IT531

Introduction to NetSim

1 Introduction

Network simulator enables users to design a virtual network along with its components like switch, router, links etc. It also helps user to study behavior and performance of the network. Applications:

- Protocol performance analysis

- Application modeling and analysis

- Network design and planning

- Research and development of new networking technologies

- Test and verification

Performing a network simulation in Netsim involves four steps:

1. Design a network from GUI

2. Configure the network

3. Model traffic

4. Analysis

There are three versions of NetSim available. Firstly, Academic used for lab experimentation in teaching. Secondly, Standard version is used for R & D at educational institute. NetSim Pro version addresses the needs of defense and industry.
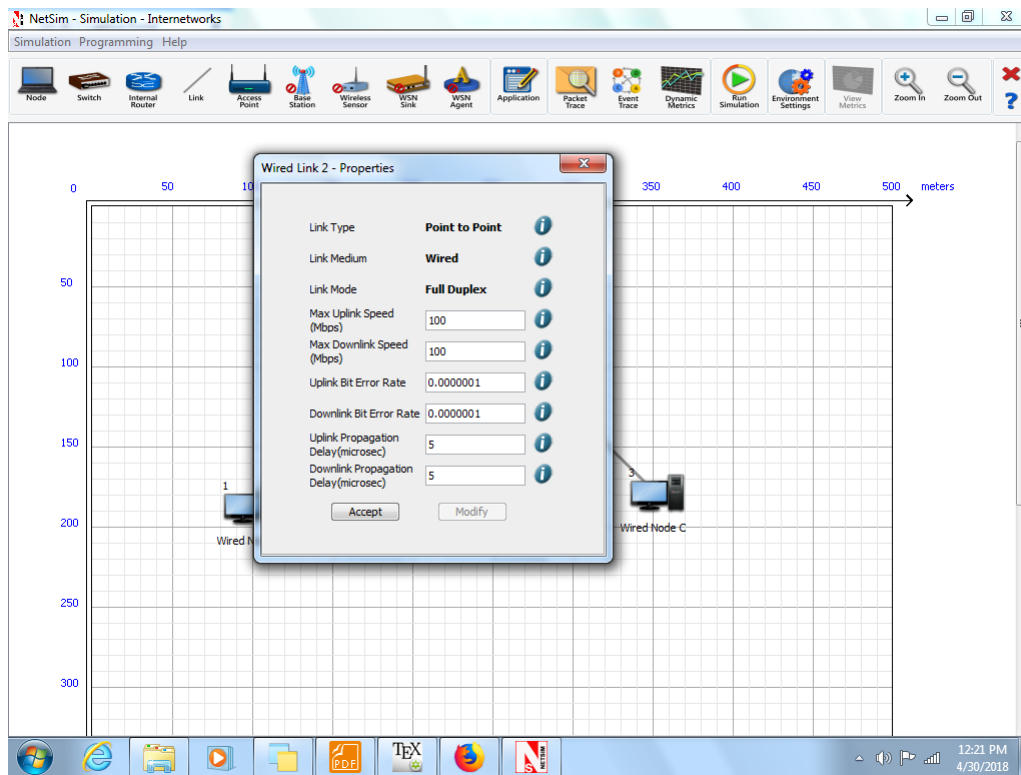
2 Modeling and simulating a simple scenario

1. To begin, Click on New → Internetwork

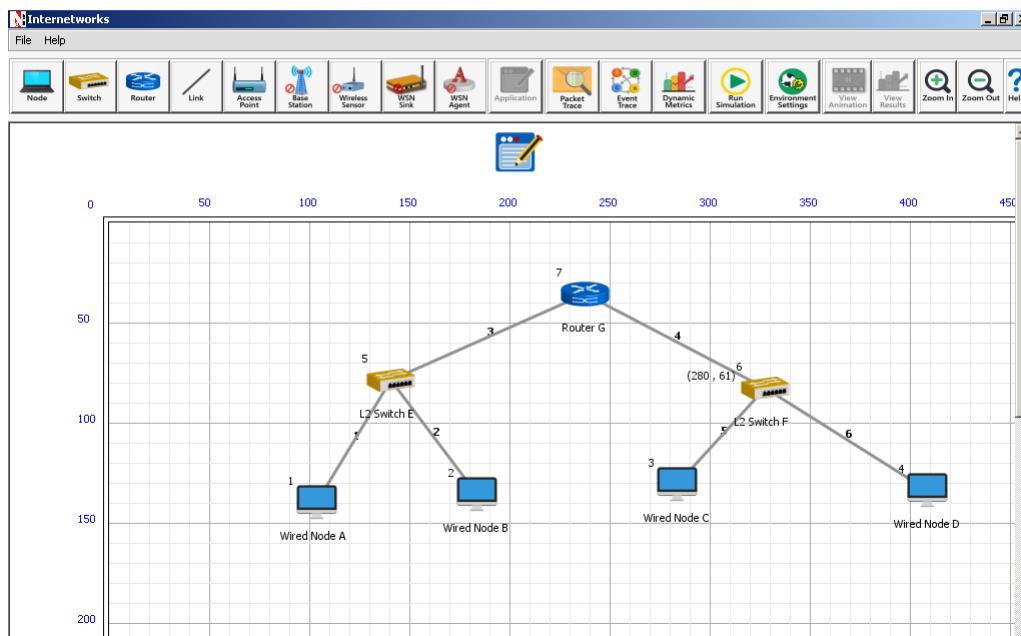2. Model the network by dragging and dropping the devices and links as shown below
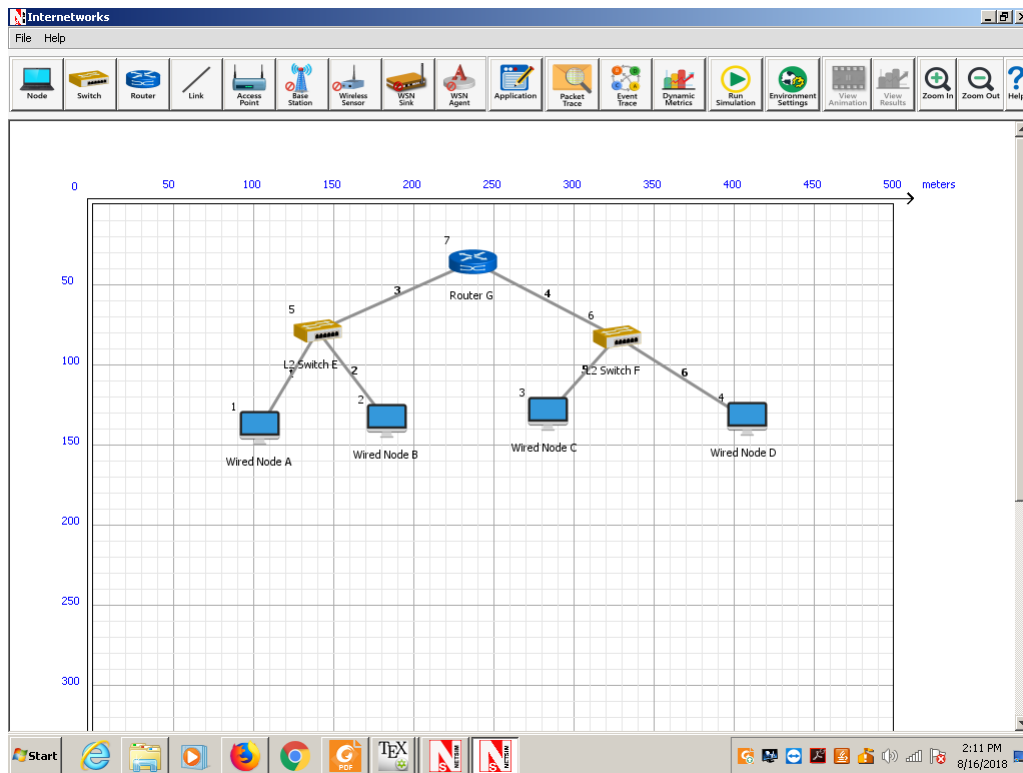
3. Set the properties of devices and links by right clicking on it.(Currently set the default values)
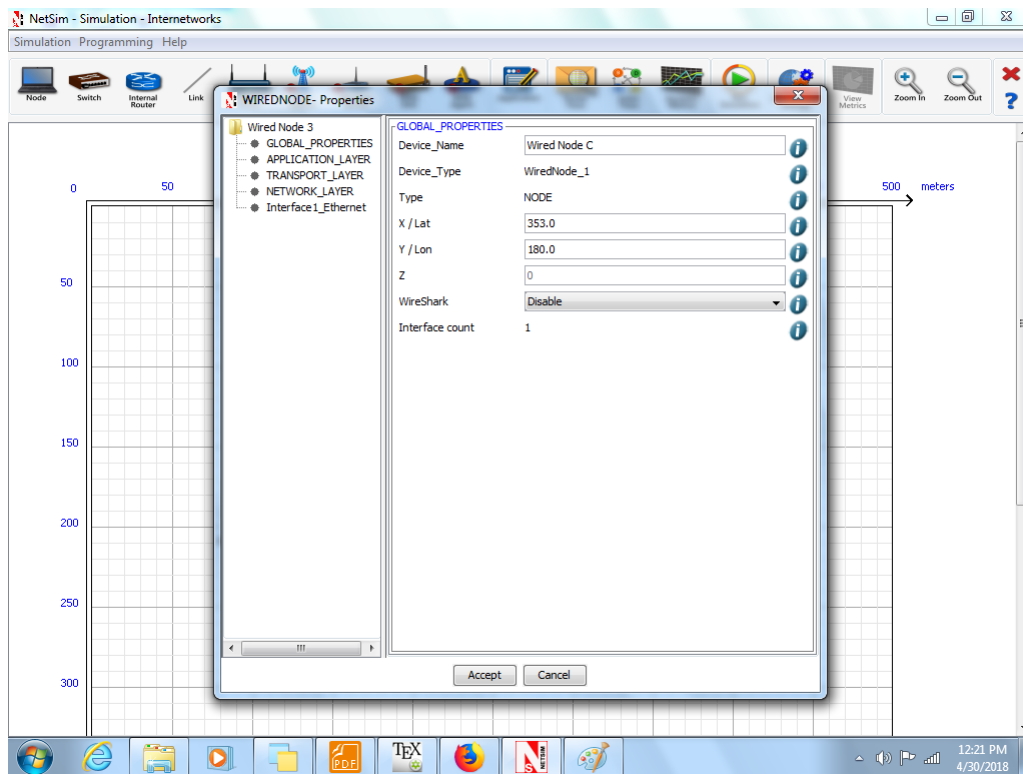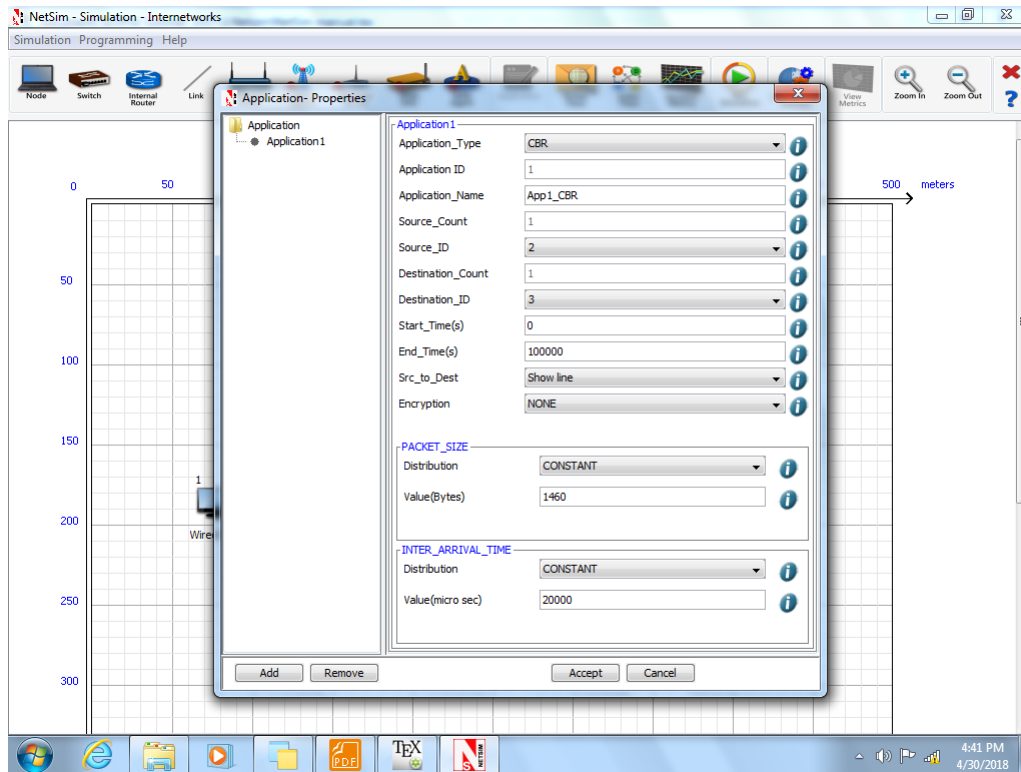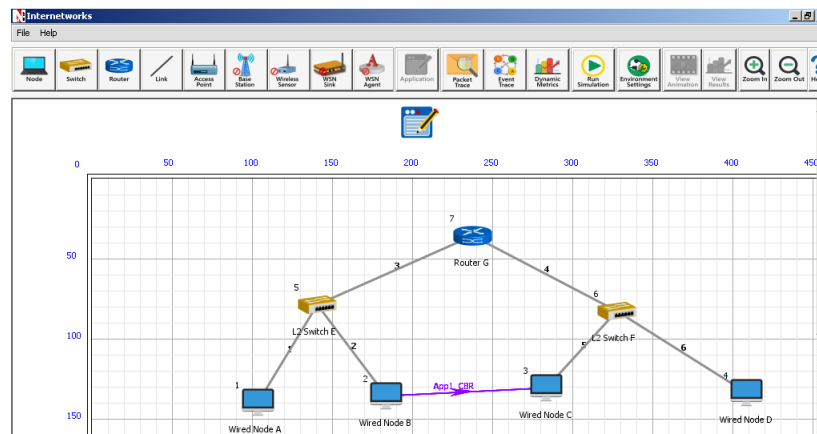
4. Drag the application icon and put in the area between the menu bar and grid.

5. Right click on it to configure parameters of it. (Currently set the default values in which 2 is source id and 3 is destination id)


6. You can see application line as shown in following figure:

7. Click on Packet trace icon to enable packet trace. Select required attributes.(currently select all of them)

8. Click on Event trace icon to enable event trace. Select required attributes.(currently select all of them)

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9. Click on Dynamic Metrics icon to generate various plots. Select required attributes.(currently select all of them)

10. Save the experiment by, File menu → Save.

11. Go to the folder where you have saved the experiment. There will be configuration file. Open it in visual studio 2017.(if file is not formatted you may go to edit → Advanced → Format document. Compare it with the given configuration file.

12. Run the simulation set the time interval of 10 s.

13. Packet animation window will be opened as shown in following figure:
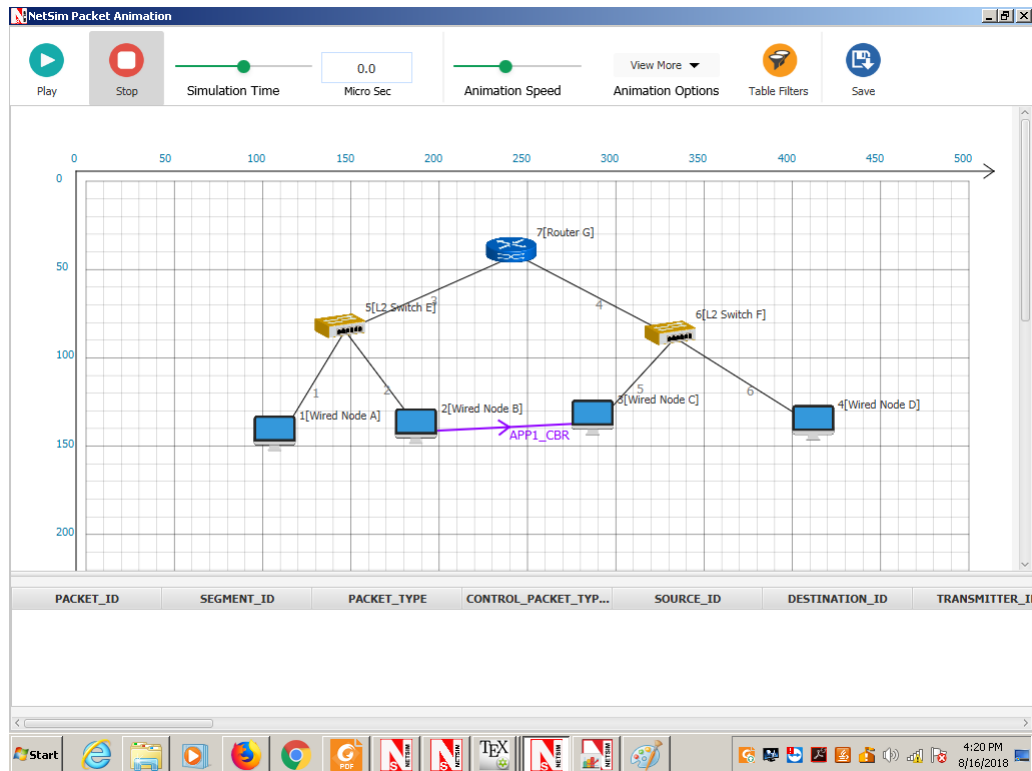
14. There will be another window for trace parameters as shown in following figure:
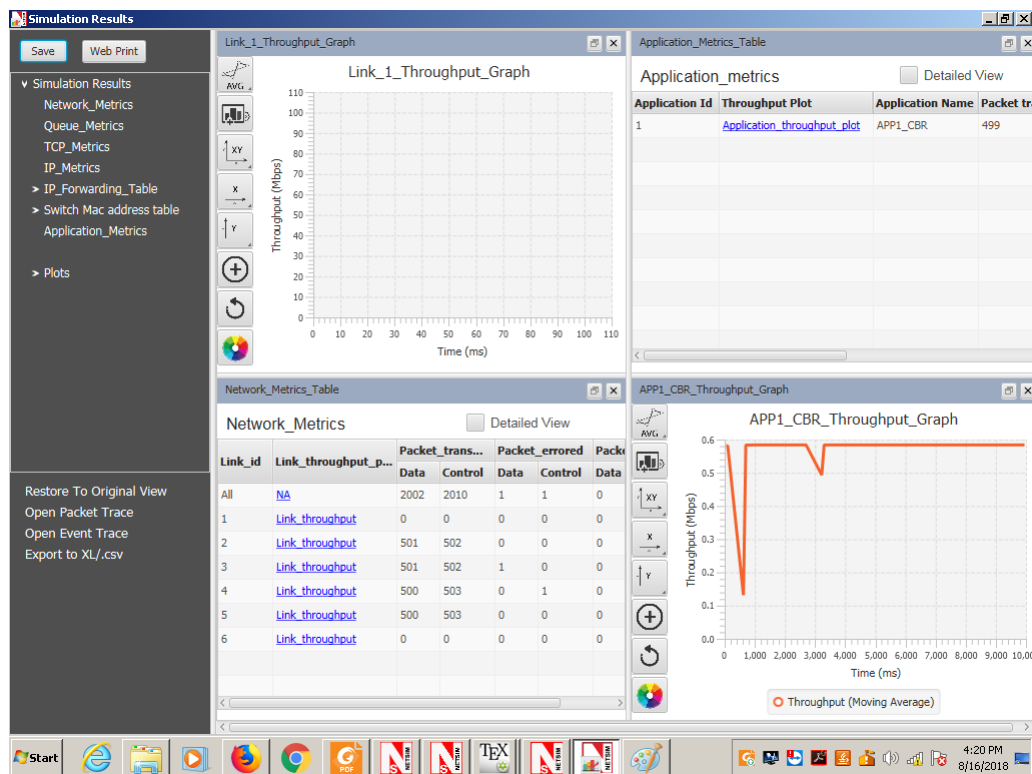
15. Save animation file and trace files.

3 Exercise

3.1 Implement the following LAN configuration

1. Devices:
   - 10 wired nodes
   - 1 L2 switch

2. Topology: Star topology(All the wired nodes connected to switch)

3. Implement 5 different applications between every disjoint pair of wired nodes(i.e. 1-2,3-4,5-6,7-8,9-10) with following properties:

   (a) HD video: This is a video application which sends 30 frames per second and every frames contains 10^5 pixels. It uses normal distribution to generate bits per pixel with $\mu = 0.52$ and $\sigma = 0.23$

   (b) You tube: This is a video application which sends 20 frames per second and every frames contains 10^4 pixels. It uses normal distribution to generate bits per pixel with $\mu = 0.52$ and $\sigma = 0.23$

   (c) Gmail: This is an EMAIL application which sends and receives mail of 30000 bytes at every 2s.

   (d) Browsing: This is a HTTP application in which server sends 3 pages, each of size 25000 bytes at every 2 s.

   (e) Database: This is a database application in which a transaction of size 10^4 bytes are sent at every $10^5 \mu$s.

4. Link properties:
   The link between every wired node and switch is of length 10 m and it is copper cable which has propagation speed of $\frac{2}{3}C$. where C is speed of light in universe.

3.2 Perform analysis on the LAN performance

1. Find throughput of every application.

2. Find average throughput of video applications

3. Find average throughput of all the applications.