

THE MESH NETWORK PROTOCOL EVALUATION AND DEVELOPMENT

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Abstract

In this paper, we introduce a Mesh network protocol evaluation and development. It has a special protocol. We could easily to understand that how different protocols are used in mesh network. In addition to our comprehension, Multi – hop routing protocol could provide robustness and load balancing to communication in wireless mesh networks.

Key words: *Mesh network, protocol, structure, package transform.*

1. Introduction

Wireless mesh networks have independent networking, dynamic topology, multi-hop routing features. It could quickly deploy to a local area communication networking and provide communications in the evil strategies and special circumstances. Therefore, it has broad prospects in the military field, temporary situation, even a disaster site.

The mesh network mainly includes: a wireless city. It also mainly used for the filed which need to communicate in the case of group movement. Such as temporary rent collective police network, share information networking, temporary internal network which needs video voice sharing. Use in the military is extraordinary. Because one hand mesh networks no need to assume specific network facilities, one other hand mesh network has rapid deployment ability, and strong anti-destructive characteristics. It may

soon become the preferred technology for next-generation digital battlefield communications.

2. Mesh network communications routing protocol

In reality, mesh network has inherit the mobile ad hoc networks a lot of technologies. The most representative is the wireless routing protocol. ad hoc network routing protocols can be divided into three categories. The first one is a prior formula routing protocol. For example, it has DSDV, WRP. The second is a reactive routing protocol. For example, it has DSR, AODV. The third is a hybrid routing protocol. For example, ZRP.

For mesh networks are suitable for ad hoc network routing protocols. But for use of the performance all functions, the authors believe that it is necessary to develop a suitable routing protocol for mesh network. There are two approaches to designing a mesh network routing protocol currently: the first one is using ad hoc network routing protocol to transplant for mesh networks. The second is to develop proprietary mesh network routing protocol. Currently it has developed special mesh routing protocols PWRP (predictive wireless routing protocol), MR-LQSR (multi-radio link- quality source routing).

3. A prior formula routing protocol

A prior routing protocol is a kind of proactive routing protocol. Prior routing protocol, each node needs to maintain one or more multiple routing tables. This table will record the routing way from original node to other nodes. If the network topology changes in a suddenly, the node will send update messages to released routing table in the network. Each node will receive a new message update to their routing tables. Since the update of each node, the whole network will achieve consistent and accurate routing information.

A prior routing protocol needs time to detect the changes constantly network topology and link state updates. So the routing table can accurately reflect the network topology. Due to time detection, the prior routing protocol will take a very large overhead cost. Finally the resulting in routing protocol function is not easy to convergence.

Distance vector routing protocol and link state routing protocol exist in a prior routing protocol. WRP wireless routing protocol is a kind of distance vector routing protocols. This kind of routing protocol doing maintain routing information for all network nodes. Each node in the network maintain a number of distance table, routing table, line cost table. As well as information re-transmission list. GSR- global state routing is a link state routing protocol which each node stores neighbor table, topology table, next jump hop table, and distance table.

Reactive routing protocol is a kind of on-demand routing protocols. It is different from proactive routing protocol which nodes do not keep accurate routing information. If the source node sends packets to the destination node in this moment, the source node initiates a route “look-up” process in the network, and begins sending packets when the process found the appropriate route. Of course, in order to improve the efficiency, routing nodes could be saved in the cache for the next follow-up sent. The most representative is DSR routing protocol. DSR is a simple demand routing protocol. The source node is dynamically to discover destination node. Each packet header is carrying all routing information. The router can easily identify forward packets.

Specific steps are as follows: when a node prepares to send data to the destination node in reactive routing protocol while first need to inquire whether there is a routing way to reach the destination node routing. Then using this routing way to send data if it has passing way. If it has not this passing way, the first source node needs to start the route discovery process, however the Route discovery program will first use information flood routing (flooding routing).

There is a source node 1 send a data packet to node 8. At the first the 1 node will check cache if there is a routing way to the destination node. If there will be a routing way has storage in cache already, the data will send directly. Contrary, the source node will apply route discovery procedure. The source node at first will send a route request message (RREQ). RREQ request information message include a unique destination. The second is that source node will send RREQ message address to all its neighbors. Each node receives a data packet will first check whether it is the target node. Fig 1,[1].

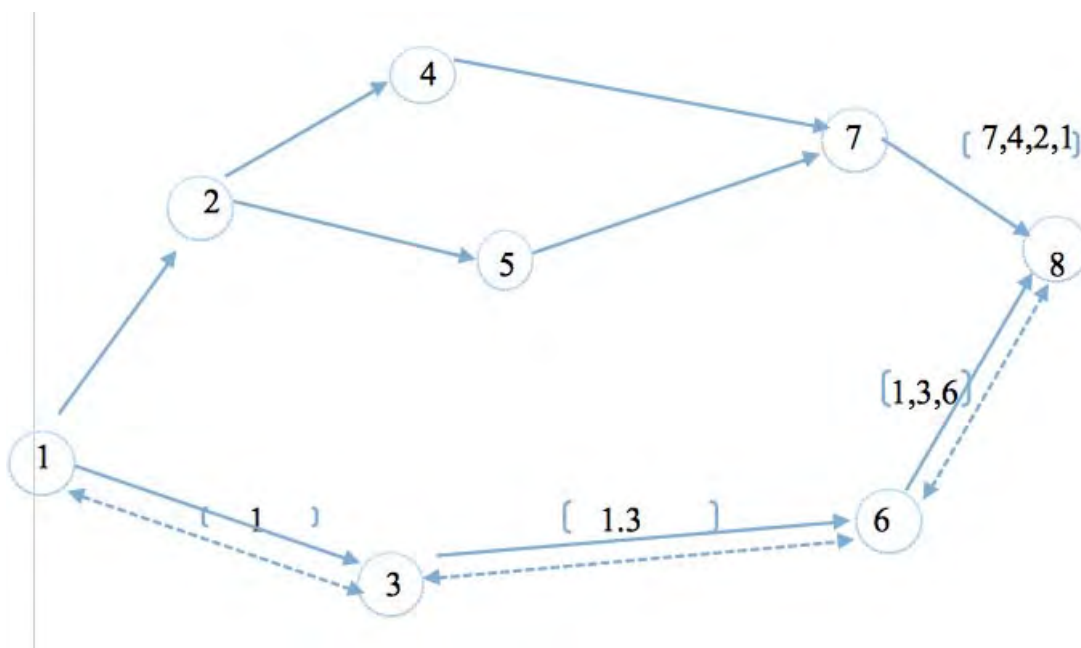


Figure1 - DSR Routing Discovering

4. Function features for the mesh network routing protocol

Based on more traditional routing to improve the utilization efficiency of mesh networks, a new routing protocol has developed for specially appointed need in the mesh network.

1. MR - LQSR

Multi - Radio Link - Quality Source Routing is a Microsoft-developed multi-channel wireless mesh routing protocol. It is based on DSR routing protocol to mention one of the

multi-channel wireless mesh network routing protocol. Multi Radio Link Quality source routing is different from traditional DSR routing protocol. DSR determine the shortest path way. However MR - LQSR protocol uses a combination of factors to decide a routing.

2. PWRP

Predictive Wireless Routing, PWRP is developed by TROPOS company which has proprietary for outdoor system routing protocol. PWRP routing protocol is used for large-scale network. PWRP agreement is not only according to the number of hops and the packet error rate to calculate a routing way, but also by comparison the optimum conditions which in a specific circumstances to determine the routing way.

PWRP agreement is improved from the traditional network routing protocol OSPF. PWRP applications designed for wireless mesh cell. PWRP could automatically to select the maximum throughput in a transmission way to path information data message. Thereby the impact which from traffic overload has reduced in a PWRP routing protocol.

3. Mesh – AODV

AODV routing protocol has widespread concern by developer, because of it has a small cost in algorithm complexity, superior performance to other similar routing protocol. It is considered as one of the most popular moving network routing protocols in prospect by scientist. In this moment Mesh AODV has been marked by IETF organization in No. RFC3501.

Mesh AODV has special features for wireless mesh network routing protocol. Mesh AODV Including the route discovery process and routing maintenance processes. Route discovery is responsible for establishing the initial communication routing way. Route maintenance is responsible for maintaining the network routing way in a changes state when the accident occurred. The following is the routing

maintenance process:

1. When a link fails

The node will attempt multiple retransmissions when data transmission comes our errors in networking. If not successful after a few times retransmissions, the node will determine link failure. Route cache table will be deleted by original node.

2. Link Recover

At this time, the source node which in the end of failed link initiates apply to path - finding process to find the target node. A new routing way information will be sent to the source node if the path - finding process successfully. Contrary, if the path - finding process failed, the source RERR packet will be send to source node inform that relaunch the path - finding process.

Conclusion

These are the introduction about mesh network routing protocol technology. Mesh network routing includes direct borrowed Ad hoc network routing protocols and independent special line mesh routing protocol.

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