

Design and Implementation of Crossbar Switch in NS-2

A THESIS

submitted by

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for the award of the degree of

Master of Science

(by Research)



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October 2015

Dedicated to
My Mother, My Father
and
My Brothers

Declaration

I hereby declare that the entire work embodied in this thesis is the result of investigations carried out by me in the **School of Computing and Electrical Engineering, Indian Institute of Technology Mandi**, under the supervision of **Dr. Samar Agnihotri**, and that it has not been submitted elsewhere for any degree or diploma. In keeping with the general practice, due acknowledgements have been made wherever the work described is based on finding of other investigators.

Place: Mandi

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This is to certify that the thesis titled **Design and Implementation of Cross-bar Switch in NS-2**, submitted by **Sujeet Kumar**, to the Indian Institute of Technology Mandi for the award of the Degree of Master of Science (by research) is a bonafide record of the research work carried out by him under my supervision. The content of this thesis, in full or in parts, have not been submitted to any other Institute or University for the award of any Degree or Diploma.

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Acknowledgements

First of all, I would like to express my sincere gratitude to my advisor Dr. Samar Agnihotri and former advisor Dr. Anand Srivastava. Their guidance, support and patience have made this research possible. Next, I would like to thank my another former advisor Dr. Dinil Mon Divakaran for providing me research topic.

I also want to express my gratitude to the Prof. Timothy A Gonsalves and all of my committee members, Dr. Anil K. Sao, Dr. Bharat Singh Rajpurohit and Dr. Syed Abbas for their support and valuable advice.

I thank to my lab-mates Runa, Reena, Snehal, Srimanta, Neha, Anna, and all of my colleagues sharing the same time and space with me during my MS study. Specially, I would like to thank Prof. Timothy A Gonsalves and my friends Runa, Reena, and Snehal for their help, support, encouragement and constructive discussions.

Finally, but not least, I thank my mother, father and brothers for their patience, encouragement, love and support.

Sujeet Kumar

ABSTRACT

The Internet is composed of various devices for handling data. Packet switches, which include network switches, routers, bridges, etc. form its important building blocks. Internet traffic is increasing exponentially owing to availability and usage of Internet-enabled devices. High performance packet switches are the key to improve and maintain the high performance of the Internet. Crossbar switch is the dominant architecture and the main fabric of high performance packet switches. While many implementations exist in the research literature for various types of crossbar switches, they are limited to a few types. NS-2 is one commonly used network simulator which allows exhaustive simulations of network system by means of different parameters. However, currently, NS-2 does not support various types of buffered and bufferless crossbar switches. In this work, we design and implement all types of crossbar switches in NS-2. We also implement various existing scheduling algorithms of crossbar switches in NS-2 and contribute some new scheduling algorithms for bufferless crossbar switches. Finally, we perform the performance analysis of crossbar switches with various scheduling algorithms, switch parameters and traffic.

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