A-Z installation Guideline for OpenFlow Simulation/Emulation Tool: Estinet8.1

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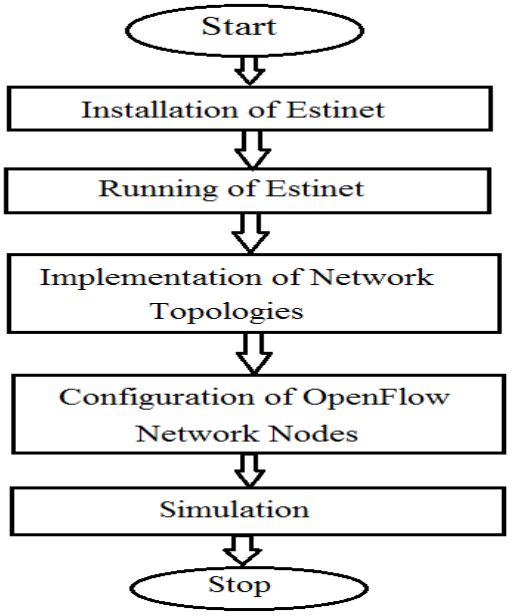
ABSTRACT
Aim of this paper is to provide a complete instructions for creating OpenFlow infrastructure using Estinet8.1. Estinet8.1 is both network emulator and simulator which provide capability to simulate and control various Ver 1.3.2 and Ver 1.0.0 OpenFlow switches using real-world controllers like NOX, POX, Floodlight and Ryu by running on a host in Estinet simulated network. This Paper provides a brief guideline in a hierarchical manner to install OpenFlow network tool. This easier step by step approach provide users to tackle problems during the installation.

Keywords
OpenFlow, EstiNet, NOX, POX.

1. INTRODUCTION
In today's era network should able to fulfil the increasing demand and handle dynamic traffic too. To come up with new technologies for networks [1] [2], we need a platform where the implementation of experiments or modifications and checking of results can be perform. Here to create a platform, Software Defined Networking [3] is used. Software defined Networking is the approach for network virtualization in it control plane (software) is separated from data plane (hardware) and implemented on an external controller and OpenFlow [4] [5] [6] is widely used SDN solution. Linux is the best platform for network virtualization, implementation and testing. Here Estinet8.1 [7], world-renowned software tool which supports the latest Fedora 17 Linux distribution to create network virtually using OpenFlow [8] [9]. Controllers like NOX [10] [11], POX [12], Floodlight [13] and Jha [14] are used in open flow network to manage the flow control. NOX [10] [11] is most widely used controller since it is written in C++/python.

The whole paper covers the following sections: Section 2 describes the introduction to EstiNet and its installation. Section 3 discusses the running of EstiNet with the help of three terminals. Section 4 consists the implementation of OpenFlow network topologies. Section 5 & 6 describes the process to configure the OpenFlow network nodes and simulation respectively. Paper also covers the issue occurs during installation process with proper justification. Finally Section 7 concludes the whole paper.

Flow Chart of complete paper:



2. ESTINET AND ITS INSTALLATION
EstiNet OpenFlow network simulator and emulator [7], uses specific approach to testing the performances and functions of OpenFlow controllers. By using a productive simulation terminology, called kernel re-entering [15], EstiNet combines the advantages of both the simulation and emulation approaches. In EstiNet simulated network, each simulated host is able to run the real operating system of Linux, and any UNIX-based real application program can easily run on a simulated host without any modification. With the help of these capabilities, simulation results of EstiNet are as correct as those produced from an emulation while still keeping the various advantages of the simulation approach. To install the EstiNet it is necessary that Fedora 17 Linux distribution must be running on PC. Installation is done with following steps:

2.1 Install EstiNet- EstiNet Membership

To download EstiNet one can have to be a member. To be a member follow the steps: Go to **www.estinet.com** → Supports → Customer Registration → Filling the form → Enter Personal Information → Verify Email Address → Customer Login→ Click on Free Trial→ Check your Email (consisting license key along with ftp account's user name and password).

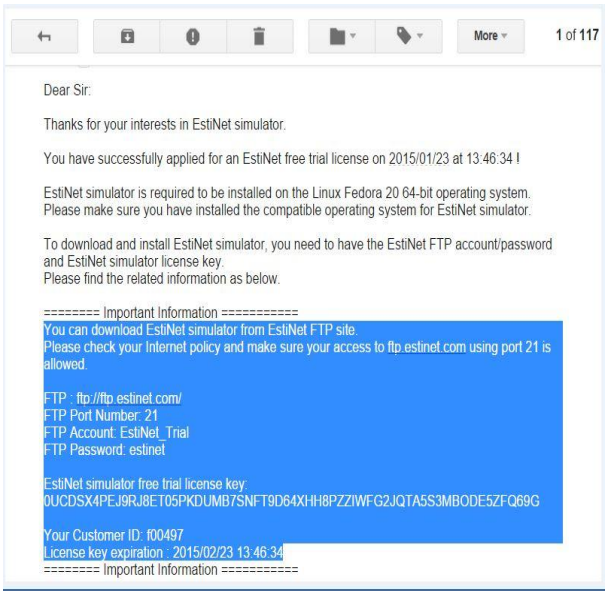


Fig 1

2.2 Install EstiNet- Download EstiNet:

To download EstiNet Go to ftp://ftp.estinet.com/ → Enter the user name and password mentioned in email After entering the credentials in ftp server user can save the Estinet Zip file as shown in Fig.2

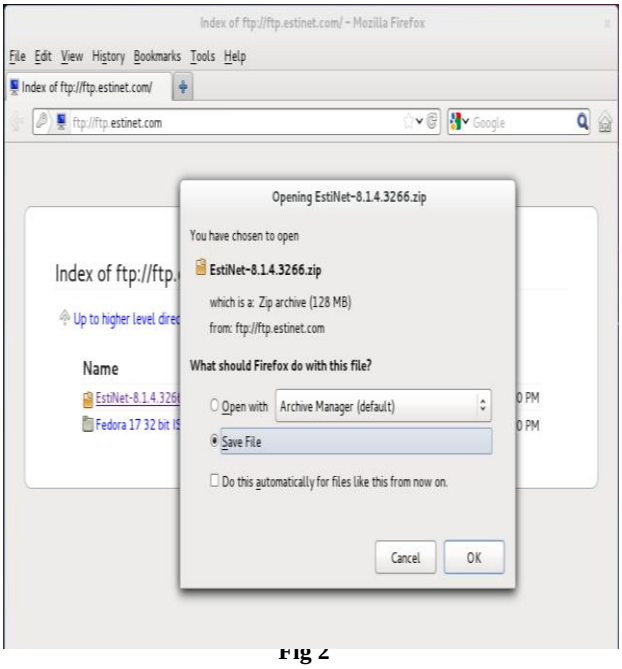


Fig 2

2.3 Install EstiNet- Unzip EstiNet package:

To unzip the package, user can directly access the InstallPackage folder by double clicking the Zip file. User can also unzip the file by running the Command- **tar -xvf estinet-XXXX.tar.bz2** with the root privilege in the terminal using following steps shown in fig.3.

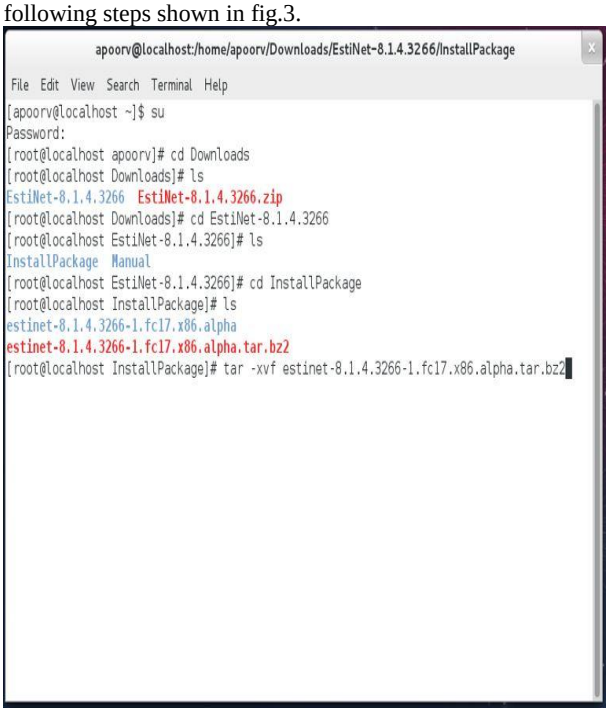


Fig 3

After unzipping the file InstallPackage folder must be containing the folders shown in Fig.4

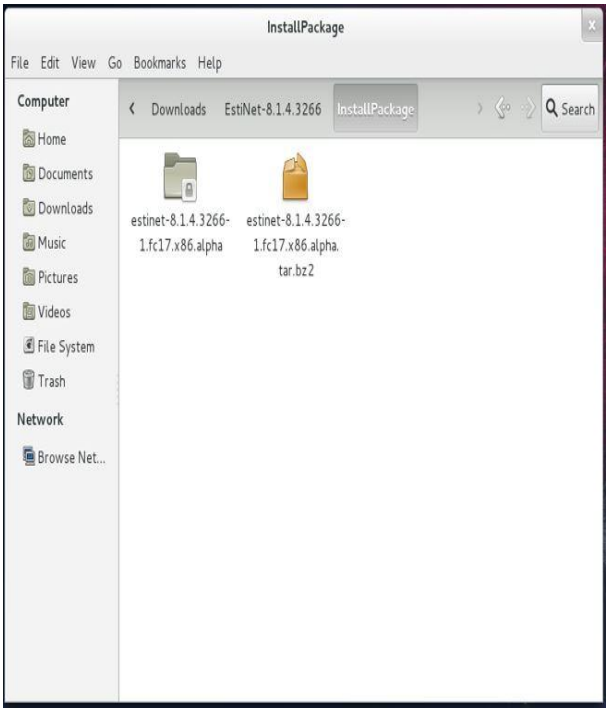


Fig 4

2.4 Install EstiNet – Execute install script:

After unzipping the package, user can find a script named "install.sh" in unzipped directory. Run the command

./install.sh with root privilege to start installing EstiNet shown in fig.5.

Fig 5

2.5 Install EstiNet – Installation Query 1:

Disable SELinux when installing by answering yes to continue in fig6

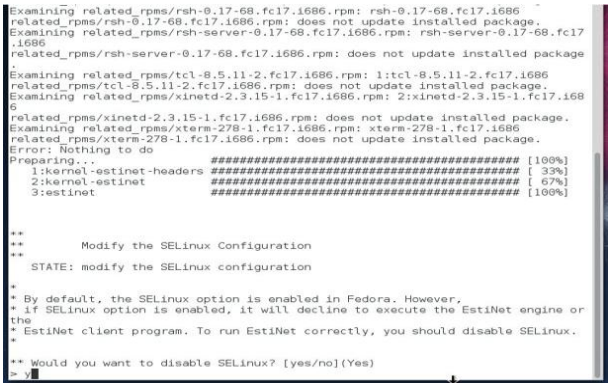


Fig 6

2.6 Install EstiNet – Installation Query 2:

To create a new Linux user account estinet/estinet, please answer yes to continue shown in fig.7.

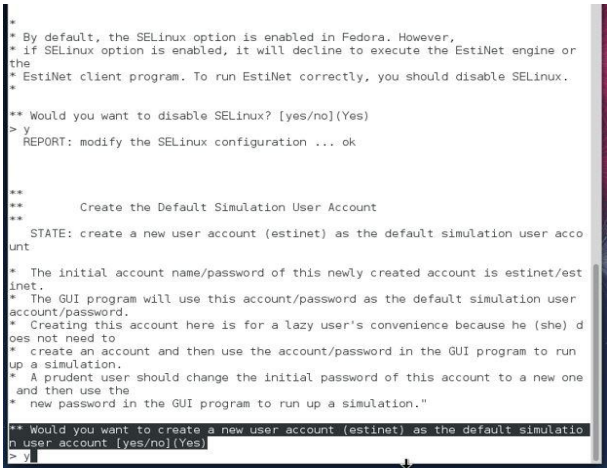


Fig 7

2.7 Install EstiNet – Installation Query 3:

Choose the version of NOX controller to install shown in fig.8.

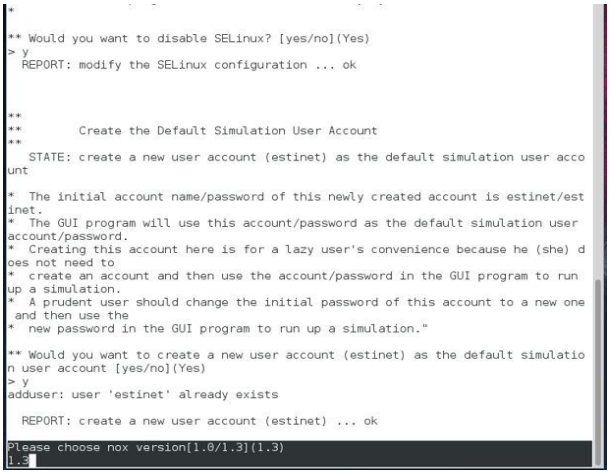


Fig 8

2.8. Install EstiNet – EstiNet hack kernel:

After the installation it is recommended to reboot the system by entering command reboot with the root privilege as shown in fig.9.

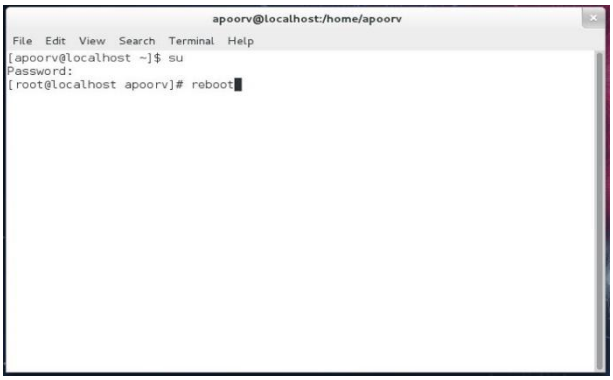


Fig 9

2.9 Install EstiNet – EstiNet User Account:

After reboot user find a new user account named estinet and password estinet created by EstiNet as shown in fig.10 & 11.

Fig 10

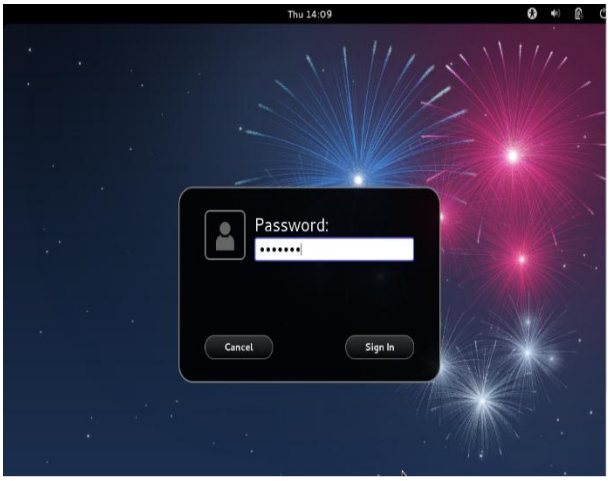


Fig 11

2.10 INSTALL ESTINET– License Certificate: Enter the license key using command **inputkey** in terminal with root privilege and after that use **reserve** command to reserve the key shown in fig.12.

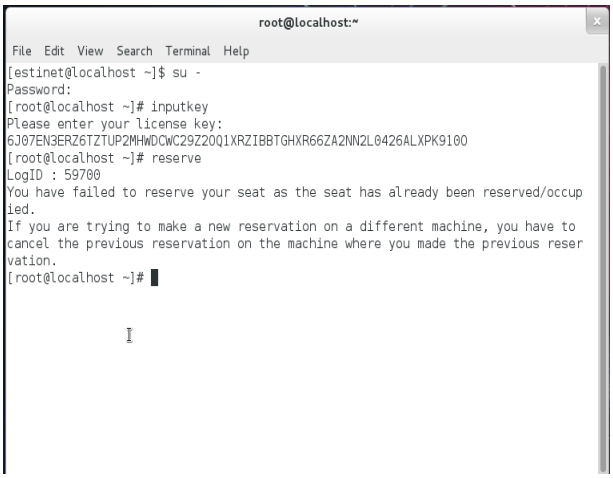


Fig 12

3. RUN ESTINET- Open three Terminals: User is directed to open three tab in same terminal with the help of right click + new Tab or Ctrl + Alt + t as shown in fig.13.

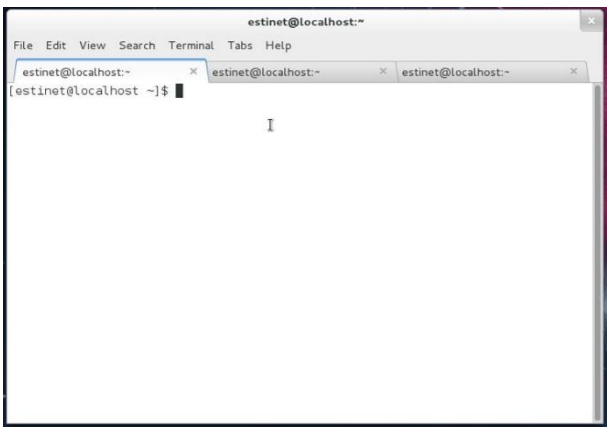


Fig 13

3.1 Run Estinet–Run dispatcher: Use the command **dispatcher** in Terminal 1 with root privilege to run dispatcher as shown in fig.14.

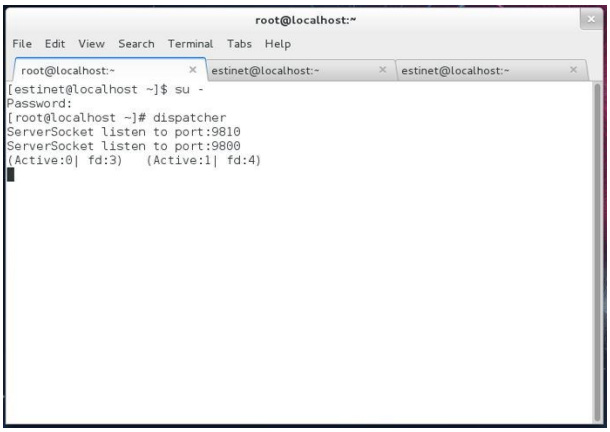


Fig 14

3.2 Run Estinet- Run coordinator: Use the command **coordinator** in Terminal 2 with root privilege to run coordinator shown in fig.15.

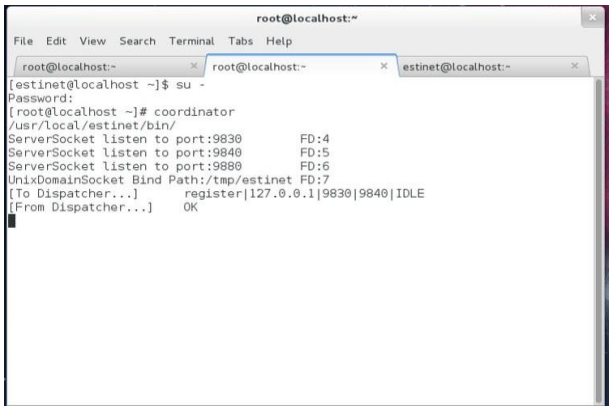


Fig 15

3.3 Run Estinet- Run estinetgui: Firstly Use the command **iptables -F** in Terminal 3 with root privilege to putting off Linux firewall then run estinetgui command to open estinet graphical user interface as shown in fig.16 & 17.

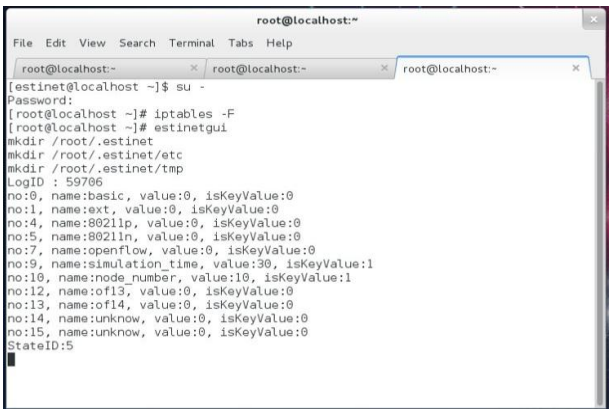


Fig 16

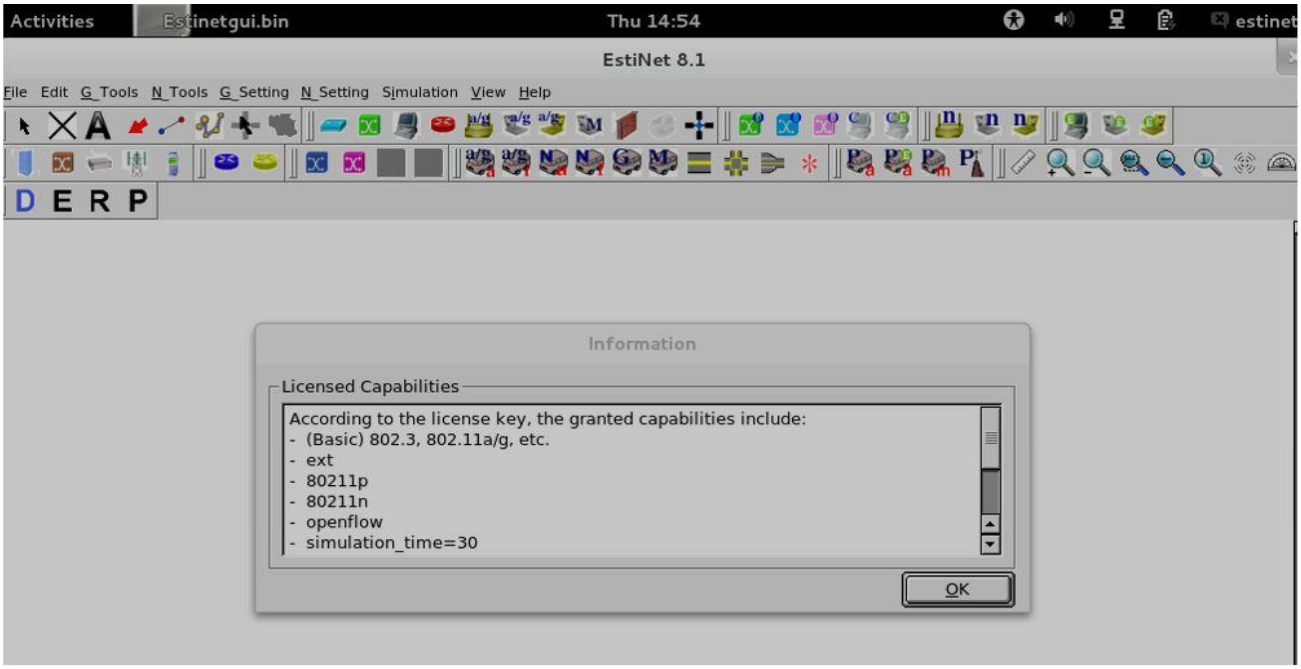


Fig 17

4. IMPLEMENTATION

Implementation part of this paper consists the designing part of OpenFlow network; selection of the number and types of devices are being used and proper connection between them as shown in Fig 18

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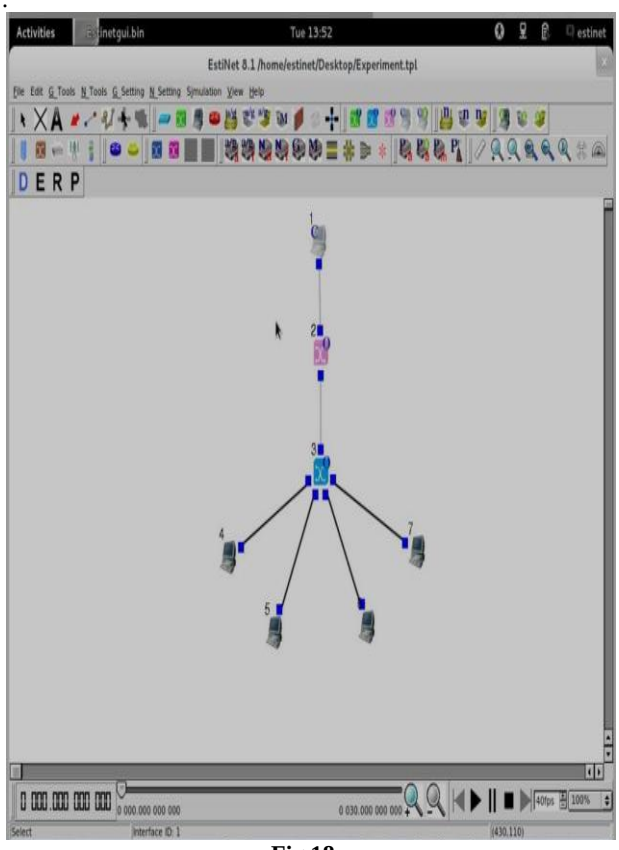

Fig 18

5. CONFIGURATION

This section deals with Configuration of OpenFlow devices. To configure any device use double click to change its properties depend upon type of device used in implementation of OpenFlow network**.**

5.1 Controller Configuration:

Different commands are associated to different controllers i.e. to select particular controller for the implemented design as shown in fig 19.

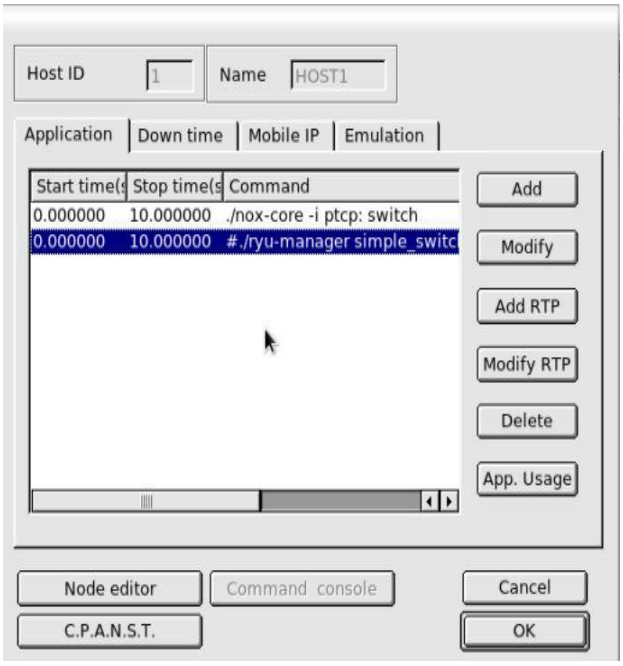

Fig 19

5.2 OpenFlow v1.3 Switch Configuration:

5.2.1. Using Node Editor- As shown in Fig 20.

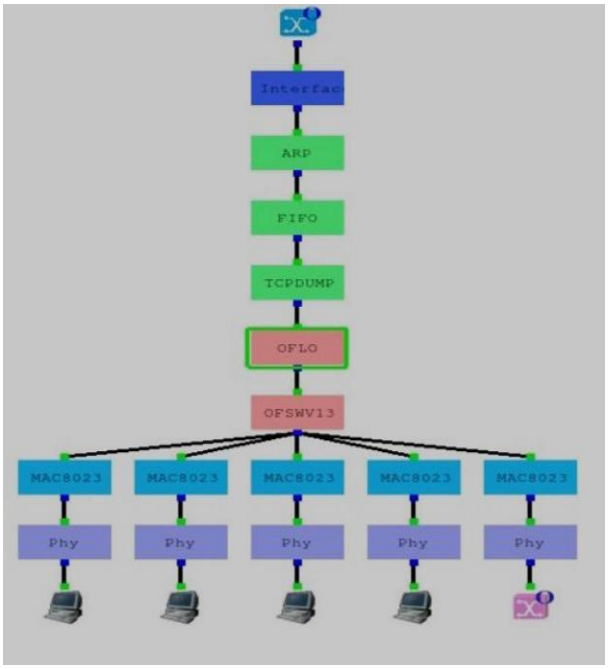

Fig 20

5.2.2 Using OFSWV13 (OpenFlow Switch version 1.3) module- As shown in Fig 21, 22 & 23.

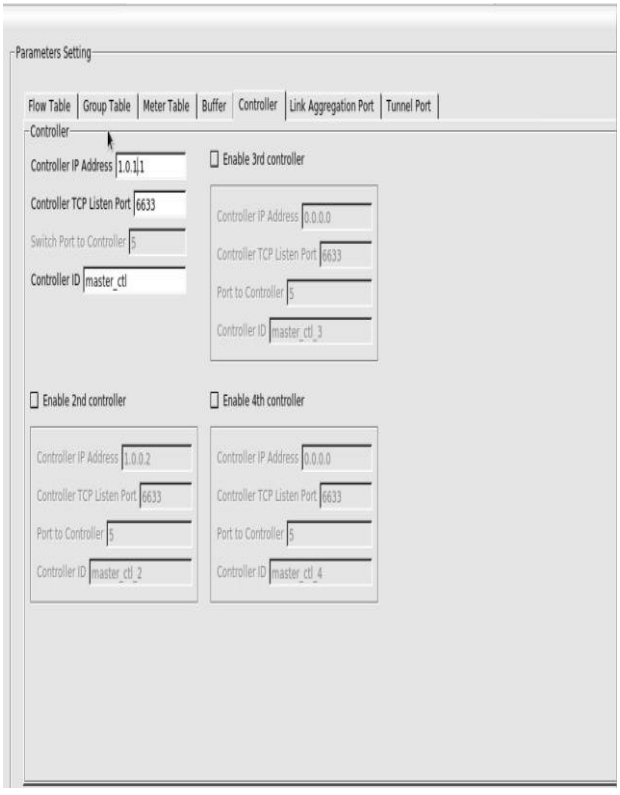

Fig 21

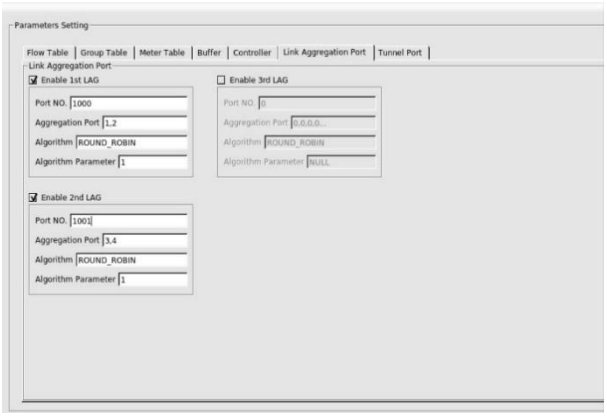

Fig 22

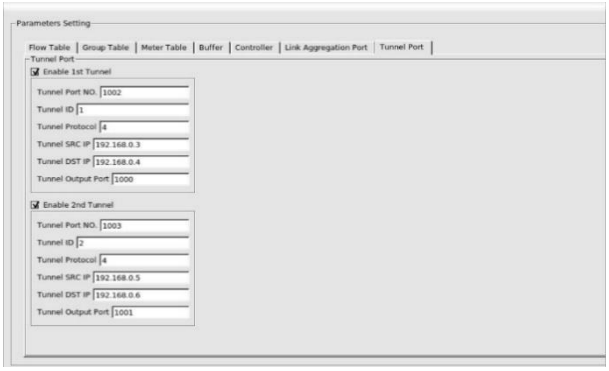

Fig 23

5.3. Host Configuration- Following commands are used to configure sender or receiver nodes shown in fig 24-

i). Command: ***stcp –p 9000 1.0.2.2:*** To configure host as a sender node.

ii). Command*: rtcp –p 9000*: To configure host as a receiver node.

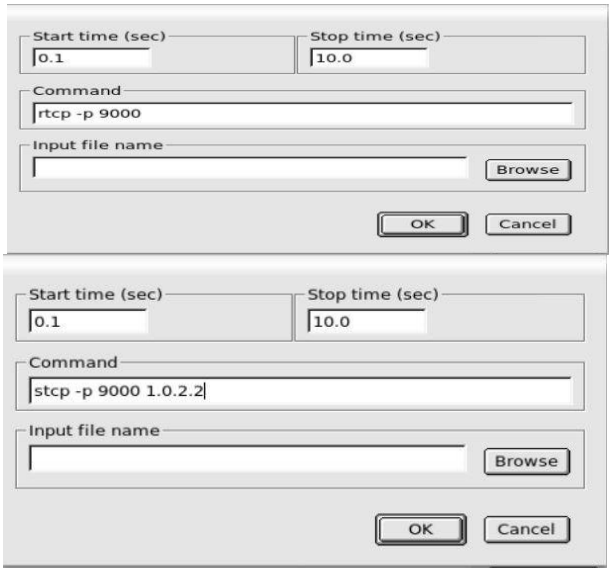

Fig 24

6. SIMULATION & ANALYSIS-

As shown in fig 25 & 26

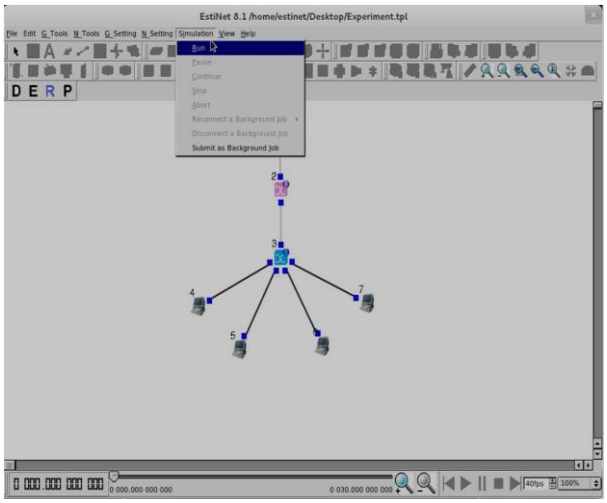

Fig 25

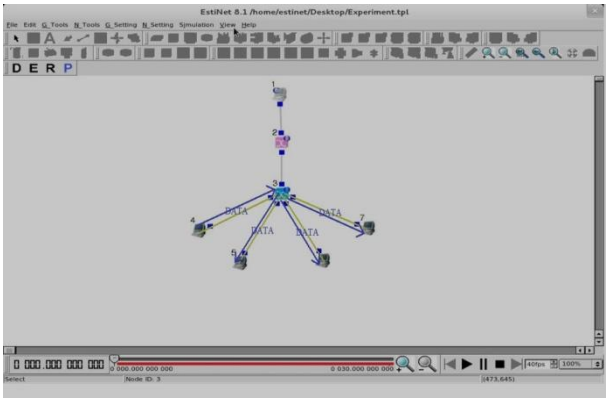

Fig 26

7. CONCLUSION

Now a day's OpenFlow is emerging topic for researchers and students. OpenFlow is used to develop an effective and real time networks. Different kind of tools are needed for the implementation of an OpenFlow based network. This paper concludes the installation of Estinet8.1 software and its implementation as well as simulation for OpenFlow network. The solutions for basic errors with proper justification is also described. The main aim of this paper is to make familiar to a beginner in technologies used in OpenFlow.

8. ACKNOWLEDGEMENTS

The authors wish to acknowledge Dr. R. K. Jha, Assistance Professor in Department of Electronics and Communication Engineering, Shri Mata Vaishno Devi University, Katra, J&K for their constant guidance.

9. REFERENCES

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