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A Survey on Packet Retrieval for Three-hop Routing Protocol in Hybrid Wireless Networks

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Abstract: ***Hybrid wireless networks is important solution, which allowing mobile clients to achieve service access in a seamless manner independent of their existence in Wireless LAN communication. The hybrid protocols are more flexible, reliable, and have better performance than the traditional wireless network protocols. However, most routing protocols for these networks simply combine the ad-hoc transmission mode with the cellular transmission mode, which inherits the drawbacks of ad-hoc transmission. This paper presents a Survey on Packet Retrieval for Three-hop Routing Protocol in Hybrid Wireless Networks. To take full advantage of the widespread base stations, we retrieve a packet which is going to loss. An efficient data routing protocol is important in such networks for high network capacity and scalability. However, most routing protocols for these networks simply combine the ad-hoc transmission mode with the cellular transmission mode, which inherits the drawbacks of ad-hoc transmission.***

Keywords: Hybrid Wireless Network, Routing Protocol, Congestion Control, Security, Quality of Service.

1. Introduction

Hybrid wireless networks are any mobile node in a wireless network may have connectivity, either directly or via a gateway node, to an infrastructure network[12]. While the capacity performance of cellular networks has been well researchers have started to investigate the capacity of wireless ad hoc networks[13]. Hybrid wireless network consists of an infrastructure wireless network and a mobile ad-hoc network. Wireless devices such as smart-phones, tablets, military operation, business and laptops , have both an infrastructure interface and an ad-hoc interface. As the number of such devices has been increasing rapidly in recent years, a hybrid transmission structure will be widely used in the future.[8]

In a mobile ad-hoc network, the absence of a central control infrastructure, self-configuring, data is routed to its destination through the intermediate nodes in a multi-hop manner. Each device in a MANET is free to move independently in any direction, hence the multi-hop routing needs on-demand route discovery or route maintenance.[1] Some of the network constraints in MANETs are limited bandwidth, low battery power of nodes, frequent link unreliability due to mobility.[1]

In infrastructure mode, communicate with each other with a wired network. When one AP is connected to wired network and a set of wireless stations it is referred to as a Basic Service Set (BSS).The protocols use the multi-hop routing to forward a message to the mobile gateway nodes that are closest to the BSes or have the highest bandwidth to the BSes. The mobile gateway nodes then forward the messages to the BSes, functioning as bridges to connect the ad-hoc network and the infrastructure network. It makes the support of universal network connectivity and ubiquitous computing by integrating all kinds of wireless devices into the network.[3]

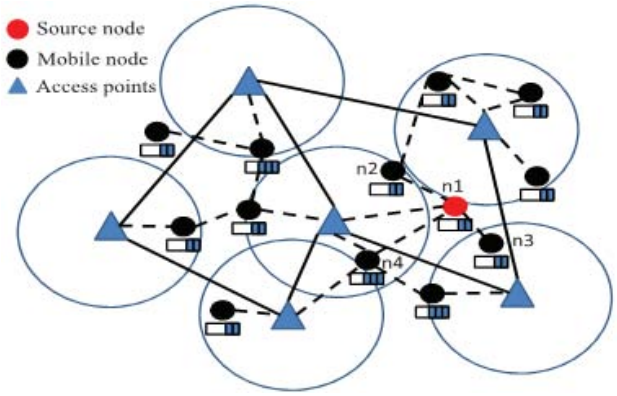

Figure 1: The network model of the hybrid networks

Hybrid Networks provides unidirectional links, which are a common event in wireless networks. It can make direct communication with the access point for mobile nodes but the access point has a greater transmission range than the mobile nodes. With the continued growth of interest in ad hoc networks, it is very important that global connectivity will be required for mobile wireless devices in the near future[10]. The limitation of ad hoc networks is that there is typically no connectivity between the fixed network and the mobile nodes, due to the lack of previous infrastructure. With the continued growth of interest in ad hoc networks, it is inevitable that global connectivity will be required for mobile wireless devices in the near future.[8]

2. Literature Survey

1 Distributed Three-hop Routing Protocol to Increase the Capacity of Hybrid Wireless Networks:
A hybrid network is formed by placing a inadequate network of base stations in an ad hoc network. These base stations are assumed to be connected by a high transfer speed wired network and act as relays for wireless nodes. They are not information sources or data receivers. Hybrid networks present a tradeoff between traditional cellular networks and

pure ad hoc networks in that data may be forwarded in a multi-hop fashion or through the infrastructure. It has been shown that the capacity of a random ad hoc network does not scale well with the number of nodes in the system[12]. This paper presents Distributed Three-Hop Routing (DTR) [1] protocol to improve the capacity of Hybrid wireless networks. This DTR protocol divides the message stream in to a number of segments. This segments are distributed in terms of wide spread Base station. Simultaneously the Base station distributes the segments and forwarding the data using Mobile Ad hoc Network. So the DTR protocol improves the Network efficiency and reduces the Overhead. They run a set of experiments this DTR protocol by using Network Simulator-2. Existing Two-Hop Routing protocols are produce High overhead and Low Reliability. The proposed DTR protocol compare to Two-Hop Routing protocol improve the Network Efficiency and reduce the Overhead.

To overcome the aforementioned shortcomings, DTR tries to limit the number of hops. The first hop forwarding distributes the segments of a message in different directions to fully utilize the resources, and the possible second hop forwarding ensures the high capacity of the forwarder. DTR also has a congestion control algorithm to balance the traffic load between the nearby BSes in order to avoid traffic congestion at BSes. Using self-adaptive and distributed routing with high speed and short-path ad-hoc transmission.

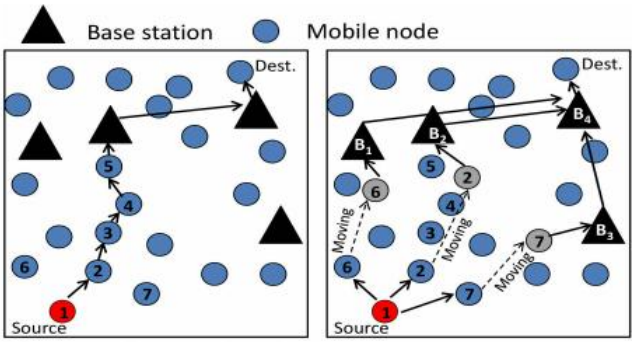

Figure 2: One-hop System Fig 3 . Three-hop System

2. A QOS-oriented distributed routing protocol for Hybrid Wireless Networks:

As wireless communication gains popularity, significant research has been devoted to supporting real-time transmission with stringent Quality of Service (QOS) requirements for wireless applications. At the same time, a wireless hybrid network that integrates a mobile wireless ad hoc network (MANET) and a wireless infrastructure network has been proven to be a better alternative for the next generation wireless networks. By directly adopting resource reservation-based QOS routing for MANETs, hybrids networks inherit invalid reservation and race condition problems in MANETs. In this paper, proposed a QOS-Oriented Distributed routing protocol (QOD) [13] to enhance the QOS support capability of hybrid networks. Taking advantage of fewer transmission hops and any cast transmission features of the hybrid networks, QOD transforms the packet routing problem to a resource scheduling problem. QOD incorporates five algorithms: 1) a QOS-guaranteed neighbor selection algorithm to meet the transmission delay requirement, 2) a distributed packet scheduling algorithm to further reduce transmission delay, 3) a mobility-based segment resizing algorithm that adaptively adjusts segment size according to node mobility in order to reduce transmission time, 4) a traffic redundant elimination algorithm to increase the transmission throughput, and 5) a data redundancy elimination-based transmission algorithm to eliminate the redundant data to further improve the transmission QOS. Analytical and simulation QOD protocol provide high QOS performance in terms of overhead, transmission delay, mobility-resilience, and scalability.

3. A Highly adaptive distributed routing algorithm for mobile wireless networks:

This paper presents a new distributed routing protocol for mobile, multi hop, wireless networks. The protocol is one of a family of protocols which we term “link reversal” algorithms. The protocol’s reaction is structured as a temporally-ordered sequence of diffusing computations; each computation consisting of a sequence of directed link reversals. The protocol is highly adaptive, efficient and scalable; being best-suited for use in large, dense, mobile networks. In these networks, the protocol’s reaction to link failures typically involves only a localized “single pass” of the distributed algorithm. This capability is unique among protocols which are stable in the face of network partitions, and results in the protocol’s high degree of adaptively. This desirable behavior is achieved through the novel use of a “physical or logical clock” to establish the “temporal order” of topological change events which is used to structure (or order) the algorithm’s reaction to topological changes. They refer to the protocol as the Temporally Ordered Routing Algorithm (TORA). In future to reduce the Performance overhead[12].

4. Ucan: A unified cell and ad-hoc network architecture.

In third-generation (3G) wireless data networks, mobile users experiencing poor channel quality usually have low data-rate connections with the base-station. Providing service to low data-rate users is required for maintaining fairness, but at the cost of reducing the cell's aggregate throughput. In this paper, propose the Unified Cellular and Ad-Hoc Network (UCAN) architecture for enhancing cell throughput, while maintaining fairness. In UCAN, a mobile client has both 3G cellular link and IEEE 802.11-based peer-to-peer links. The 3G base station forwards packets for destination clients with poor channel quality to proxy clients with better channel quality. The proxy clients then use an ad-hoc network composed of other mobile clients and IEEE 802.11 wireless links to forward the packets to the appropriate destinations, thereby improving cell throughput. They refine the 3G base station scheduling algorithm so that the throughput gains of active clients are distributed proportional to their average channel rate, thereby maintaining fairness. With the UCAN architecture in place, they propose novel greedy and on-demand protocols for proxy discovery and ad-hoc routing that explicitly leverage the existence of the 3G infrastructure to reduce complexity and improve reliability. They further propose a secure crediting mechanism to motivate users to participate in relaying packets for others. Through extensive simulations with HDR and IEEE 802.11b [2].

5. Multi-hop cellular: A new architecture for wireless communications

In multi-hop cellular networks, a channel that contributes the lowest relaying delay is proposed to the current node on the path. The current node itself does not receiving on the tim-e slot of the proposed channel that enhance the capacity and coverage problems of cellular networks. They also allow faster and cheaper deployment of cellular networks. This paper presents a new architecture, Multi hop Cellular Network (MCN), for wireless communications. MCN preserves the benefit of conventional single hop cellular network (SCN) where the service infrastructure is constructed by fixed bases, and it also incorporate the flexibility of ad-hoc networks

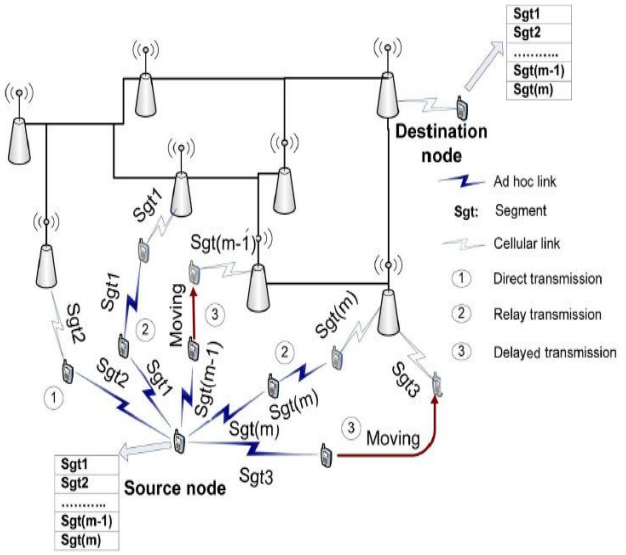

Figure 4: System Architecture of multi-hop routing protocol

where wireless transmission through mobile stations in multiple hops is allowed. MCN can reduce the required number of bases or improve the throughput performance, while limiting path vulnerability encountered in & ad hoc networks. In addition, MCN and SCN are analyzed, in term of mean hop count, hop-by-hop throughput, end-Wend throughput, and mean number of channels under different [3].

6. Highly dynamic destination sequenced distance vector routing (DSDV) for mobile computers

In this paper they present an innovative design for the operation of such ad-hoc networks. The basic idea of the design is to operate each Mobile Host as a specialized router, which periodically advertises its view of the interconnection topology with other Mobile Hosts within the network. This amounts to a new sort of routing protocol. They have investigated modifications to the basic Bellman Ford routing mechanisms, as specified by RIP, to make it suitable for a dynamic and self-starting network mechanism as is required by users wishing to utilize ad-hoc networks. The modifications address some of the previous objections to the use of Bellman-Ford, related to the poor looping properties of such algorithms in the face of broken links and the resulting time dependent nature of the interconnection topology describing the links between the Mobile Hosts. Finally, they describe the ways in which the basic network-layer routing can be modified to provide MAC-layer support for ad-hoc networks. [14]

7. Ad hoc on demand distance vector (AODV) routing

The Ad hoc On Demand Distance Vector routing algorith-m is a routing protocol designedfor adhoc mobile networks. AODV is capable of both unicast and multicast routing. It is an on demand algorithm, meaning that it builds routes between nodes only as desired by source nodes. It maintains these routes as long as they are needed by the sources.

Additionally, AODV forms trees which connect multicast group members. The trees are composed of the group members and the nodes needed to connect the members. AODV uses Sequence numbers to ensure the freshness of routes. It is loop free, self starting, and scales to large numbers of mobile nodes. In this paper they present Ad hoc On Demand Distance Vector Routing (AODV) [6], a novel algorithm for the operation of such ad hoc networks. Each Mobile Host operates as a specialized router, and routes are obtained as needed (i.e. on demon) with little or no reliance on periodic advertisements their new routing algorithm is quite suitable for a dynamic self starting network, as required by users wishing to utilize ad hoc networks. AODV provides loop free routes even while repairing broken links. Because the protocol does not require global periodic routing advertisements, the demand on the overall bandwidth available to the mobile nodes is substantially less than in those protocols that do necessitate such advertisements. Nevertheless we can still maintain most of the advantages of basic distance vector routing mechanisms. They show that our algorithm scales to large populations of mobile nodes wishing to form ad hoc networks they also include an evaluation methodology and simulation results to verify the operation of our algorithm Keywords.

3. Disadvantages of Existing System routing protocol

- Packet Loss- When Packet is transmitting from source to destination then their has more occurrences to failure the node in wireless sensor networks. It affected on the packet of the message, means the message is lost. There is no record over the wireless network for the loss packet of data.
- Security- Security in routing or forwarding functionality is not specified in the standard. As a consequence, HWMP in its current form is vulnerable to various types of routing attacks such as flooding, route disruption and diversion, spoofing etc.[11]
- High overhead- Route discovery and maintenance incur high overhead. The wireless random access medium access control (MAC) required in mobile ad-hoc net-works, which utilizes control handshaking and a back-off mechanism, further increases overhead.
- Hot spots- The mobile gateway nodes can easily become hot spots. The RTS-CTS random access, in which most traffic goes through the same gateway, and the flooding may exacerbate the hot spot problem.
- Low reliability- Dynamic and long routing paths lead to unreliable routing. Noise interference and neighbor

interference during the multi-hop transmission process causes a high data drop rate. Long routing paths increase the probability of the occurrence of path breakdown due to the highly dynamic nature of wireless ad-hoc networks.[1]

4. Conclusion

A hybrid wireless network combining an infrastructure wireless network and a mobile ad-hoc network leverages their advantages to increase the throughput capacity of the system. However, current hybrid wireless networks simply combine the routing protocols in the two types of networks for data transmission, which prevents them from achieving higher system capacity.

In this paper, the proposed framework for efficient and secure data routing protocol. It is space efficient and has numerous applications to secure and reliable storage of information in networks, and even on single disks, to fault-tolerant and efficient transmission of information in network. Using this approach one can achieve secure packet sharing application over hybrid networks. In Future work we discuss about energy consumption along the path, and energy aware load balancing among the nodes. Also improves routing optimality by monitoring routing paths continuously, and gradually redirecting the path towards a currently more optimal one.

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