Performance analysis of QoS-Oriented Distributed Routing protocols for wireless networks using NS-2.35

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Team number – 8

Project webpage- http://manpreetensc833.weebly.com/

ENSC 833 : NETWORK PROTOCOLS AND PERFORMANCE

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Roadmap

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• Introduction
• Related work
• Simulation design
• NS-2.35 model
• Simulation results
• Conclusions
• Challenges and future work
• References
Acronyms

• **EAODV**: Enhanced Ad-hoc on demand distance vector routing
• **QOD**: QOS oriented dynamic routing protocol
• **DSR**: Dynamic source routing
• **AS**: Access Point
• **UDP**: User datagram protocol
• **CBR**: Constant Bit rate
• **TX**: Transmission
Motivation

• Related to my Co-op work
• Emergence of real time and multimedia applications have stimulated the need of high Quality of Service (QoS) support for wireless networking environment.

• **Challenges in QOS**
  • Mobility
  • Bandwidth constraints
  • Energy constraints
  • Dynamic changing topology
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• **Data transmission in hybrid networks has two features.**
  • AP can be a source or a destination to any mobile node.
  • Number of transmission hops between a mobile node and an AP is small.
• **EAODV:** Node always forwards a packet to a next hop node that has small buffer usage than itself and high remaining energy

![Diagram](image.png)

Fig. 1

Reference:[1]
QoS-Oriented distributed routing protocol

• **QOD:** If source node is not within the TX range of the AP, it selects nearby neighbors that can provide QOS services to forward its packets to AP in a distributed manner

• Neighbor node selection criterion of **QOD:**
  • Queuing condition
  • Channel condition
  • Bandwidth availability

• Neighbor node selection criterion of **EAODV:**
  • Power availability
  • Buffer usage
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Related work


- Only AODV and EAODV is compared


- QOD routing protocol is discussed and simulated
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### Simulation design

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SIMULATOR</strong></td>
<td>Network Simulator 2</td>
</tr>
<tr>
<td><strong>NUMBER OF NODES</strong></td>
<td>Random</td>
</tr>
<tr>
<td><strong>TOPOLOGY</strong></td>
<td>mobile users</td>
</tr>
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<td><strong>INTERFACE TYPE</strong></td>
<td>Phy/WirelessPhy</td>
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<td><strong>MAC TYPE</strong></td>
<td>802.11</td>
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<td><strong>QUEUE TYPE</strong></td>
<td>Droptail/Priority Queue</td>
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<tr>
<td><strong>QUEUE LENGTH</strong></td>
<td>50 Packets</td>
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<td><strong>ANTENNA TYPE</strong></td>
<td>Omni Antenna</td>
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<td><strong>PROPAGATION TYPE</strong></td>
<td>Towray Ground</td>
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<td><strong>ROUTING PROTOCOL</strong></td>
<td>DSR</td>
</tr>
<tr>
<td><strong>TRANSPORT AGENT</strong></td>
<td>UDP</td>
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<tr>
<td><strong>APPLICATION AGENT</strong></td>
<td>CBR</td>
</tr>
<tr>
<td><strong>SIMULATION TIME</strong></td>
<td>50 seconds</td>
</tr>
</tbody>
</table>
Network model

Basic Hybrid N/w model

Fig:2

Reference:[1]
Network topology

- 30 mobile nodes in the network
- APs are fixed nodes
- Source nodes connects to nearest AP using neighbor node while ensuring QOS.

Fig :4
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Transmission delay

- **Analysis:** QOD has performed better as comparison to energy based EAODV
  - EAODV has higher TX delay in this scenario.
- **Reason:** QOD uses the distributed packet switching algorithm which reduce the TX delay.
• **Analysis:** QOD has performed better as comparison to energy based EAODV
  • Result may vary according to scenario and topology chosen.
• **Reason:** In EAODV the delay resulted from the path searching degrades the ability to meet the QOS requirements as comparison to QOD.
• **Analysis:** In low mobility environment, QOD generates higher overhead than E-AODV. But with high mobility EAODV has higher overhead.
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Extensive simulations of hybrid wireless networks is conducted and the findings are

- Direct adoption of the QOS routing techniques in hybrid networks inherits their drawbacks such as race condition.
- QOD provides better quality of service than energy based EAODV but this might differ depending upon scenario and topology.
- With low mobility in network QOD has higher overhead
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Challenges and Future Work

• **Challenges:**
  - Understanding TCL and ns-2.35
  - Implementation of mobile nodes with fixed node

• **Future work:**
  – Enhanced propose a QoS-based distributed routing protocol (QOD) for hybrid networks to provide QoS services in a highly dynamic scenario
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