CS 544: TOPICS IN NETWORK

Assignment 2

Topic: To understand the performance of queuing in packet switch.

Mayank Verma (194101031)

Naman Garg (194101035)

INTRODUCTION

As the purpose of this assignment is to understand the performance in queuing in packet switch, we were tasked to implement different packet switching scheduling in a simulating program. We implement INQ input-port queuing scheduling, KOUQ knockout-queuing scheduling and Islip queuing scheduling. And we observe their performance on the basis of average delay or mean delay in packet transmission and link utilization.

IMPLEMENTATION

We implement our task in C++ language and source code is along with this file in same folder. As directed in every time slot a new packet may generate with given packet generation probability. There are same no of input port and output port. And scheduling type take cares of amount of delay in transmission.

There are some default values in source code as given in problem.

These are:

Max Time: 10000 units.

Packet generation probability: 0.6.

Number of ports: 8

Buffer size: 4

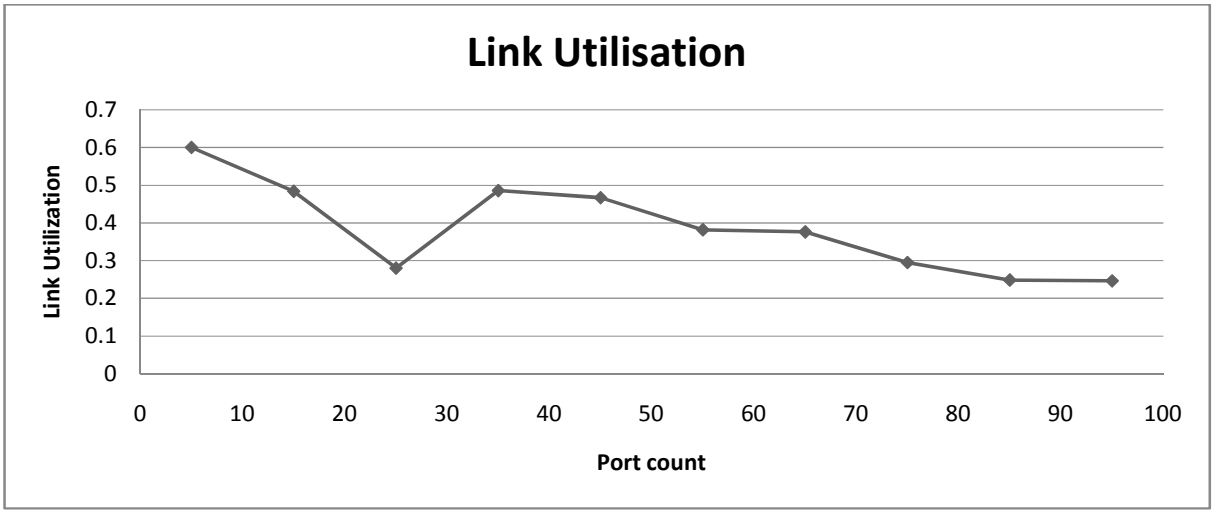
Knock-out: 0.6

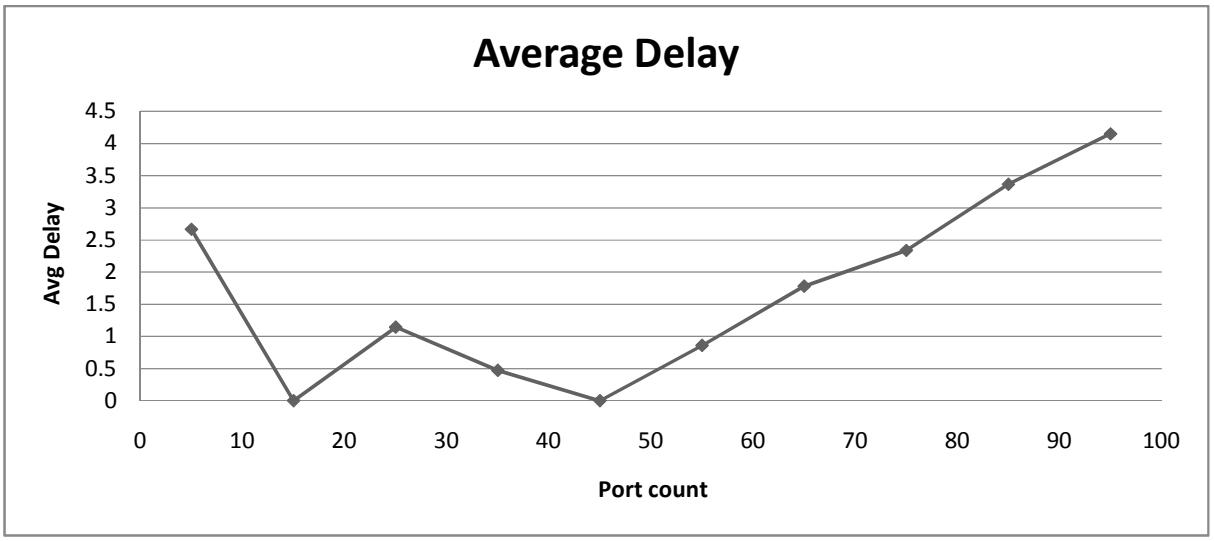
Scheduling type: INQ.

PERFORMANCE ANALYSIS

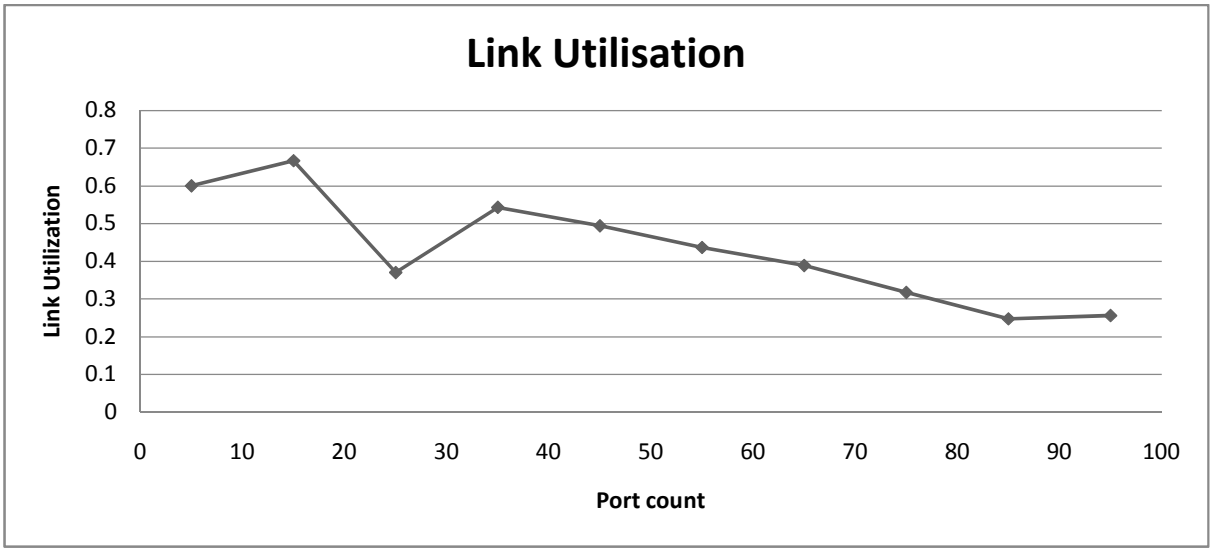
1. Input queuing scheduling (INQ).

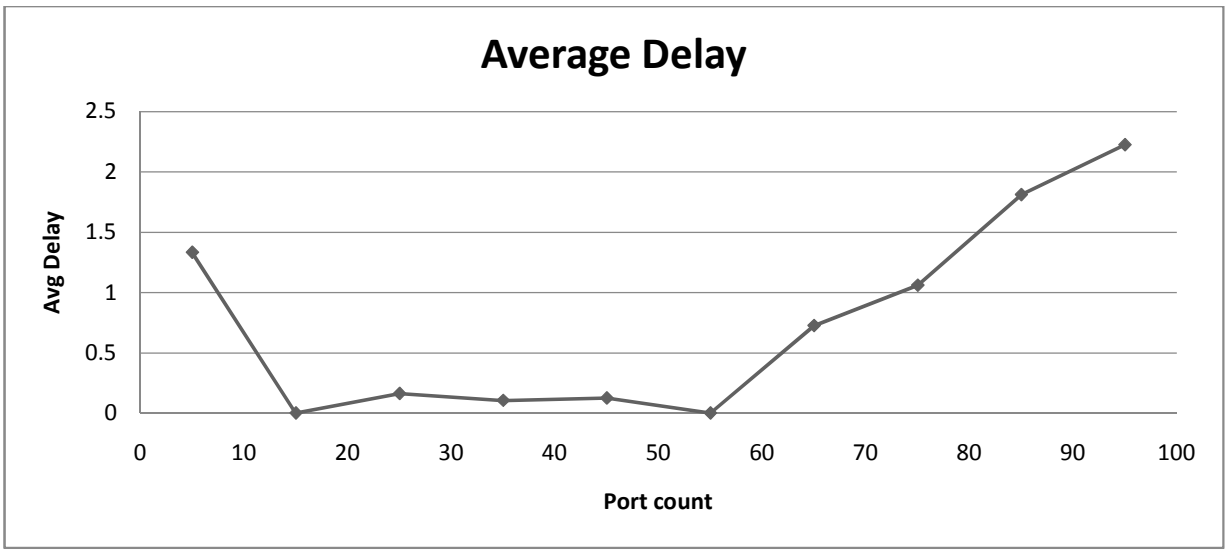
INQ with probability=0.5, buffer size 4, max time=10000



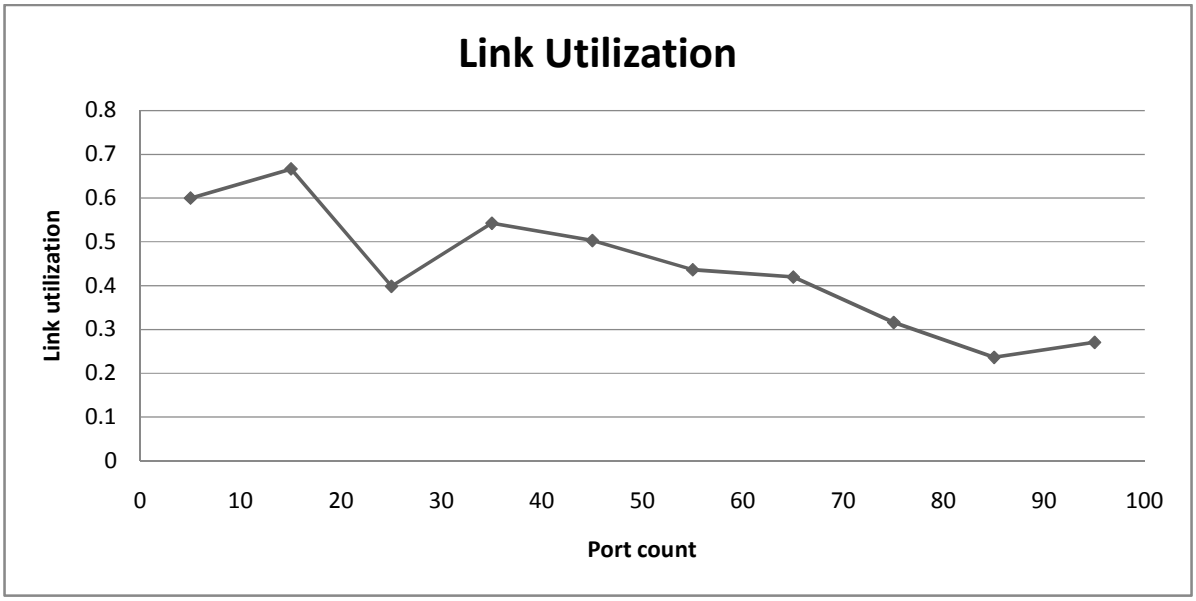


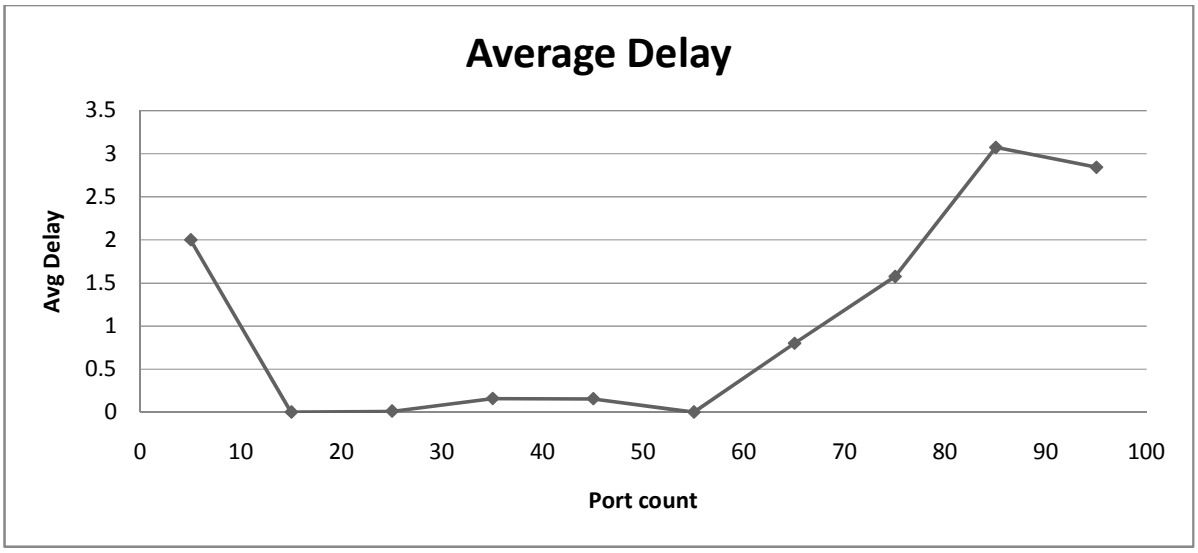
INQ with probability=0.5, buffer size 2, max time=10000





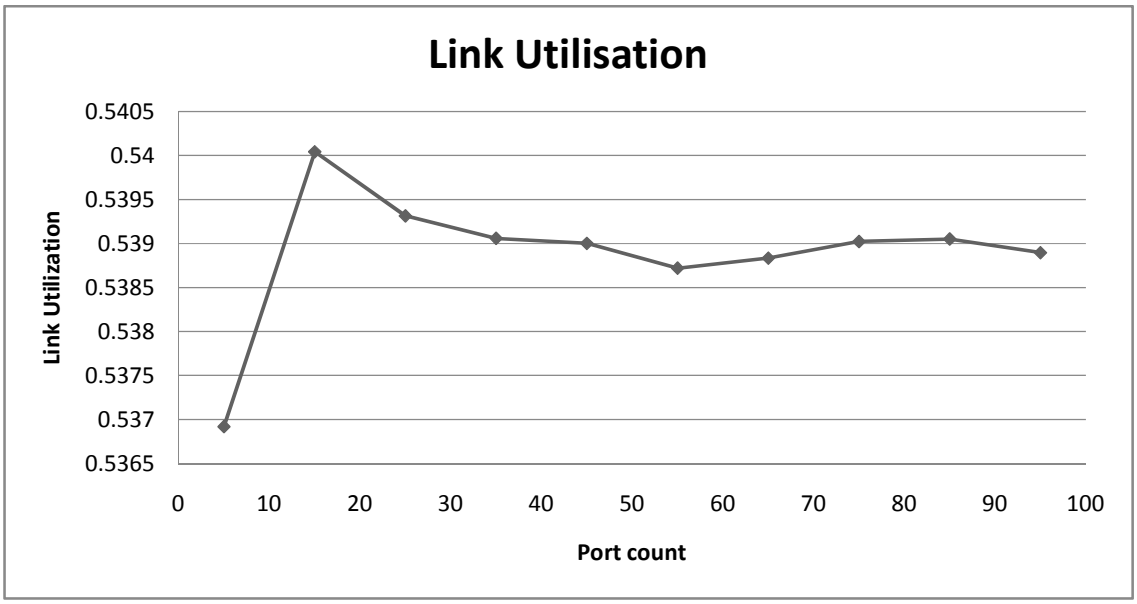
INQ with probability=0.5, buffer size 3, max time=10000

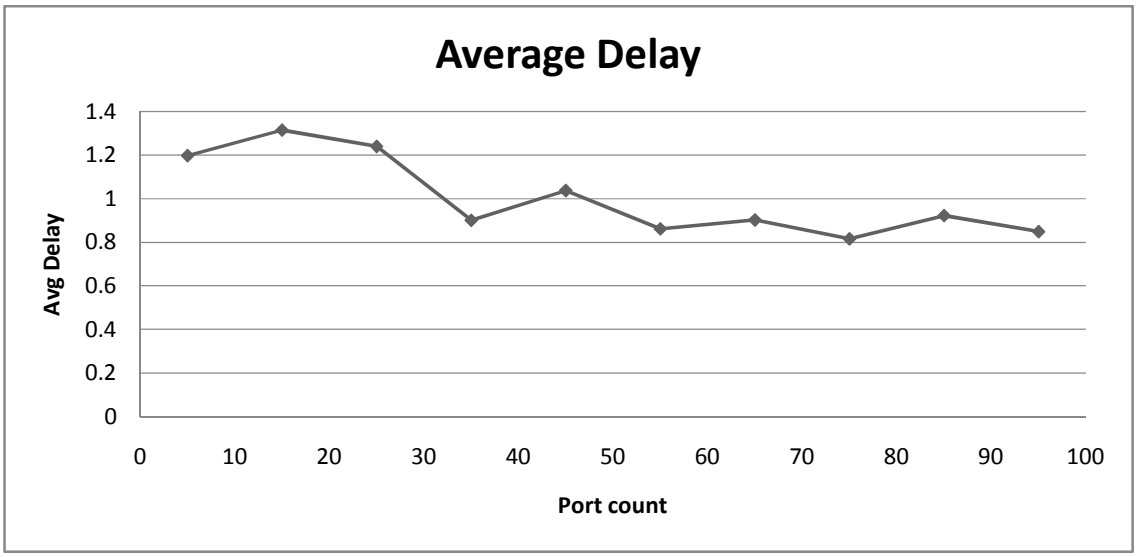




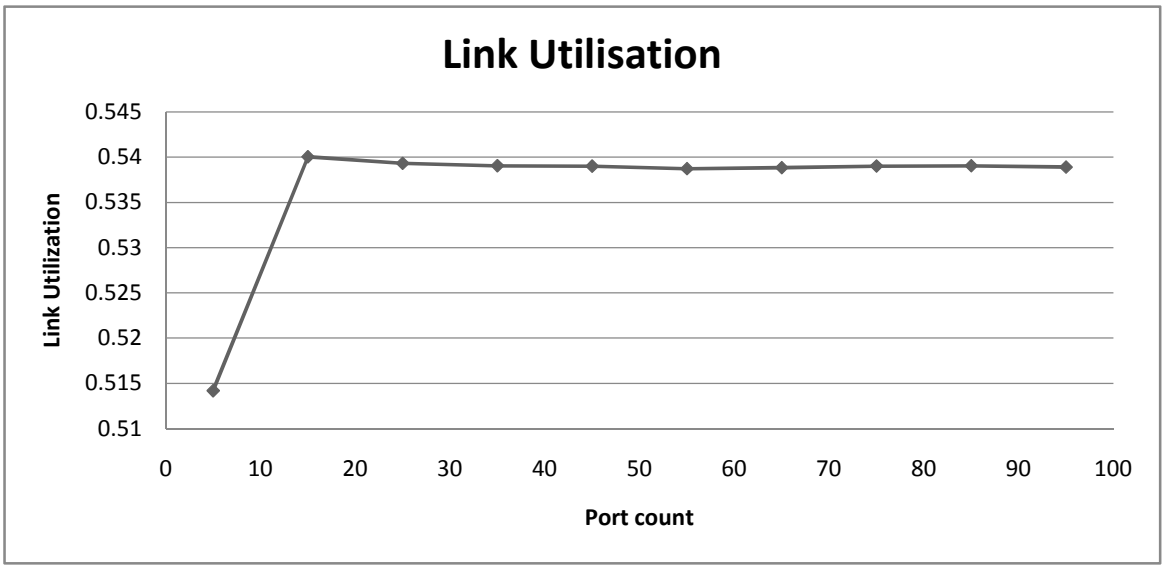
2. Knockout scheduling (KOUQ).

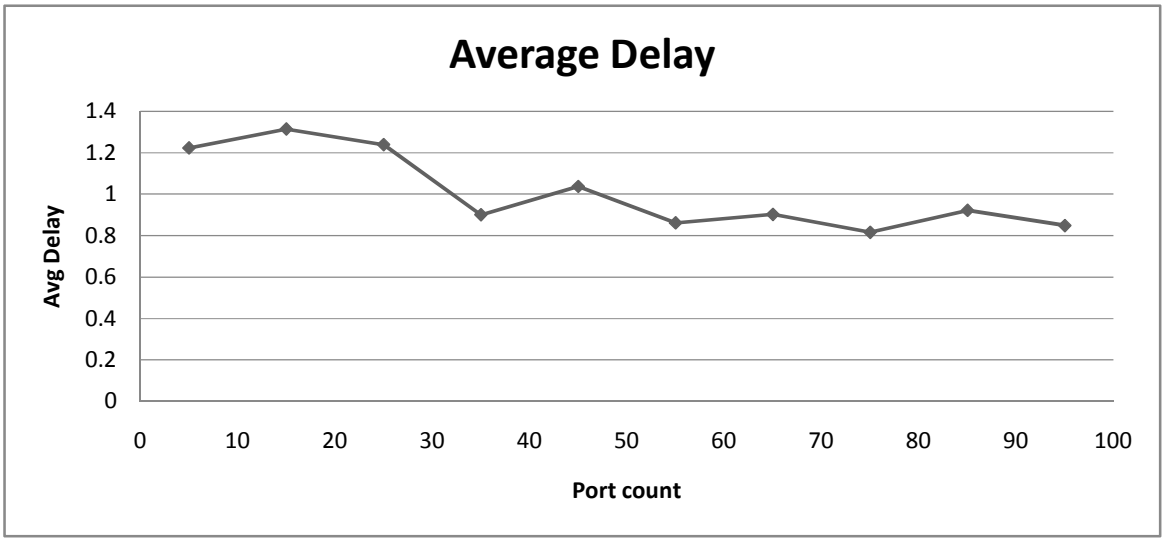
KOUQ with probability=0.5, buffer size 4, max time=10000,K=0.6*N



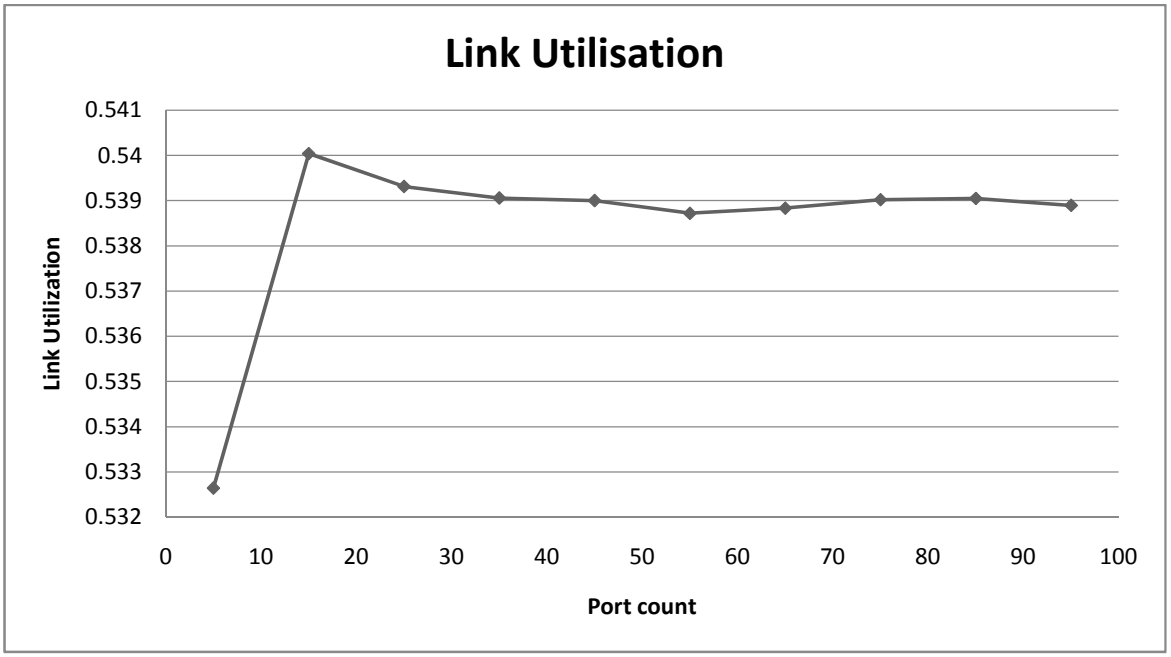


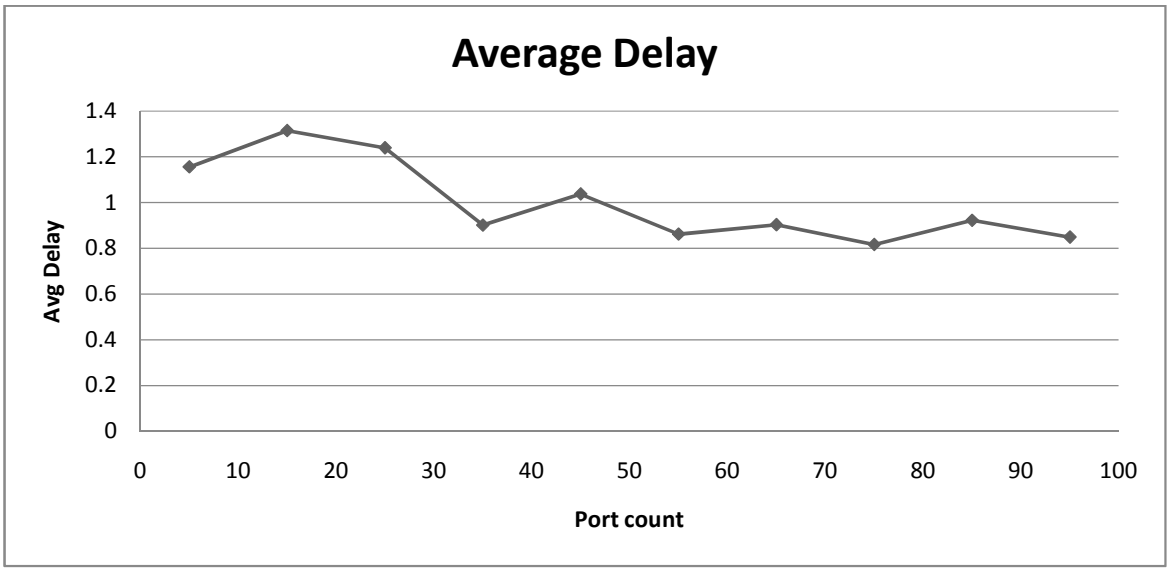
KOUQ with probability=0.5, buffer size 2, max time=10000, K=0.6*N



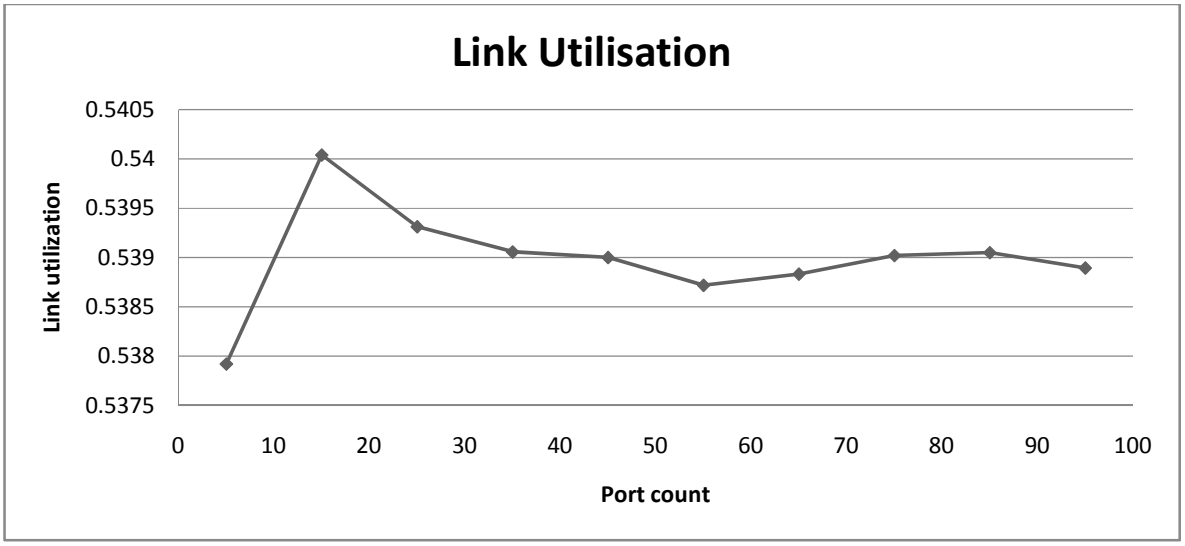


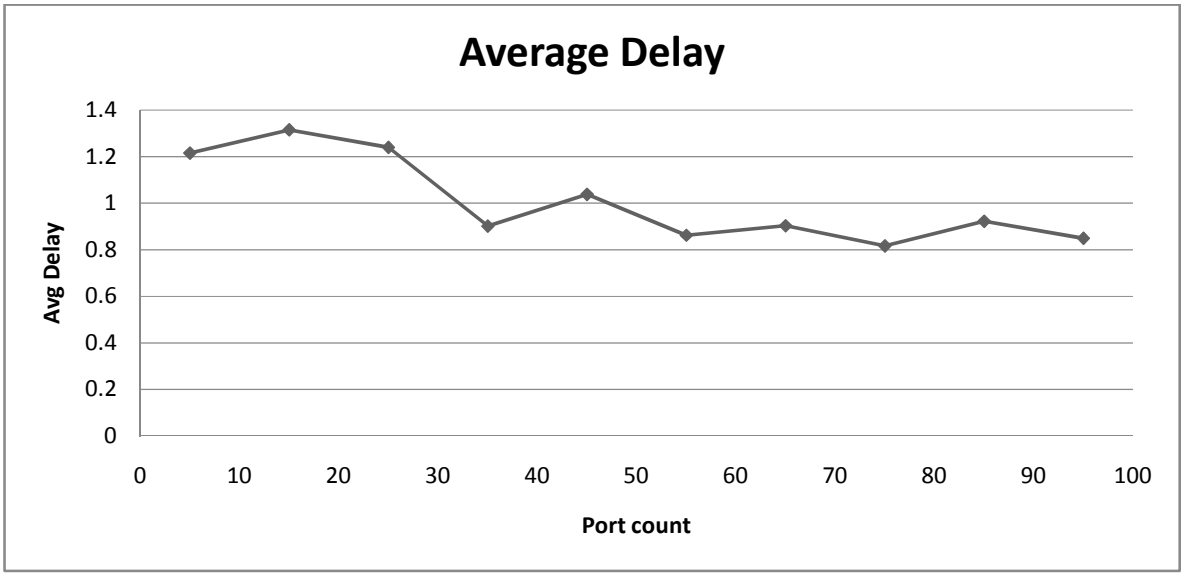
KOUQ with probability=0.5, buffer size 3, max time=10000, K=0.6*N



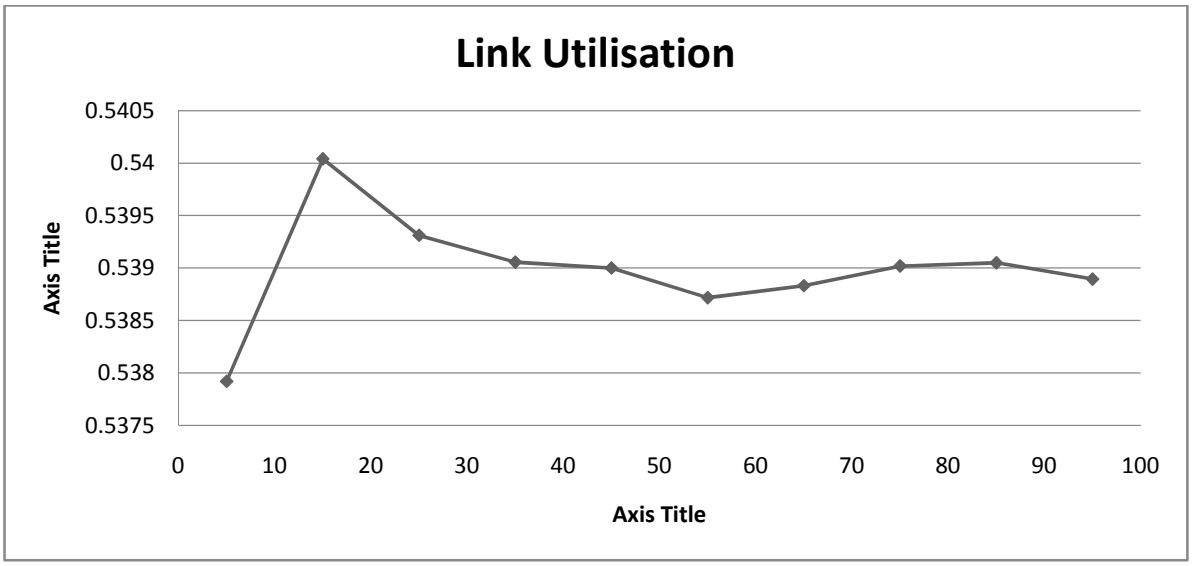


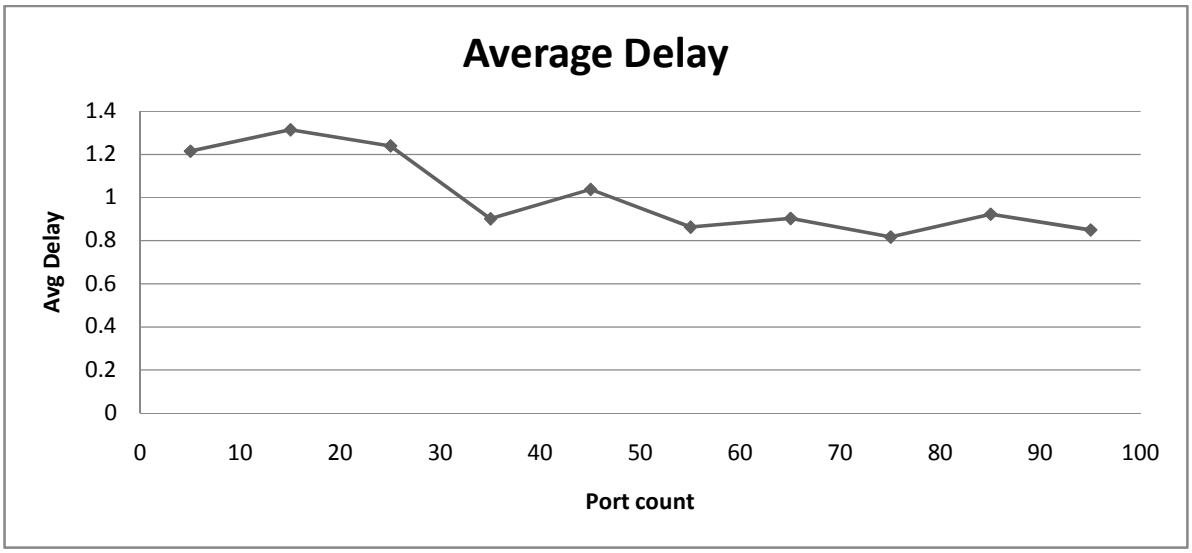
KOUQ with probability=0.5, buffer size 2, max time=10000, K=0.8*N



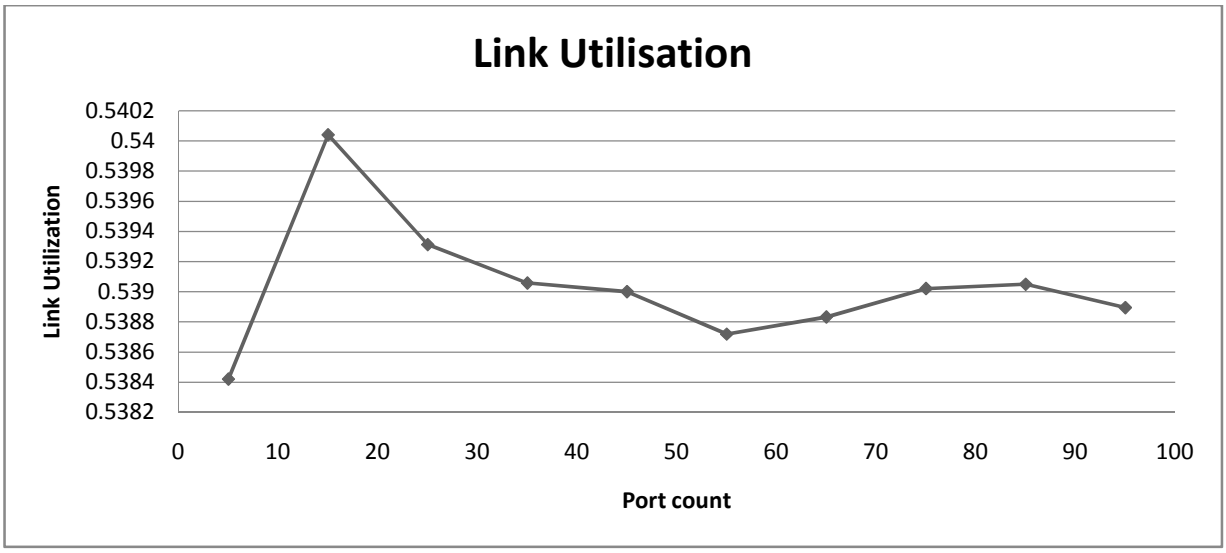


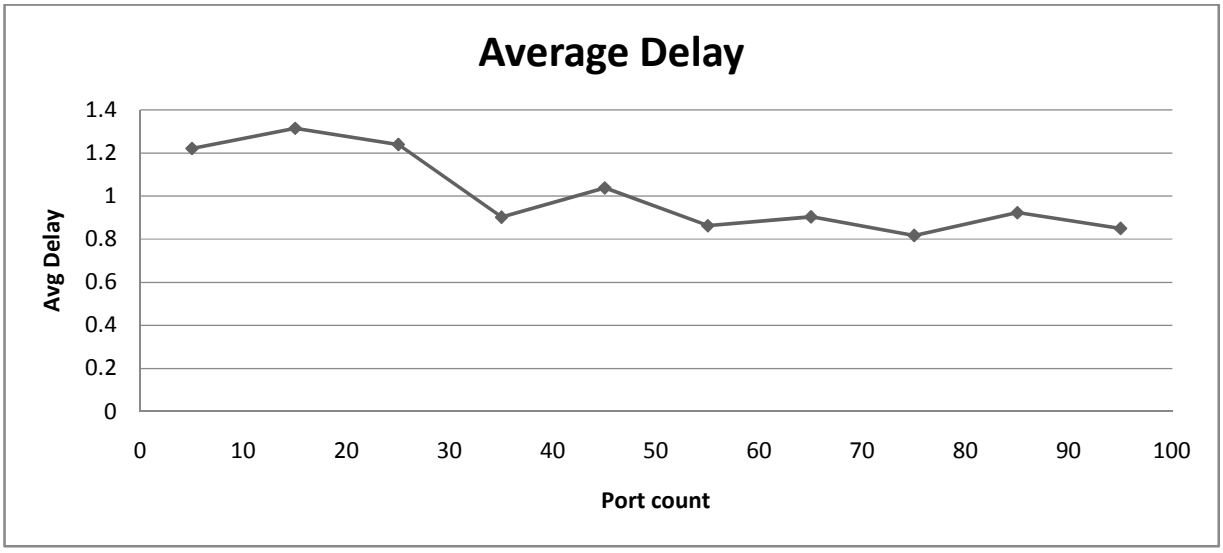
KOUQ with probability=0.5, buffer size 3, max time=10000, K=0.8*N



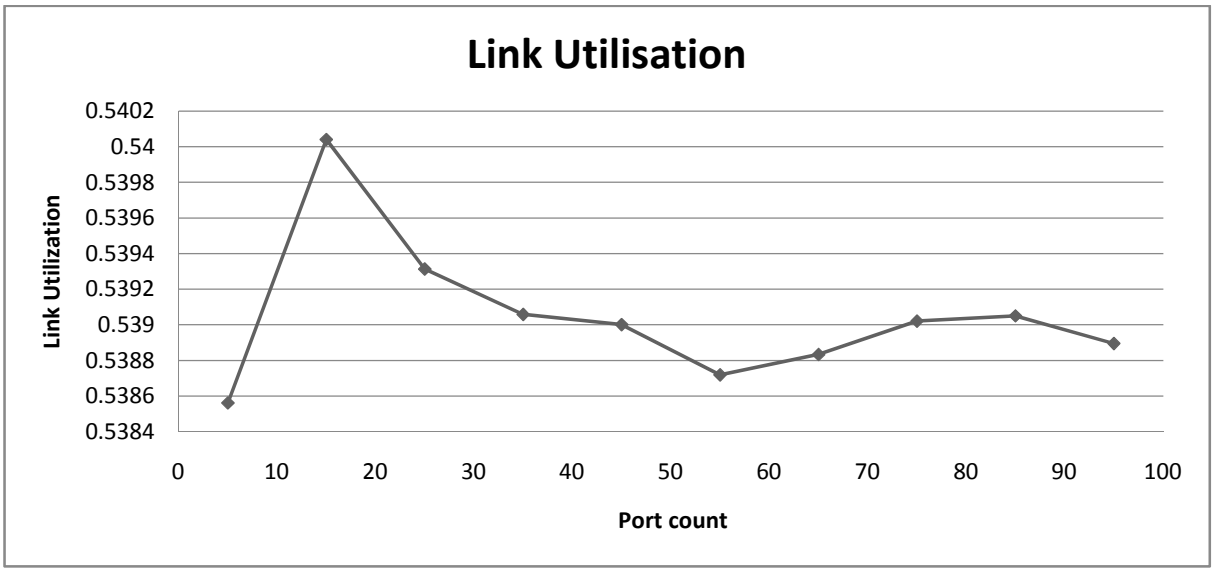


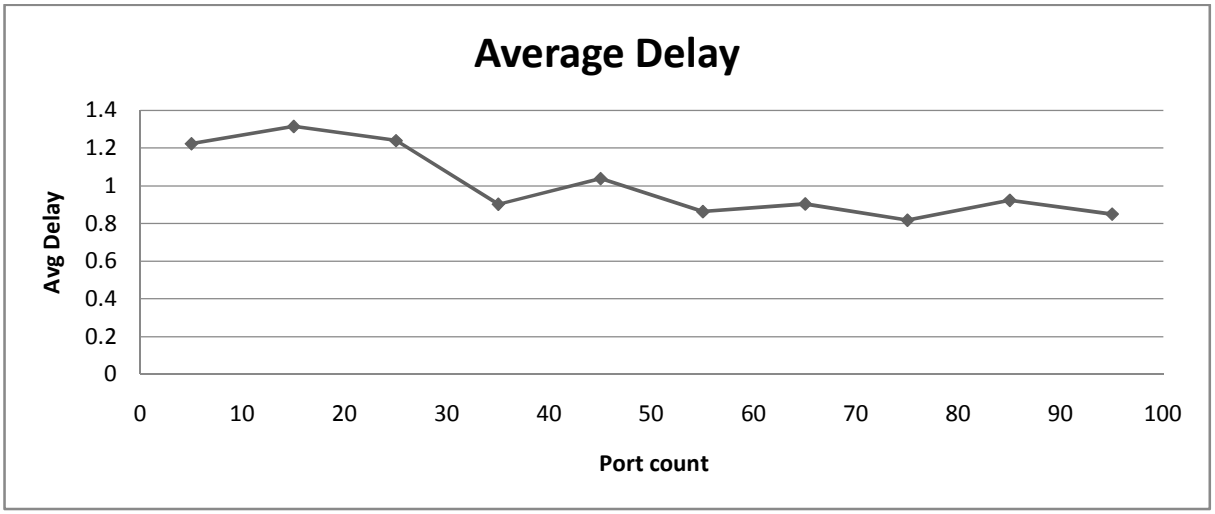
KOUQ with probability=0.5, buffer size 4, max time=10000, K=0.8*N



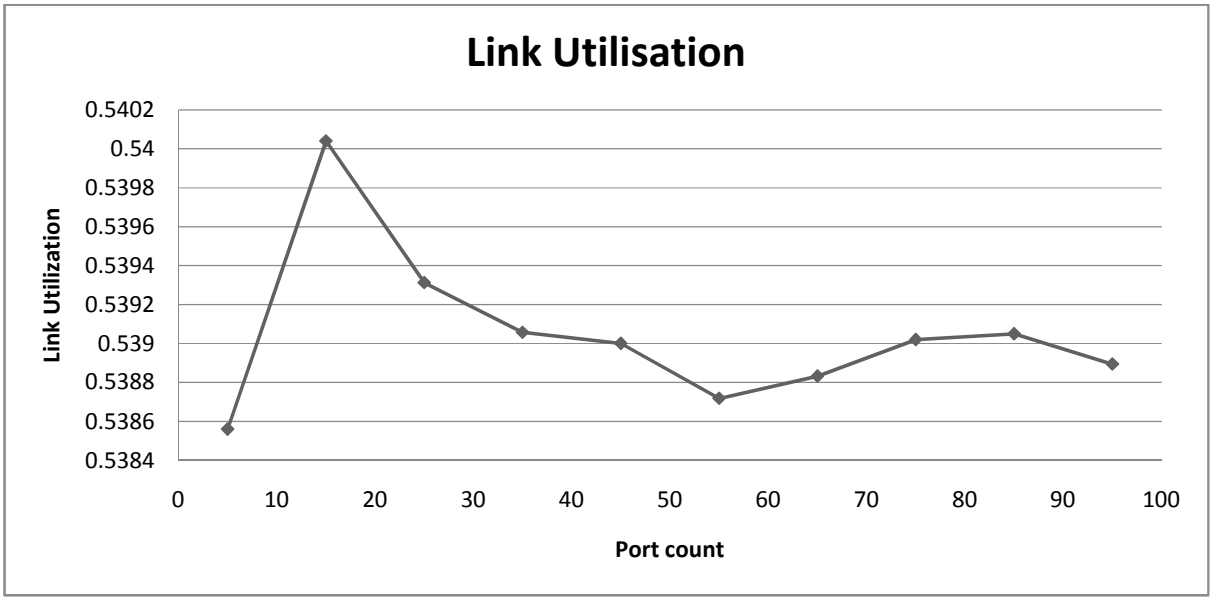


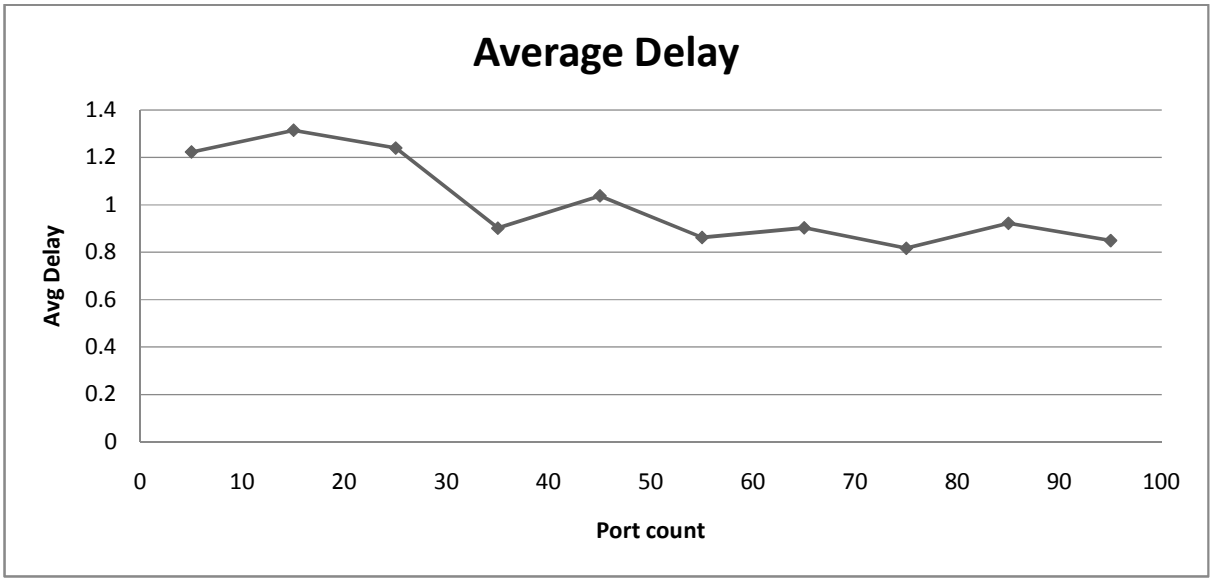
KOUQ with probability=0.5, buffer size 2, max time=10000, K=1.0*N



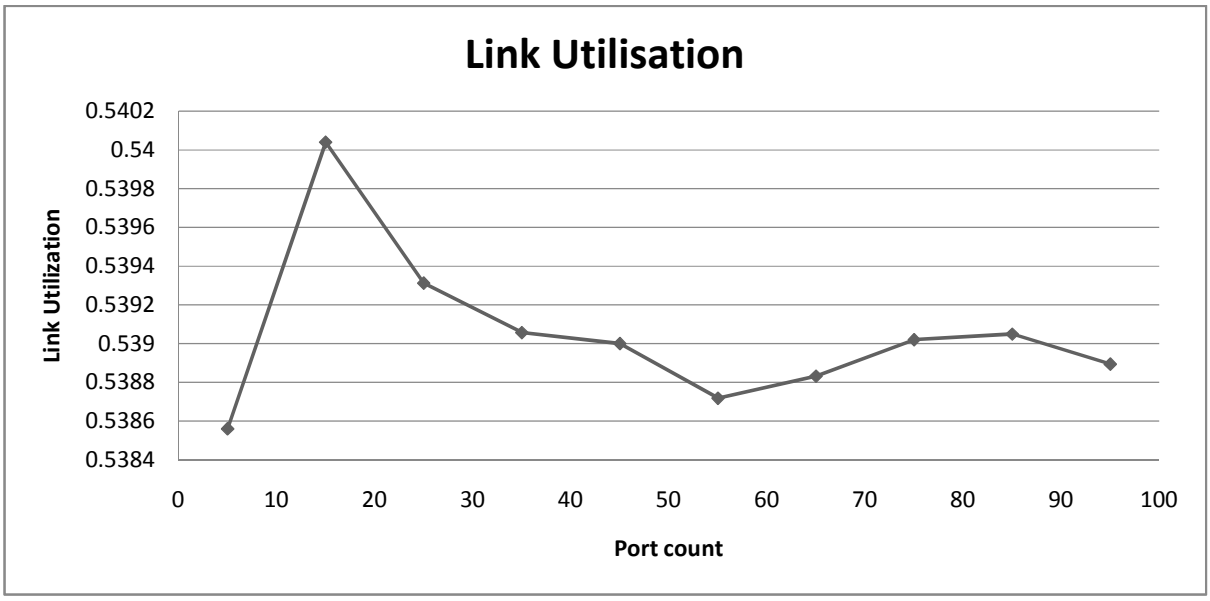


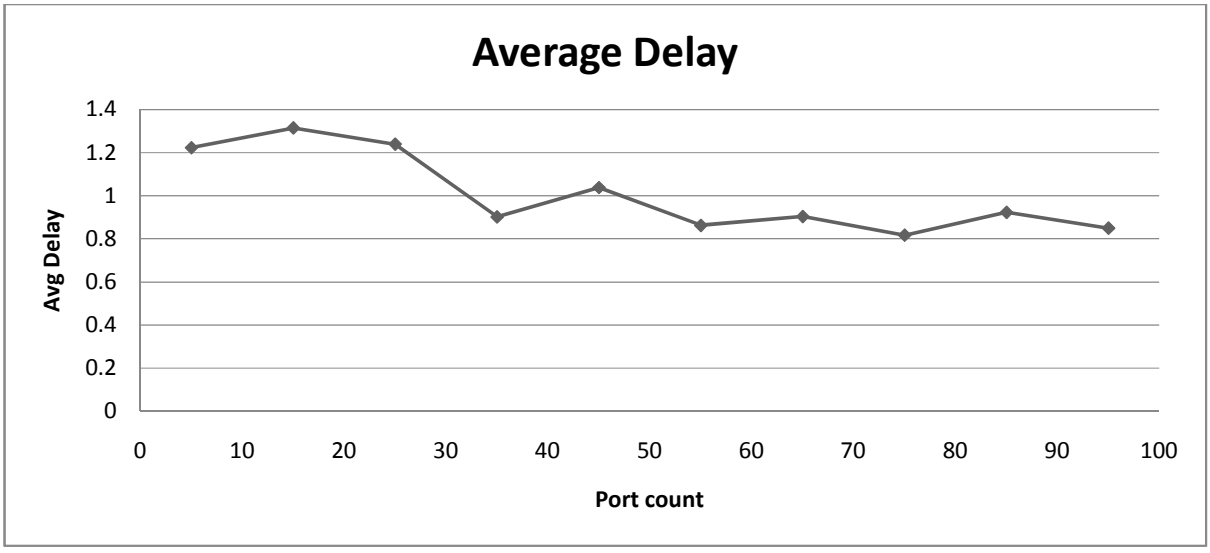
KOUQ with probability=0.5, buffer size 3, max time=10000, K=1.0*N





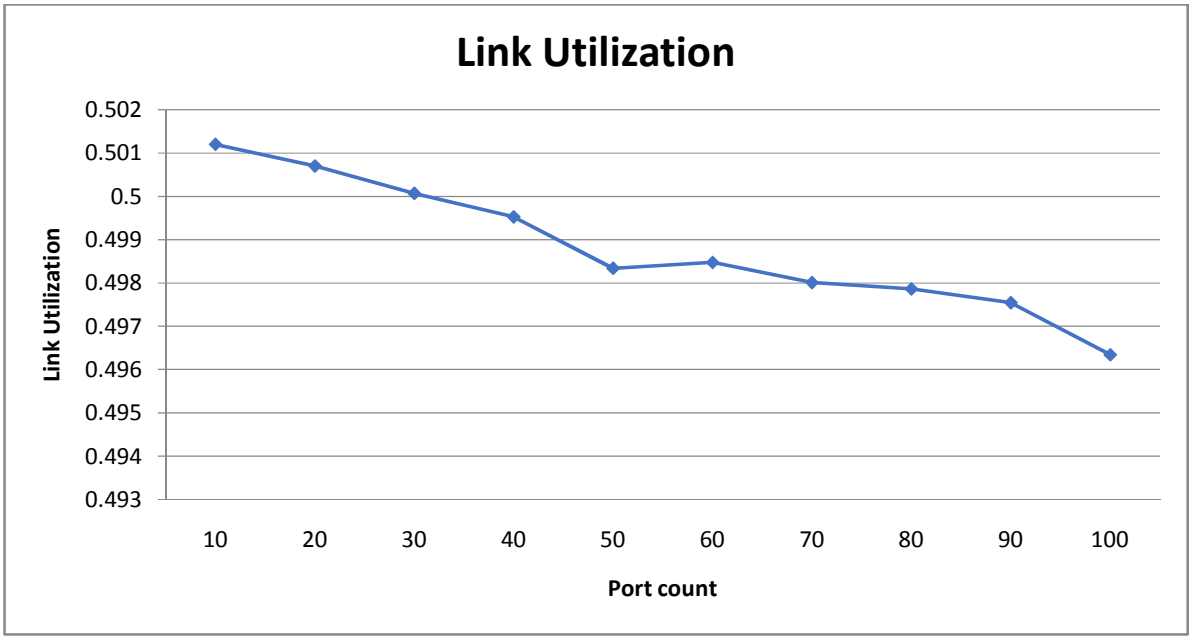
KOUQ with probability=0.5, buffer size 4, max time=10000, K=1.0*N

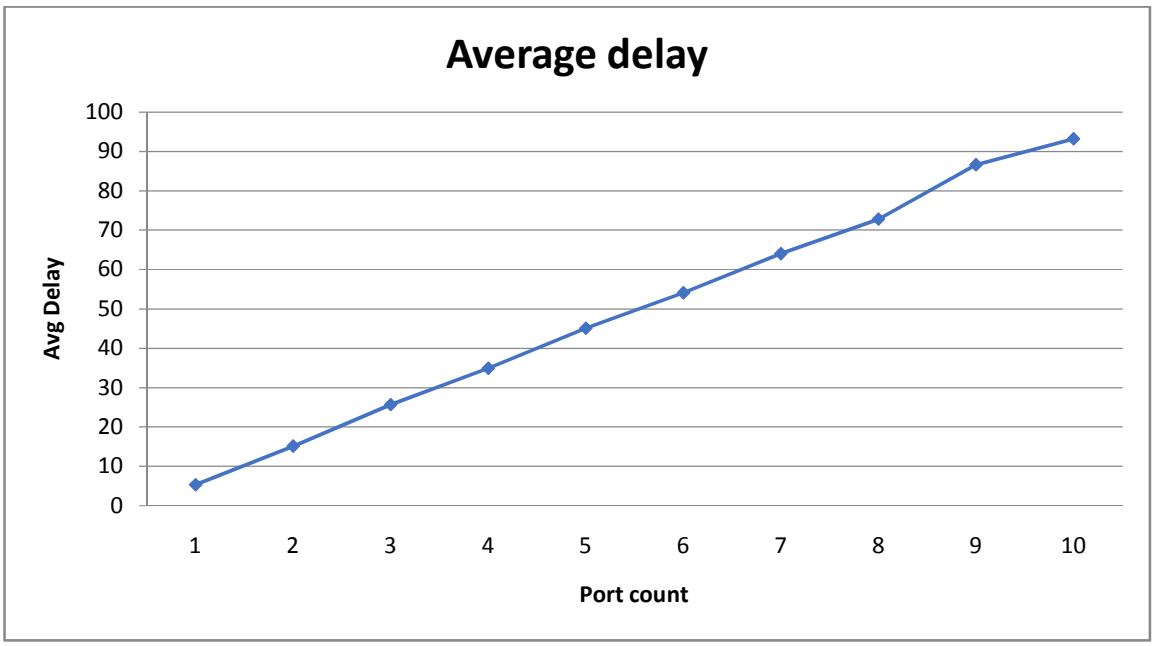




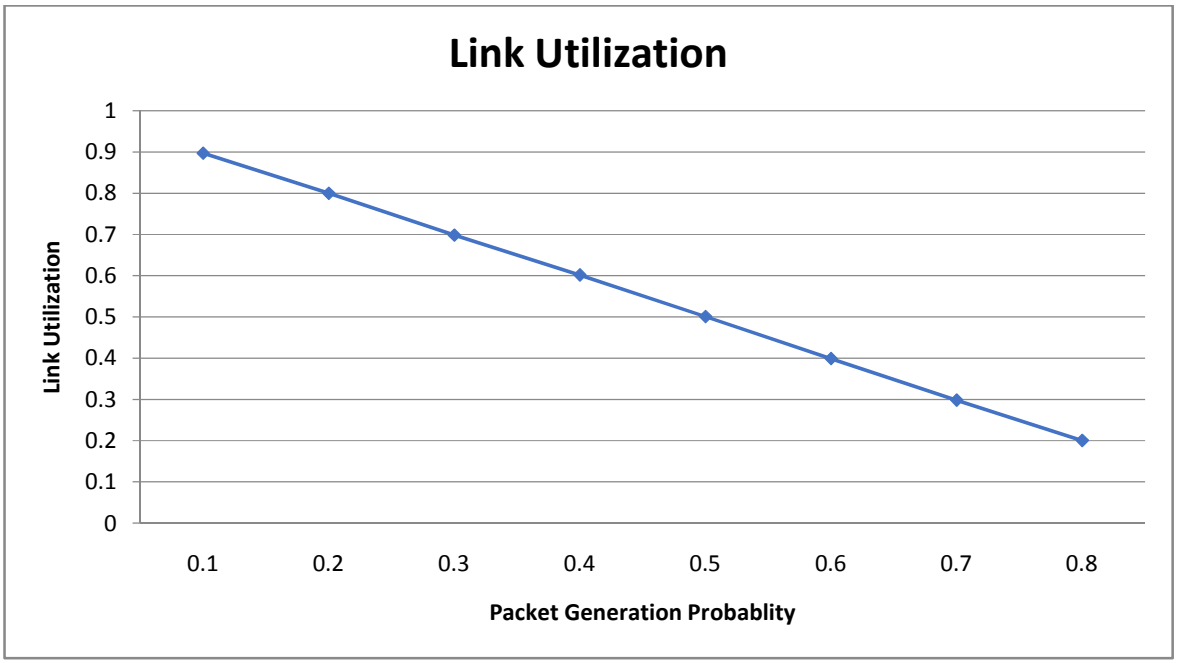
3. Islip scheduling (islip).

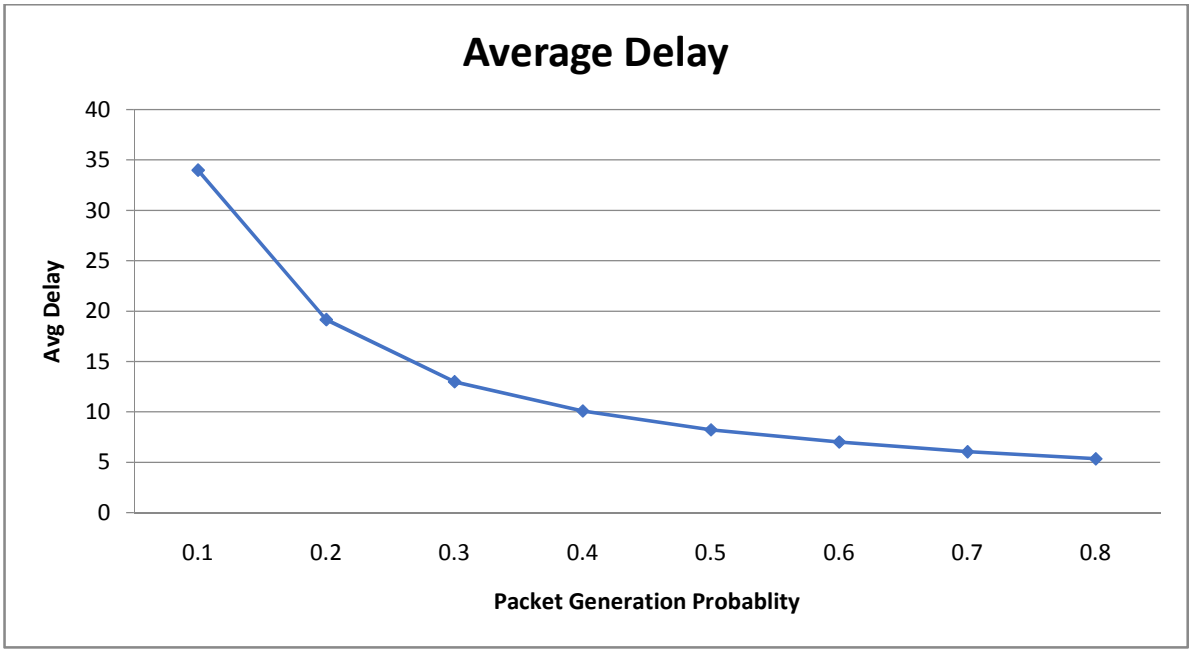
Islip with prob 0.5 , max time 10000





Islip with Port count 8 and max time 10000.





CONCLUSION

In INQ scheduling link utilization is in range between 0.31-0.42 while mean / average delay in transmission is in between 2.1 - 3.54 time units.

In KOUQ scheduling link utilization is in range between 0.53 – 0.556 while mean / average delay in transmission is in between 0.81 – 1.0 time units

In Islip scheduling gradually decreases as we increase number of ports in switch and also average delay in transmission increases proportionally. When we increase packet generation probability form 0.1 to 0.9 we observe that link utilization and average delay both decreases with in increasing probability.

As of now we conclude that knockout scheduling gives us best performance on the basis of link utilization and average delay in transmission.

REFERENCES

1. The iSLIP Scheduling Algorithm for Input-Queued Switches Nick McKeown, Senior Member, IEEE.
2. Course material provided in moodle.