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ISMS2012
3rd International Conference on Intelligent Systems, Modelling and Simulation,
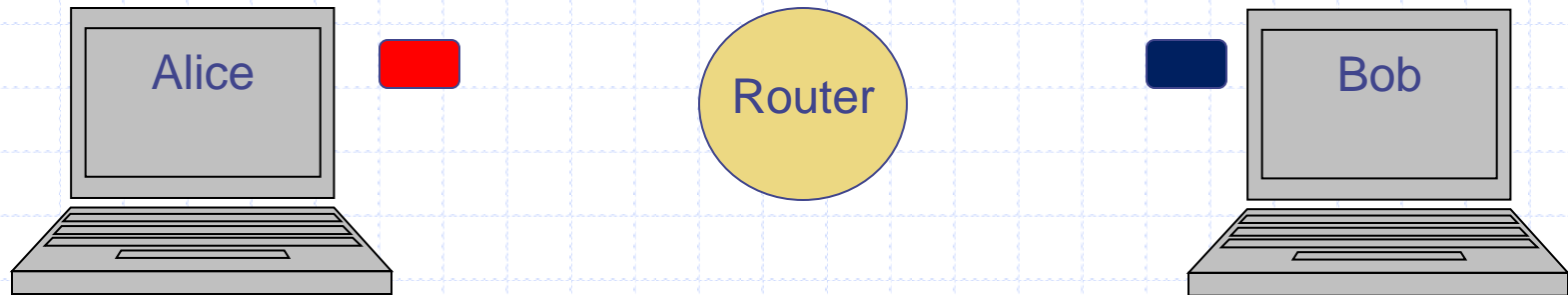**Sabah, Malaysia, 8-10 February 2012**

1.0 Introduction

- Wireless Ad Hoc Network:
  - ➤ Decentralize
  - ➤ non-fix infrastructure

- Practical importance
  - ➤ Low cost blanket coverage
  - ➤ Many deployment

- Challenge
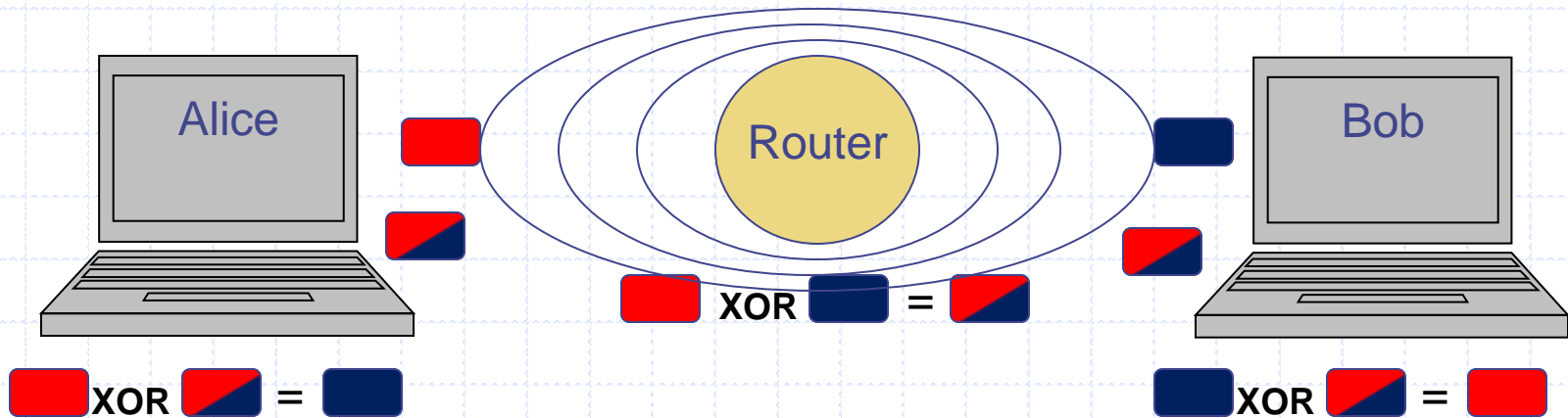 - ➤ Share broadcast medium
    - ▪ Low throughput

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1.0 Introduction

Current Approach

• Require 4 time slot

• Can make it fewer time slot?

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1.0 Introduction

Network Coding

Alice

Router

Bob

XOR =

XOR =

XOR =

- Require 3 time slot instead of 4

- Fewer time slot → Higher throughput

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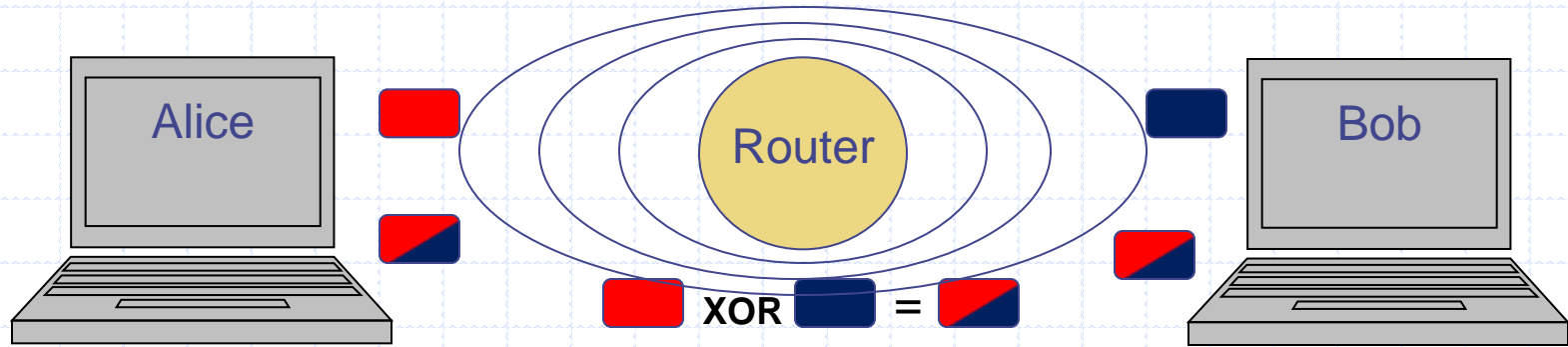**Sabah, Malaysia, 8-10 February 2012**

2.0 Objective

- The purpose of this paper is to present a time delay of transmission can increase network coding opportunities, this lead higher throughput.

- This proposed method with more coding opportunities able to send out more packets in short time.

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3.0 Methodology (Queue Management)

Alice

Router

Bob

XOR =

• Increase chance of coding

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3.0 Methodology (Queue Management)

Algorithm 1 Network Coding output queue at node i

1: **for** m = 1 **do**
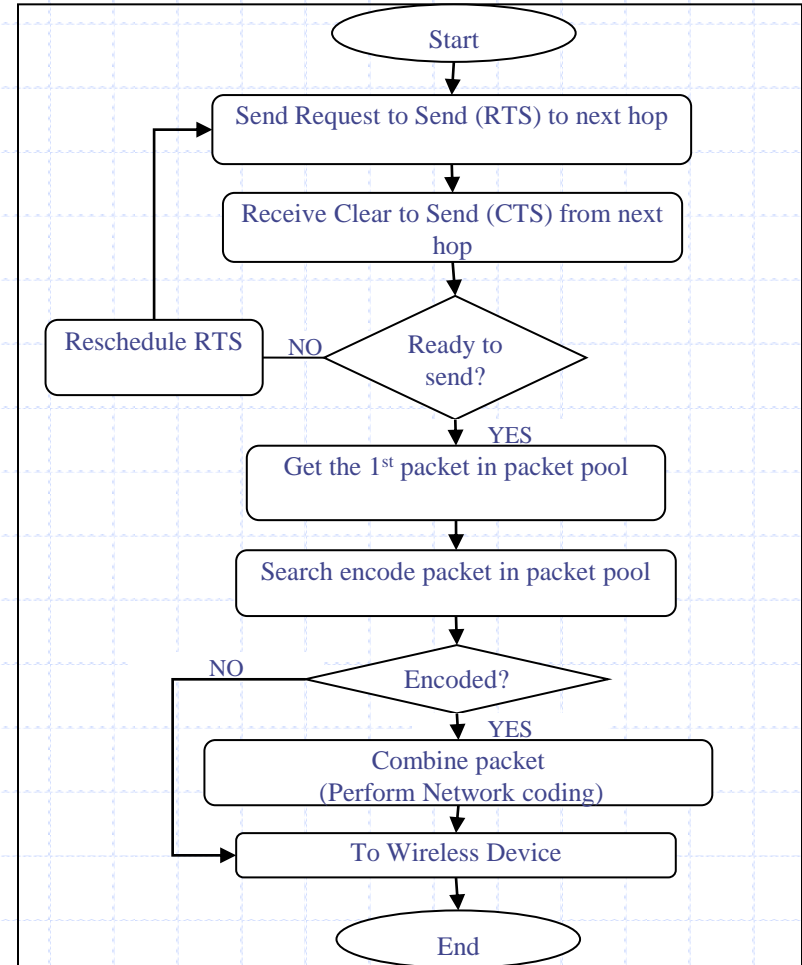2:   **for** n > 1 **do**
3:       **if** packet(m) XOR packet(n) qualify **then**
4:          packet(m)=packet(m) XOR packet(n)
5:       **end if**
6:    **end for**
7:    update queue list(i)
8:**end for**

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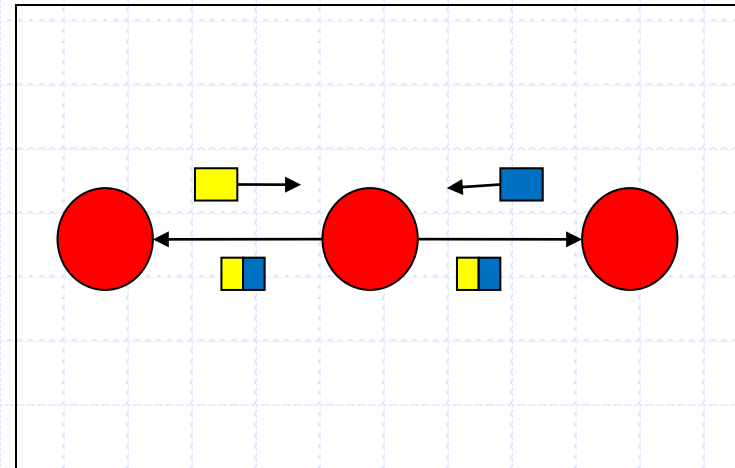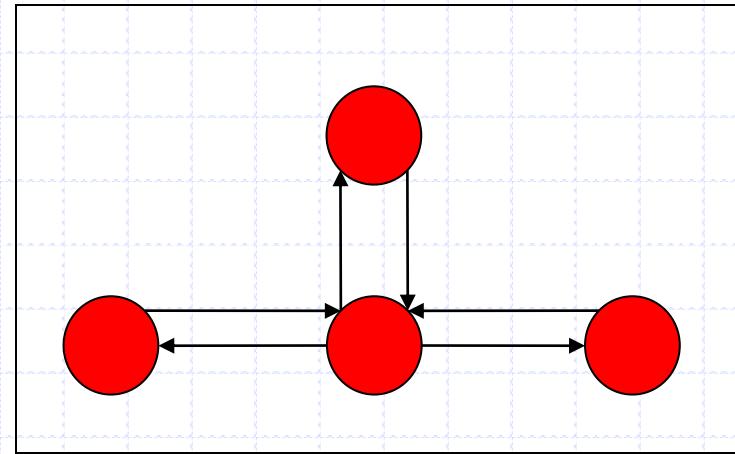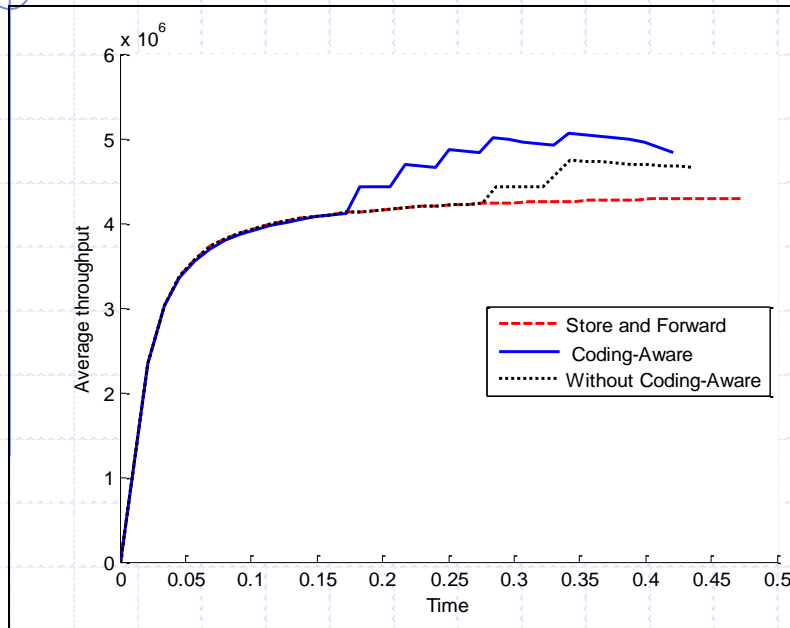**Sabah, Malaysia, 8-10 February 2012**

4.0 Simulations (Setup)

- Simulation- MATLAB M-File

- Setup topology
  - Alice and bob
  - Cross topology

- RTS-CTS
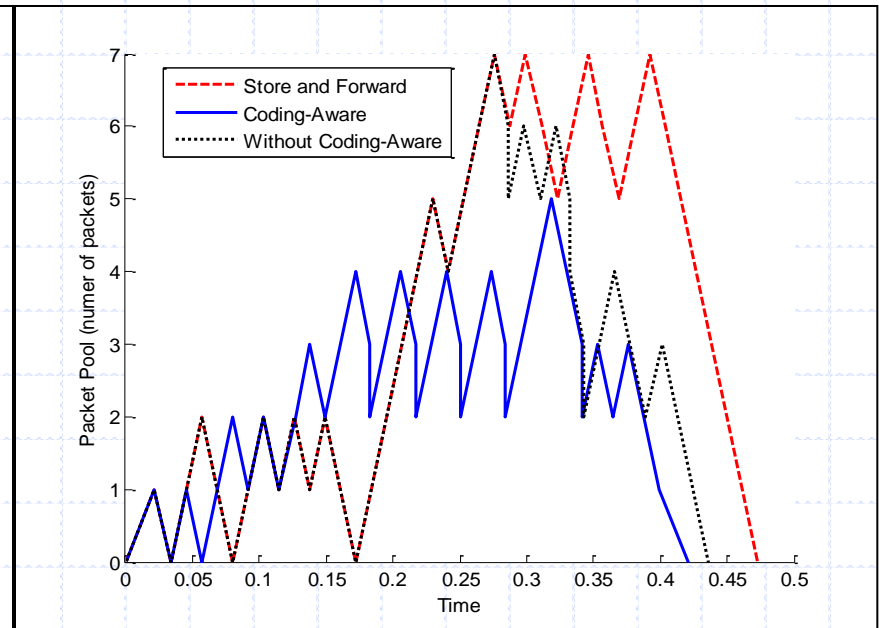 - Ensure packet delivery

- 20 packets each node

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5.0 Results and Discussions
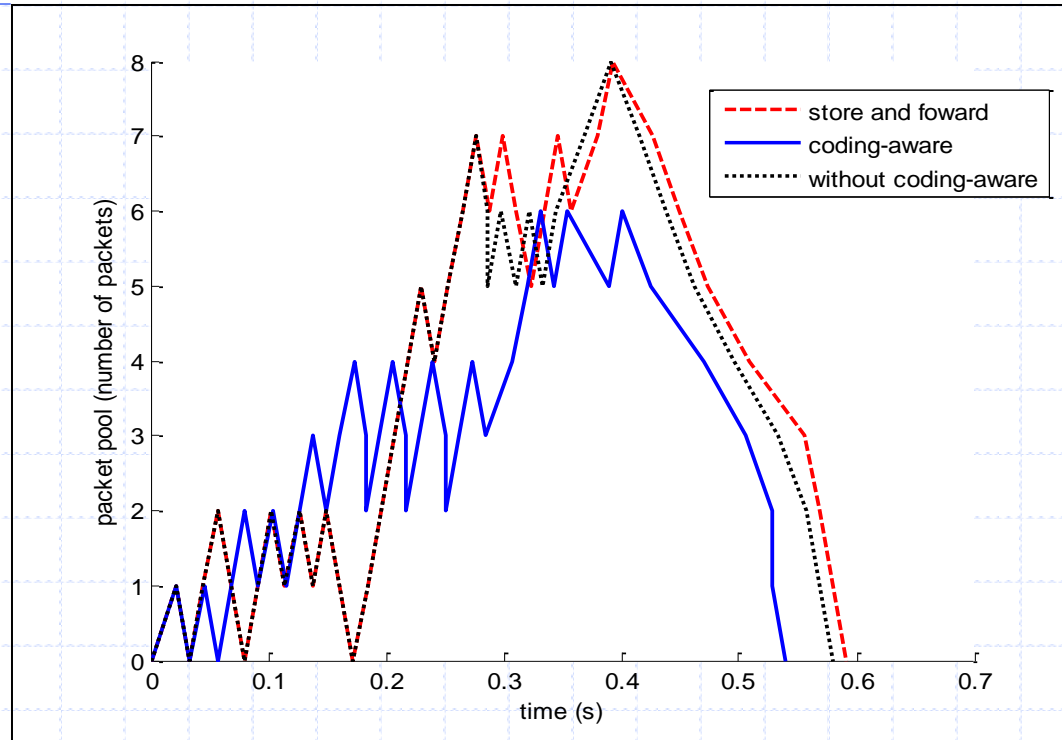

Average Throughput

Packet in queue

The performance show throughput of overall network in Alice and Bob topology, store and forward have lowest throughput. Packet in queue show the packet waiting in intermediate node, the packet queue are accumulate more in beginning and send out rapidly afterward due to network coding.

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5.0 Results and Discussions

Cross topology

The intermediate node in cross topology will keep on communicate with other node, the result show that the transmission with delay queue more faster then other.

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6.0 Conclusions

• Network Coding can significantly increase the average throughput of wireless ad hoc network.

• In this paper, the queue management at the intermediate node improves the chance of network coding at the intermediate node.

• An optimum wait time can increase chances of coding opportunity.

• The average throughput and queue management of all 3 methods are evaluated and their overall performances are compared.