Reliable Optimised Flooding in Ad hoc Networks

Chunwei Yan

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Proposed Reliable

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Reliable Optimised Flooding in Ad hoc Networks

Chunwei Yan

YanChunwei@outlook.com

November 13, 2012

Outline

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 - RMST
 - Unicast Transmission Mechanism
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 - Broadcast Reachability
 - Energy consumed



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Blind Flooding

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Blind Flooding

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- results in the broadcast storm problem

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Optimised Flooding

• limits the broadcast storm problem

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Blind Flooding

- remarkably robust and is able to reliably deliver messages
- results in the broadcast storm problem

Optimised Flooding

- limits the broadcast storm problem
- reduces the inherent level of redundancy

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replace broadcast transmissions with unicast transmissions

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RMST-Reliable Minimum Spanning Tree

- replace broadcast transmissions with unicast transmissions
 - link layer acknowledgement and retransmission
- improve the reliability of a flood

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Definition

An ad hoc network is a collection of wireless mobile nodes forming a temporary network lacking tranditional centralised administration

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● 不固定,移动性

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- ② 相互协作, 远距离传递转发

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- 不固定, 移动性
- ② 相互协作, 远距离传递转发
- 3 每一个节点同时是一个路由器

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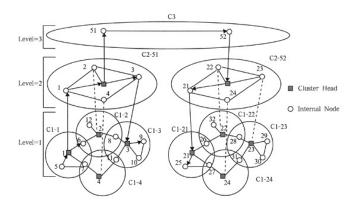
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Unicast(单播)

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Definition

- a piece of information is sent from one point to another point.
- just one sender, and one receiver.

Unicast(单播)

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Definition

 a piece of information is sent from one point to all other points.

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Definition

- a piece of information is sent from one point to all other points.
- just one sender, but the information is sent to all connected receivers.

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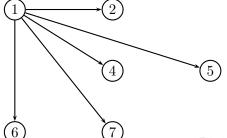
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Definition

- a piece of information is sent from one point to all other points.
- just one sender, but the information is sent to all connected receivers.



Broadcast Flood Problem

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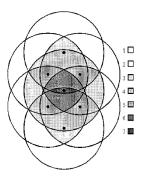
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RMST-Reliable Minimum Spanning Tree

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RMST is a reliable and optimised flooding mechanism taht computes a local MST based upon one hop neighbour knowledge in a distributed manner.

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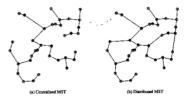


Fig. 1. Centralised and Distributed MST

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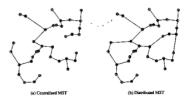


Fig. 1. Centralised and Distributed MST

ullet the centralised MST \Box distributed MST

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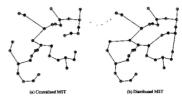
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ig. 1. Centralised and Distributed MST

- ullet the centralised MST \Box distributed MST
- the distributed MST results in a connected graph with

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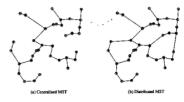
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ig. 1. Centralised and Distributed MST

- the distributed MST results in a connected graph with
 - a neighbour degree greater than one but less than six

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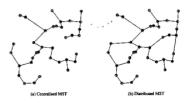
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ig. 1. Centralised and Distributed MST

- the distributed MST results in a connected graph with
 - a neighbour degree greater than one but less than six
 - an average neighbour degree of less than 2.04 nodes



Algorithm

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Chunwei Yar

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```
Algorithm RMST(message)
  if not seen message before
    BSET <- MST(!-hop Neighbours)
    i <- previous broadcasting node
    H <- nodes that recieved previous broadcast
    BSET <- BSET - i
    BSFT <- BSFT - H
    for each node i in BSET
         T_{power} < - transmission_{power}(i)
```

 $Unicast(Message, T_{power})$

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Fig. 2. RMST floodutilising IEEE 802.11 unicast and link layer ARQ

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Fig. 2. RMST floodutilising IEEE 802.11 unicast and link layer ARQ

 unicast transmission utilises a frame retransmission mechanism at the MAC layer

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Fig. 2. RMST floodutilising IEEE 802.11 unicast and link layer ARQ

- unicast transmission utilises a frame retransmission mechanism at the MAC layer
- positive acknowledge ment scheme(ARQ)

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Fig. 2. RMST floodutilising IEEE 802.11 unicast and link layer ARQ

- unicast transmission utilises a frame retransmission mechanism at the MAC layer
- positive acknowledge ment scheme(ARQ)
- a transmitting node will retransmit a frame if it does not receive a positive acknowledgement from the destination node

Broadcast Reachability

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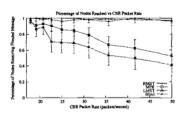
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ig. 3. Broadcast Reachability with Background CBR traffic

bind flooding and RMST provide the best delivery performance and are only slightly affected by background traffic.

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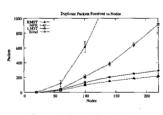
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ig. 6. Duplicate Packets Recieved

It shows the power consumed by each mechanism to complete a flood.

RMST utilises more energy to complete a flood than I MSTflood.



Goodbye

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Tankyou!