

Routing in mobile ad hoc networks

Humayun Bakht

School of Computing and Mathematical
Sciences

Liverpool John Moores University

Email: humayunbakht@yahoo.co.uk

[What it covers]

- I am going to give a general overview of routing first and will discuss different techniques in future presentations.
- In general how routing is achieved in mobile ad hoc networks ?
- What are the solutions (details will cover in future)
- Most importantly “Why routing is still unresolved” in MANET’s.

Quick overview of mobile ad hoc networks (MANET)

- Ad hoc networks are the short live temporary networks establish without the help of any fixed infrastructure.
- Any two or more then two mobile devices can establish ad hoc networks
- How and who ??
- any radio device with the capability of receiving and transmitting messages can establish ad hoc networks.

[Any where and at any time]

- These networks can be established at any where and at any time. As we say Instantaneous deployment.
- Main area was military to aid operation under circumstances where either its difficult to establish fixed networks or is not point of interest.
- But off-course we need networked machines or devices.

[Routing]

- Exchange of information (in this case typical term 'packets') from one station of the network to the other.
- What is required a protocol
- Set of standard or rules to exchange data between two devices.
- What are the difficulties in mobile ad hoc networks ?

[Difficulties]

- Frequent topology changes
 - Topology or physical connection of the devices changes frequently and unexpectedly
- Battery power
 - Limited battery power (we will see shortly how it affects the routing process of ad hoc networks)
- Bandwidth
 - Limited bandwidth available for network operations
- Hidden terminal problem
 - where one terminal although active but hidden it could be for any reason.

[Difficulties (1)]

- .corroboration of mobile devices
 - Some time devices tends to be self-fish do not willing to forward or receive packets for the sake of others.
 - It might be they would like to save their battery power and chose not to participate in a communication which has no direct benefit for them.
 - Then in this context number of different other issues comes.
 - I regard security and quality of services as most important among others.
 - The reason why I do not want to go in further details about these two issues, based on the fact that these issue comes when we have already decided what we are going to do with the routing.
- Obvious question “ Then how do we achieve routing in mobile ad hoc networks” is'not it ?

[Routing in MANET]

- By nature each of the devices in mobile ad hoc network act as intermediates nodes.
- They receive and send packets for other.
- With the formation of commercialized mobile ad hoc networks, the first routing solution was proposed in 1994 , entitled “routing in mobile ad hoc networks”.
- It was based on the idea of establishing routing as describe above and running some conventional routing protocols.

Progress made in between 1994-1998

- For mobile ad hoc networks, most of the research in this area carried out in between 1994 to 1998.
- As I said before, the author of “Routing in mobile ad hoc networks” later on invented DSR (Dynamic Source routing) protocol which was some where late 1997 or early 1998.
- In 1995, the first idea was transformed the first type of routing protocol DSDV (Destination distance sequence vector routing) was proposed.

Progress in between 1994-1998 (1)

- Till mid 1997, all of the proposed protocols were based or were extension of DSDV.
- In late 1997, a new protocol known as AODV (Ad hoc on demand distance vector routing was proposed)
- From there the routing protocols of mobile ad hoc networks were classified into two types i.e. tables driven and on-demand protocols.

[Some obvious questions]

- I would like share some question which we research in this area i.e. Routing in MANET come across.
- Why the routing is an unresolve issue in MANET's?
- And a sub questions "how many protocols so far have been proposed as a routing solutions for mobile ad hoc networks.

[Final]

- I normally answer question 2 before answer question 1
- The answer of question 2 is almost 30,
- Then why it is not resolved ?
- There are many reasons but for the sake of time I finished here with the two most important reasons.
 - 1) only three of them so far have been implemented and rest of them either proposed without any further suggested work or become replaced by some other protocols.
 - 2) All the three that have been implemented lacks
 - Very less analytical results.
 - Limited scenario do not offer solution for all the environments.
- That makes routing as a challenging issue even after 10 years

[Thanks]

- I am hoping to cover some more problem and their solution first before I go into details of different routing solutions.
- Again as for the different routing solution the session will be of general types
- First we will discuss about two main techniques before see the protocols one by one which falls into each of this category. (This all require another 6 to 8 presentations)
- As normal, you can download these web sites from my web site at <http://www.geocities.com/humayunbakht> (presentations)
- And you can read following of my articles on this subject
- Routing protocols for mobile ad hoc networks at
 - <http://www.computingunplugged.com/issues/issue200407/00001326001.html>
- Importance of secure routing in mobile ad hoc networks at
 - <http://www.computingunplugged.com/issues/issue200408/00001327001.html>

[Thanks (1)]

- Group communications in mobile ad hoc networks
 - <http://www.computingunplugged.com/issues/issue200411/00001399001.html>
- Questions
- For any further questions please drop me email at humayunbakht@yahoo.co.uk