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# Systematic investigation of Wireless Routing Protocols: A survey

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## Abstract
In wireless network, routing is one of the important consideration when we talk about the performance measurement so in order to utilized the best resources services we need to analyze and monitor the probs and cons of various tradition as well as advance routing protocols in very systematic manner, since wireless network is a composed of various tiny nodes having low bandwidth and capacity to accomplish the networking task although it's very important to manage routing procedure in a systematic manner so that network can work with the best suitable framework in order to perform networking operations. This paper brings an investigation report in order to describe the various networking routing procedure in comparative and systematic manner so that routing can manage performance efficiency with low-capacity tiny nodes.

**Keywords:** wireless network, tiny nodes, routing protocols, efficiency, bandwidth, performance.

## 1. Introduction
Wireless communication has led to the ubiquity of wireless networks for personal, commercial, industrial, and milit ary use. In many applications, device location plays a critical role in network operations and services. Advances in distribut ed systems with increasingly growing capabilities for efficient file transport and their immediate consequence, i.e. the abilit y to rapidly replicate a content over a network, have made sharing of electronic files become a revolution in business and do mestic environments. The high level of decentralization, dynamism network management, and selfmanagement of a number of emerging communication environments, including teamwork, pure wireless distributed network and mobile ad hoc netw orks, in this way no of clients are participated in the process of communication or collaboration without relying on central a uthorities, enforce cooperation to play an essential role in the overall network functioning. Particularly, ad hoc networks rel y upon the cooperation among individual nodes to carry out essential tasks such as packet forwarding. wireless distributed n etwork file sharing systems face a similar situation. File sharing has become a common practice for Internet users to obtain, for example, software updates from public sites. However, such a practice still provokes mistrust. File corruption may occur easily through dishonest and malicious actions or even by mistake. Similarly, an impostor could masquerade himself as the originator of a certain file, publishing a corrupted version of the file. In fact, users of currently deployed file sharing system s are unable to verify that files they retrieve are uncorrupted, or whether the content has been truly created by the presumed owner.

## 2. Literature Survey
In [1] author describes that the information distributed management systems share information from multiple com municating nodes in the network and during process it may be possible problems in getting consistency due to node failures or system failure, data fragmentation in different locations. In this research work we discuss architecture for a load balance, as well as distribution and reliable storage system for information distributed over a Wireless Distributed network. , if one ta lk about the resource planning for the best network design they first need to manage bandwidth of channel, buffer optimizati on and management for buffer space computation, functioning of difference processing functions to help node to participate in successful data transmission in highly congested area [2,3].In [4,5] Mobile ad hoc networks (MANET) represent complex distributed systems that comprise wireless mobile nodes that can freely and dynamically self organize into arbitrary and te mporary ad hoc network topologies. A mobile ad hoc network is a collection of nodes that is connected through a wireless medium forming rapidly changing topologies. The widely accepted existing routing protocols designed to accommodate the

needs of such selforganized networks do not address possible threats aiming at the disruption of the protocol itselfI n [6] proposed a protocol called —RACSP , Router Assisted Capacity Sharing Protocol in the research titles as —On Achi eving Low Latency at Data Centers , protocol is specially designed to make social networking as easy as possible, now are day‘s network provides social services efficiently that make such application is mostly desirable for the user‘s in result, the production of data is higher [19], At present data in network is growing day by day that cause high latency problem due to t he heavier traffic and data volume, now network need to implement such an intelligent protocols that can manage the increa sing traffic as well as data, Munir A. et al, proposed a similar type of concept in RACS protocol that make it more desirable for —High Latency Error , Today‘s network are getting suffer with real time social application to manage online services li ke web searching , searching operation based on key words skill, social networking app like facebook etc. Protocol provides Low latency which is must to improve user experience even it is important for operator revenue , traditional protocol like A pproximate Processor Sharing Protocols is used to get resolve latency error but in case if one analyze and experiment it on wire are network social application one found the performance is low [7,8], to make it more reliable with better performanc e RACS protocol has been designed that support data center‘s to manage continuously produced high volume of data theref ore it is also known as data centers transport layer protocol works on the concept of —Minimizes flow completion times by computing Shortest Remaining Processing Time First policy that result optimal computation even for maximum processes t o reduce latency on run time computation in distributed manner , in proposed protocol rate has been assigned according to t he different flows ,each flow has it associate weight that determines their priority to process , rate presents information valu e for father process [9,10] . Weight follows different scheduling to process the process; they had ranges to get variation bet ween differences of weight. After the Experimental analysis of proposed protocols author found that RACS Protocol is muc h better in performance to get low latency with protocols like TCP, DCTCP and RCP data warehouse centre. One get the re sult that it improve high latency error up to 95% with TCP, 88% with DCTCP and 80% over RCP in this way RACS perfor m outstanding compare to others [11].

## 3. Classification of the Routing Protocols

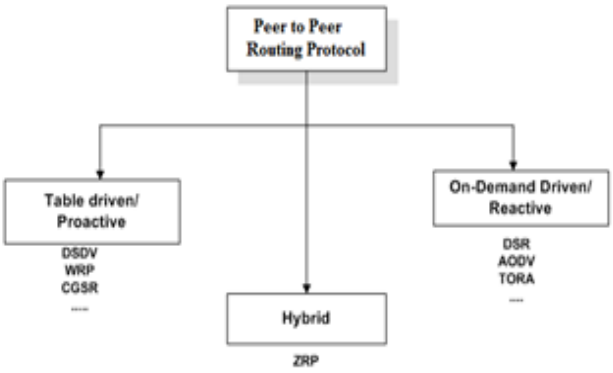


Figure 1.1: Classification of Routing Protocls

*3.1 Table-driven or Proactive Routing Protocols*

In this category, the protocols will perform routing in the way where each participated node will manage their individual inf ormation table, which has been shared with the other node of the network periodically. In this policy information are periodi cally upgraded by the way to board cast routing information to the next nearest node so that one can say it is the extension o f traditional RIP protocol [1], here we have few examples which comes under into the category of Proactive routing protoco ls like DSDV as in [3], In tabledriven or proactive protocols, the all the mobile nodes maintain and manage an active list of routes having all details to every other node in the peer to peer network in a routing table. The tables are periodically update d in specific time cycle by broadcasting information to other neighbor nodes in the peerpeer network. So that one can say th ey are an extension to the traditional wired network routing protocols like as the Routing Internet Protocol (RIP). WRP used for wireless routing protocol, another can be CGSR works on the mechanism of clusterbased routing scheme as in [5], in c oming section we are going to discuss these protocols in brief. Any node wants to communicate with another mobile node h as to obtain and mange the next hop neighbor on the route to the destination system from its routing information table. Som e examples of tabledriven routing protocols are Destination Sequenced DistanceVector routing protocol (DSDV), Wireless Routing Protocol (WRP), Cluster Switch Gateway Routing protocol etc. In the following sections, working of DSDV and W RP are discussed, and the general benefits and loss of table-driven routing protocols are discussed.

***3.1.1 DSDV Routing Protocol***

This another protocol called DSDV, which works on the concept of distributed Bellman Ford strategy, in this technique as d iscussed in [6] , every node will manage neighbor node detail and distance value to perform efficient routing The Destinatio n Sequenced Distance Vector (DSDV) protocol is works with multiple nodes, which consist sequencing by sequence no in o rder to achieve nodes data integrity , such practice will avoid looping in routing as in [2], in case if router found two same s

equence no , so that the one with different distance value of route metric will got selected , to get route refresh and updatin g has to be performed on specific time period , in this way all the network node will multicast their addressing detail to rem aining nodes of the network. The Destination Sequenced Distance Vector protocol is belonging to a proactive routing protoc ol category. This protocol, each mobile node maintains information table consisting of the nexthop neighbor detail and the d istance detail to the destination node in terms of number of hops availability. Protocol uses sequence numbers for ordering f or the destination nodes to determine and maintain "freshness" of route, in order to avoid longlived routing loops. If in case two routes having the same sequence number addressing, so protocol will take one with smaller distance metric detail is adv ertised. The sequence number is also incremented every update sent by the host node. All the nodes periodically broadcast t heir routing information tables to their neighboring nodes to get maintain an updated view of the entire network. The routin g tables can be managed in two ways either go with incrementally or a full dump. An incremental update is done when an i ncremental update is required as more than one Network Packet Data Unit any major changes happen during in the network topology. A full dump is done when network topology changes are changing significantly.

*3.1.2 Wireless Routing Protocol (WRP)*

The Wireless Routing protocol (WRP) [4] is a tabledriven protocol based upon the distributed Bellman Ford algor ithm and is similar to DSDV. The difference between DSDV and WRP is the number of tables maintained at each node. In WRP, the following tables maintained at each node As described in [4], The Wireless Routing protocol (WRP) comes under the category of proactive protocols performs similar as we discussed DSDV in last section. The major difference between t hese two protocols is the management of routing information table, as we know DSDV will not maintain table at every node but in WRP information table should be managed by every participated node as describes by following way.

- Routing table (RT): It is essential to manage the routing details such information will be maintain at routing table h aving related information to destination node, it can be identified by predecessor, successor and interface address to get accuracy in routing.
- Link Cost Table (LCT): This table manages the cost measurement belongs to different path and related destination; the objective of this table is to manage least cost computation to perform shortest path routing.
- Distance Table (DT): It is the only table used in this process which maintains destination node details.
- Message Retransmission List (MRL): Massage management is necessary part of communication; this table contain s details regarding message lost, retransmission, and message updating and message delivery time details. It is also managed acknowledgement detail with the help of flag.

Every node periodically sends an update message to its neighbors, which contains a list of updates and a list of responses in dicating which node must acknowledge the update. When a node detects a link break, it sends an update message to its neig hbors with the link cost of the broken link set to infinity. All the nodes which had an active route to the nodes affected by th e link break then update their corresponding entries to them.

*3.2 On-Demand Routing Protocols*

Protocols are used based on user demand for routing process that's why we also called it as on demand routing protocol, in t his approach two common things are Routing Invention and Path maintenance. In route invention process it will intimate to the related route address which is already available in its cache so that nodes who want to communicate with other then dest ination rely against request node. In the nest process route maintenance table will manage broken link details and acknowle dgments details.

*3.2.1 Dynamic Source Routing (DSR) Protocol*

Protocols are used based on user demand for routing process that's why we also called it as on demand routing protocol, in t his approach two common things are Routing Invention and Path maintenance. In route invention process it will intimate to the related route address which is already available in its cache so that nodes who want to communicate with other then dest ination rely against request node. In the nest process route maintenance table will manage broken link details and acknowle dgments details.

- *Route Discovery DSR*

In the route discovery phase, the source node establishes a route by broadcasting route request (RREQ) packets to all its nei ghbors. Each neighbor, in turn rebroadcasts the packets to remaining neighbors' node, and see that the TTL (Time to Live) counter is greater than zero. On the other hand, requested ids are used to find, if a particular route request has been previous ly received by the node. Since each node always maintains a list of currently received data packets and resources requested, as in the format of (initiator, request id) both fields are necessary. In case if two node demand and requests with the same pa rameters like (initiator, request id) are received by another forwarding node, it broadcasts any one node and drops the other. This approach also protects for formation of routing loops cycle in the network. When the packet reaches the destination no de it will first unicasts a reply packet forwards it to the reverse path back to sender node. This reply packet maintains the ro ute to final destination; figure 1.2 shows an example of how this process will discover route.

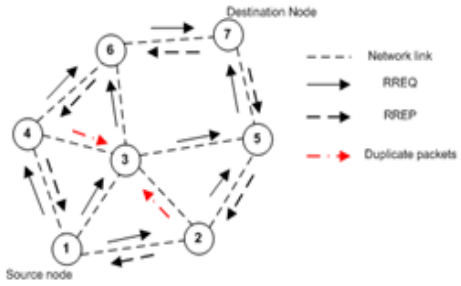


Figure 1.2: Routing Process in DSR

If we will go through the entire routing session, we find that node 1 wants to communicate with node 7, it initiates its routin g table along with the discovery mechanism and here for successful reaching to the destination it broadcasts request packet called as RREQ to its neighboring nodes like node 2, 3 and 4 as described in figure 1.2, we can see node 3 also receiving th e broadcasted packets from its neighbor nodes 4 and 2 with the same information unit of (initiator, request id) pair. In this c ase algorithm will decide to drops packets request and promote broadcasts the other data packet to its desired neighbor's no des. In the similar way routing will be processed by the other node in the same network.

*3.2.2 Ad hoc on-demand Distance Vector Routing Protocol*

Illustrated in [9], AODV protocol is the most traditional routing protocol used for efficient routing for perform routing oper ations in Ad hoc networking , AODV is good compare to DSR protocols since it has been designed to eliminate the pitfalls of DSR and do some great things with AODV, so that it is combination of DSDV and DSR so that AODV works on the bas ics of DSR and DSDV strategy like on demand service policy to finding and search desired route, it uses table driven polic y to determine the most suitable route, specially it uses destination sequence number to perform data and node integrity.

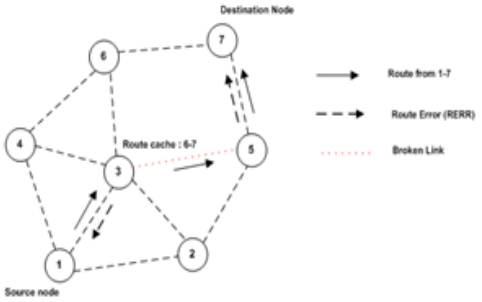


Figure 1.3: Routing maintainance in AODV

## 4. IV. Comparison of DSR and AODV

***Table 1.1*** *:provides a comparison of the features of DSR and AODV*

| Protocol / Feature | DSR | AODV |
|---|---|---|
| Destination sequence numbers | Not used | Used |
| Link Layer acknowledgements | Not Required | Required (using HELLO beacons) for link breakage detection |
| Routing mechanism | Source routing – Multiple route caches for each destination | Table driven – one entry per destination. Sequence numbers used for |
| Route storage mechanism | Using route caches | Using routing tables |
| Timers | Not Used | Used |
| Multiple Route caches | Yes | No |
| Optimizations | Salvaging, Gratuitous route replies (RREP) and Route Error (RERR), non-propagating route requests [11] | Expanding ring search [10] |

## 5. Conclusion

In this paper we analyse the basic protocols of routing strategy specially we concentrate on demand, proactive and Reactive routing policies. We found that every routing policy having their own benefits and drawback we need to design an additional protocol algorithm which consider the underline limitation of routing policy as well as the resources availability factor so that we felt to proposed another routing policy for wireless network that can manage performance as well as maintain efficiency in network during operation since wireless network users and application are growing therefore we need to produce something much better compare to AODV,DSR and other routing protocols.

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