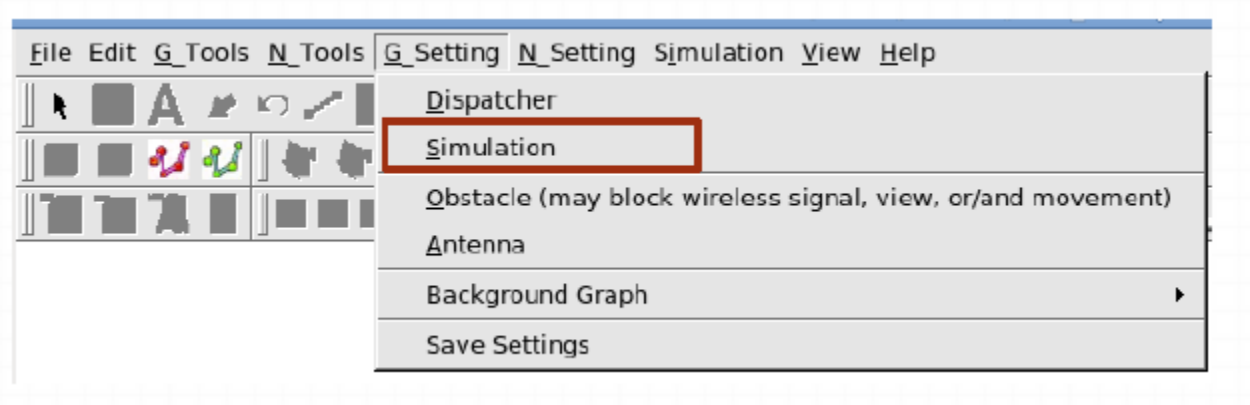
- Double click “MAC 8023”
- “Log packet statistics”
  - “Throughput (KB/sec) of in/out Packet”





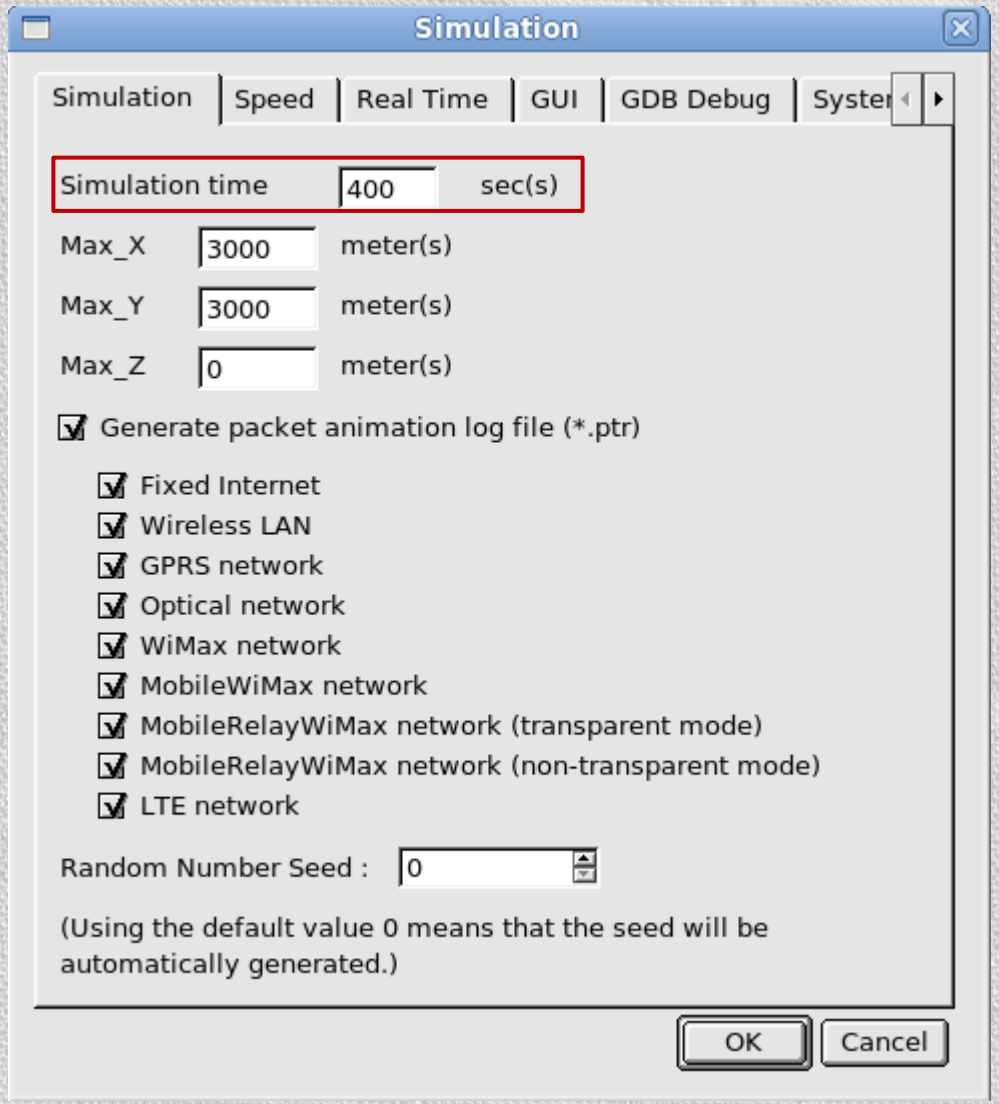
Setup parameters

- You have to know three options and parameters in this homework
  - **Simulation time, random seed, and simulation speed**
- Find them in G_setting -> simulation



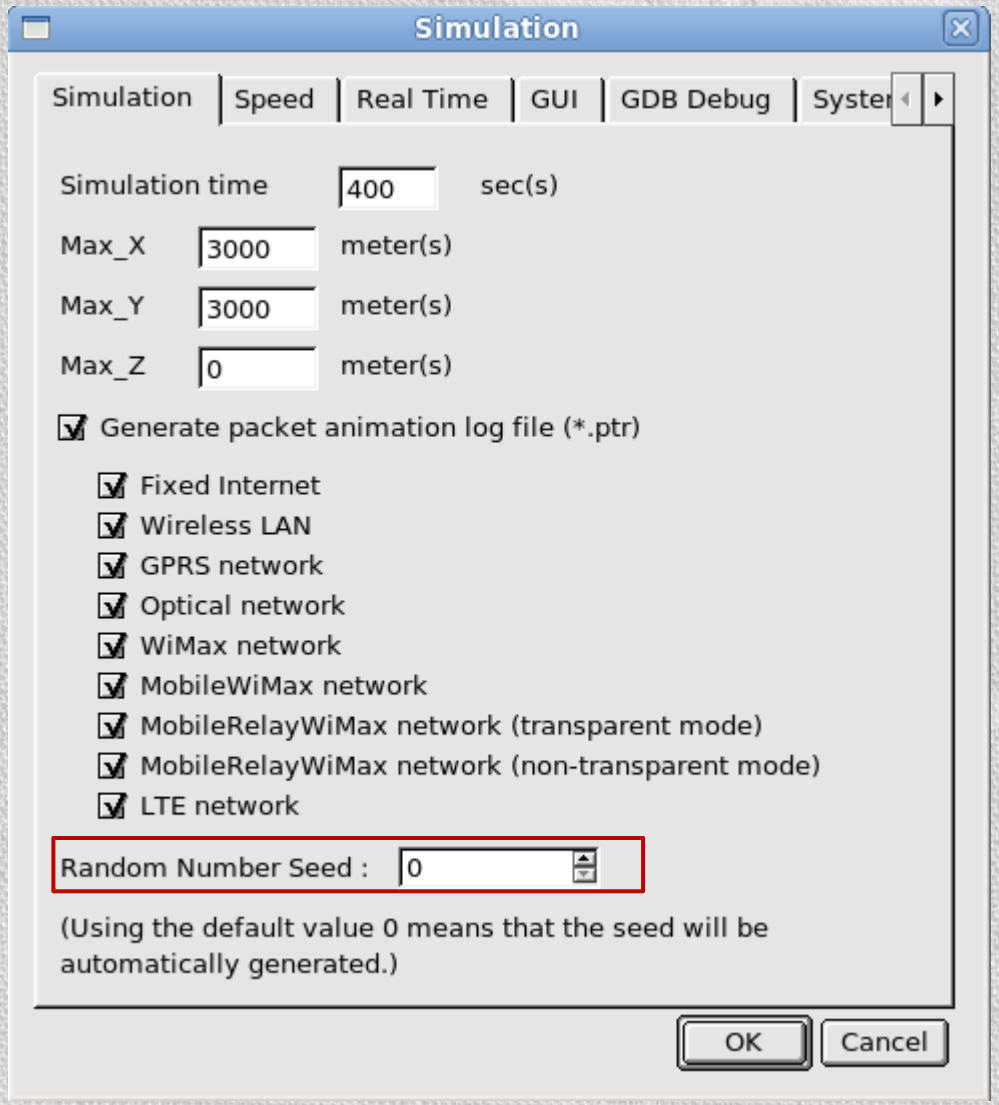
Setup parameters

- Simulation time
  - The time in the simulation network.
- You don't need to change it until your program need more time to finish it work.



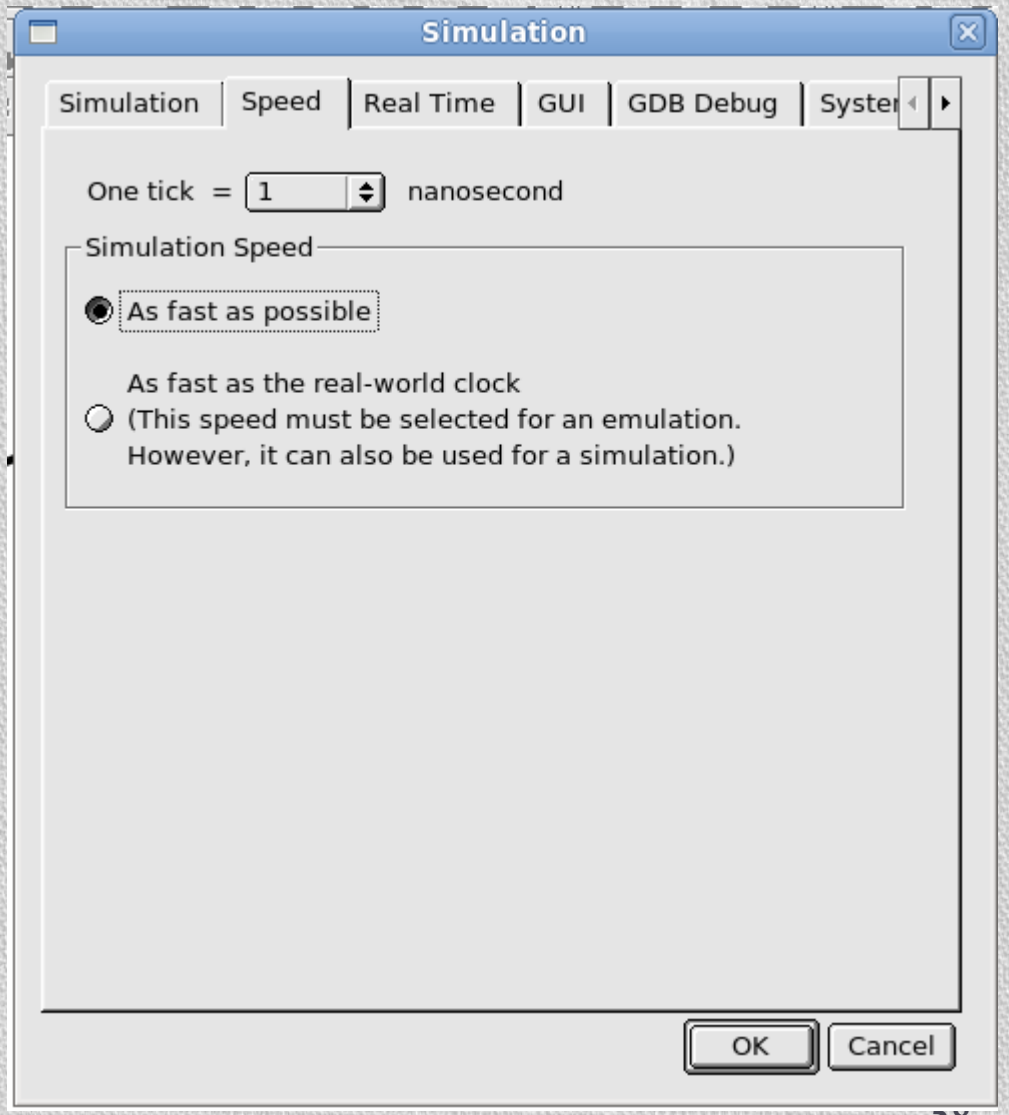
Setup parameters

- Random number seed
  - If you want your simulation case is repeatable, you should set it to a non 0 number
    - If the number is non 0, the result of a case will be always the same on each run.
    - If the number is 0, the result of a case will be different after each run.



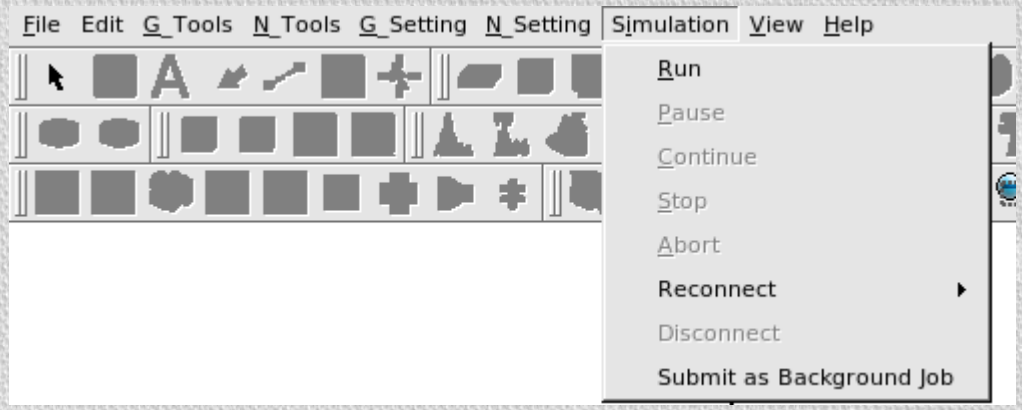
Setup parameters

- Simulation speed:
  - If you want to use command console, you have to use “As fast as the real-word clock” mode.
  - Otherwise, “As fast as possible”, mode can save your time.



Run simulation

- Use “R” mode
- Simulation -> Run



- If you want to stop before simulation is done
- Simulation -> Stop

Log time

- You should use gettimeofday to examine how long is the transfer time.
- Use gettimeofday before and after the receiving data loop.
  - #include <sys/time.h>

```
struct timeval timeintv_a, timeintv_b;
// get start time
if(gettimeofday(&timeintv_a,NULL)!=0){
    printf("gettimeofday failed\n");
    exit(1);
}
```

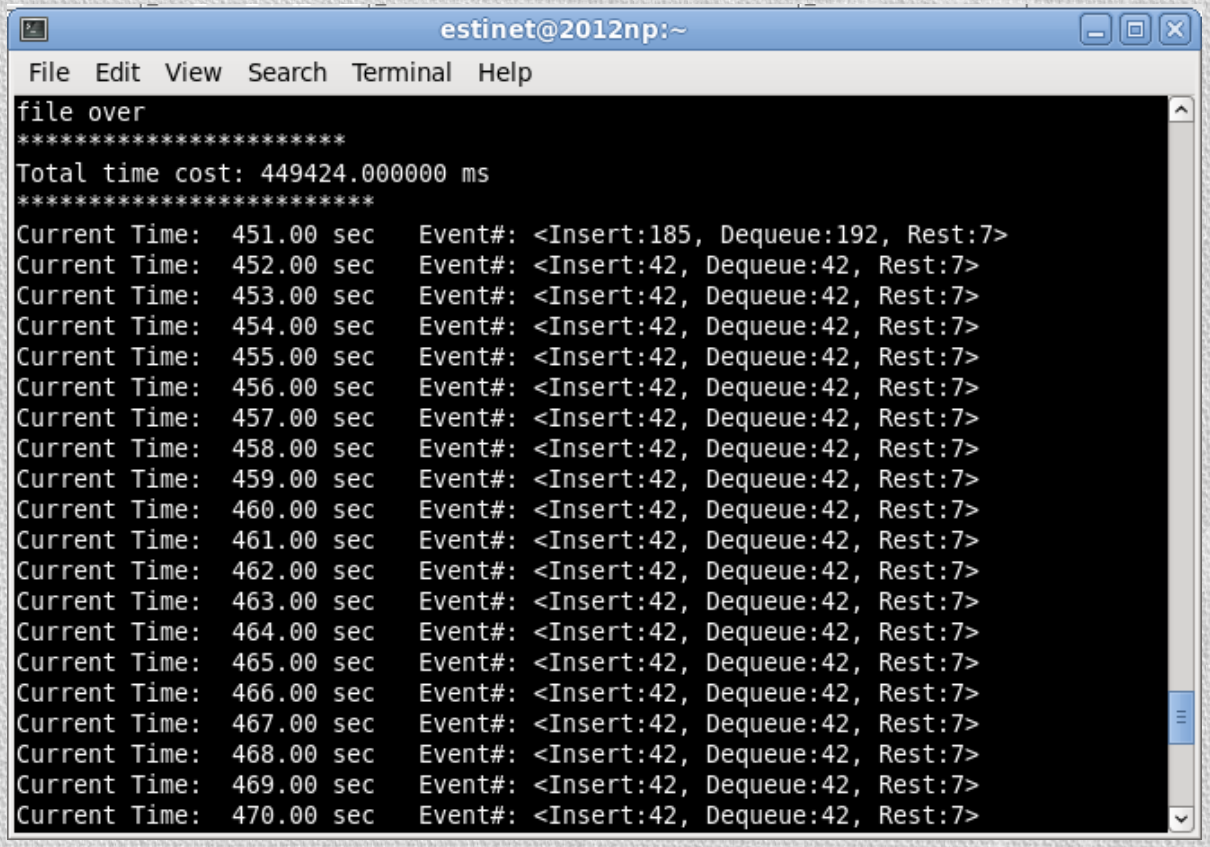
- Receiving Loop{}

```
//get end time
if(gettimeofday(&timeintv_b,NULL)!=0){
    printf("gettimeofday failed\n");
    exit(1);
}
timecost = (timeintv_b.tv_sec - timeintv_a.tv_sec) * 1000;
timecost += (timeintv_b.tv_usec - timeintv_a.tv_usec) / 1000;

printf("************************\nTotal time cost: %f ms\n*************************\n", timecost);
```

Log time

- Your program output will be shown on the coordinator window.
- You should check coordinator window to understand your time consumed.



HW requirements

- Execution format
  - ./server [port]
  - ./client [ip] [port]
- Your program should read the input file place in /tmp/input.tar
  - That is, function should be set as `fp = fopen("/tmp/input.tar","rb");`
  - If you're developing, use your own file.
- The received file should be placed in your own folder
  - Name as "received.tar"
- **Write a simple report about your design(in 400 words)**

HW requirements

- Homework parameters
  - Delay between 100 ms
  - Drop rate between 5% (for both data packet and ack packet)
  - Test file size will be approximately 20 MB
  - All students will be having the same random number seed.
- Grading policy
  - We will run the simulation three times, each using different timeout method you implemented. Each program should produced the correct result.
  - We will test only your correctness, time/ transfer size efficiency will not be concern.
- Due day 12/14(Wed.)