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SURVEY ARTICLE

SURVEY ON AN EFFICIENT APPROACH FOR MULTIMEDIA TRANSMISSION USING MULTIPATH ROUTING IN MANET

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Abstract- Mobile Ad hoc Networks community provides us with a wealth of technologies that enable the source and the destination nodes to route the data through a number of intermediate forwarding nodes. Fast resources discovery and high Quality of Service are key determinants for efficient multimedia transmission. In this paper, we describe a technique of Multipath Routing using AOMDV routing protocol used for multicasting multimedia data transmission in MANET. Multi-path routing represents a promising routing method for wireless mobile ad hoc networks. Multi-path routing achieves load balancing and is more resilient to route failures. Ad Hoc On-demand Multipath Distance Vector protocol is used to choose the multiple paths available for multicasting multimedia data in MANET, based on the rate-distortion metric instead of finding the disjoint paths. The multimedia data further transferred to one and two hop neighbours. The ability of creating multiple routes from the source to a destination is used to provide backup route. When primary route fails to deliver the packets in some way, the backup is used for maintaining connection establishment. Multipath routing using AOMDV achieves lower average end-to-end delay, high video data delivery, lower routing overhead and packet loss rate, higher network throughput, quality of service in comparison with single hop neighbours.

Keywords: Multimedia; Multicasting; AOMDV; MANET

I. INTRODUCTION

A Mobile Ad Hoc Network is also called as mobile mesh network. It is a self-configuring network of mobile devices connected by wireless links. Each device in a MANET is free to move independently in any direction, and will therefore change its links to other devices frequently. Each must forward traffic unrelated to its own use, and therefore be a router. The primary challenge in building a MANET is equipping each device to continuously maintain the information required to properly route traffic. Such networks may operate by themselves or may be connected to the larger Internet. MANETs are a kind of wireless ad hoc networks that usually has a route table networking environment on top of a Link Layer ad hoc network. They are also a type of mesh network, but many mesh networks are not mobile or not wireless.

Routing is the process of selecting paths in a network to forward the data packets. In packet switching networks, routing directs packet forwarding, the transit of logically addressed packets from their source toward their ultimate destination through intermediate nodes; typically hardware devices called routers, bridges, gateways, firewalls, or switches. An ad hoc routing

protocol is a standard that controls how nodes decide which way to route packets between computing devices in a mobile ad hoc network. Multipath routing is advantageous over a single path routing for video transmission.

A basic video quality can be achieved if the base layer can be successfully decoded. Adding one or more enhancement layers to the decoding process increases the quality of the decoded video. A particular quality enhancement layer can only be decoded if all lower quality layers are available. If we assume that only two layers are streamed to the destination (one base layer plus an enhancement layer) and two disjoint paths are used for streaming these two layers, one need to make sure that the base layer takes the path that has the smaller packet drop probability i.e. the path with the minimum rate distortion. Here, Multipath routing using AdHoc On-demand Multipath Distance Vector protocol is the routing technique of obtaining multiple alternative paths through a network, which can yield a variety of benefits such as fault tolerance, increased bandwidth, increased throughput or improved security. AOMDV protocol ability of creating multiple routes from the source to a destination is used to provide backup route. When primary route fails to deliver the packets in some way, by using the backup the video packets forward to the destination with reduce load and packet loss rate. It maintains these routes as long as they are needed by the sources. When the route disconnects, nodes of the broken route simply drop data packets because no alternate path to the destination is available until a new route is established.

II. LITERATURE SURVEY

Changqiao Xu et.al(2012) have proposed a **"Quality Aware Adaptive Concurrent Multipath Transfer"** solution for Stream Control Transmission Protocol based data delivery over heterogeneous wireless networks. It relies on three mechanisms: the Path Quality Estimation model, Data Distribution Scheduler and Optimal Retransmission algorithm. Path Quality Estimation algorithm chooses a reasonable estimation interval to calculate the data handling rate of entering and leaving sender buffer for each path, which describes any path's communication quality. Based on the path quality estimation results, Data Distribution Scheduler chooses a subset of suitable paths for load sharing and dynamically assigns them appropriate data flows. Optimal Retransmission upgrades the basic Concurrent Multipath retransmission policies to improve packet retransmission efficiency. ORP chooses the active path with the minimum value of the transfer delay to transmit these lost packets immediately, avoiding the rate-halving approach taken by the standard SCTP whenever random packet loss is detected. Using these mechanisms, CMT-QA monitors and analyzes the dynamic network environment in real time and estimates each transmission path's quality.

Danqi Wang.et.al (2011) has proposed **"Superchunk-Based Efficient Search in P2P-VoD System"**. One of the most extensively discussed proposals in P2P is the tree-based approach. In such an approach, peers are organized into a tree structure for delivering data, with each data packet being disseminated using the same structure. Nodes in the structure have well-defined relationships-"parent-child" as encountered in trees. A tree-based solution called SURFNet used for P2P Video on Demand services. SURFNet is a content discovery mechanism designed for P2P-Video on Demand system, aiming to minimize seeking buffering delay. SURFNet integrates two networks: a structured network for superchunk and chunk search and an unstructured network for chunk-level information exchange. To support different search granularities, video files are divided into two levels of segments in SURFNet: superchunk and chunk. In SURFNet, stable peers are used to construct an AVL tree to provide superchunk-level data availability information. Other peers storing the same superchunk data are grouped into a holder-chain. The holder-chain is then attached to the stable node in the AVL tree, which is the head of the corresponding holder-chain. By using this structure, SURFNet can support nearly-constant and logarithmic search time for seeking within a video stream and jumping to a different video, respectively. In SURFNet, the stability of the AVL tree highly depends on the premise that the tree consists of stable nodes.

Hanan Luss (2010), have proposed **"Optimal Content Distribution in Video-on-Demand Tree Networks"**. A model for content distribution that allows installation of servers at multiple nodes of a Video-on-demand tree network and assignment of different program families at each of these servers. A model that allows this flexibility would reduce the overall costs while satisfying different demands at different nodes of the network. The model is solved by a multistate Dynamic programming algorithm. The algorithm generalizes single-state algorithms used to solve simpler models for installing equipment in a tree network (e.g., DSL multiplexers or optical network units). Dynamic Programming that installs servers at a subset of the nodes with some or all programs at each of these servers. This would allow service providers to offer different Video on Demand services to different neighborhoods while minimizing the costs of content distribution. Here, consider a tree network with a central server at the root of the tree. The Video on Demand programs are aggregated into program families, where a family includes similar programs. The Video on Demand service must satisfy all the demands while minimizing the total cost spent on servers, program families, and bandwidth required along the links of the tree networks.

Tianyin Xu et.al(2009) have proposed **"Supporting VCR-like Operations in Derivative Tree-Based P2P Streaming Systems"** for an interactive streaming system to provide continuous media streaming with VCR-like user interactivity in large-scale P2P network. The design of derivative tree-based overlay scheme to organize dynamic and asynchronous peers while bring such advantages as well structured, controllable start-up delay, less memory consumption and quick service construction. The Derivative Tree Stream system mainly used with media servers, sessions and a Session Circles. Media servers simply provide media streaming service. All video streams are initiated from the media servers, delivered through the distributed P2P overlay, and finally reached to end users. Nodes in a session form a tree-like structure, which is called Derivative Tree [7]. Each session is composed of a set of nodes whose playback position differences are within a threshold. The Session Circle connects the root nodes of all sessions to form a ring structure. Distributed Hashing Table is used in the ring for efficient information searching. Based on Distributed Hash Table, a Session Discovery Service is implemented for quick resource location and service reestablishing.

Cooperative communication has received tremendous interests in wireless networks. Quansheng Guan et.al(2012) have proposed **"Topology Control in Mobile Ad Hoc Networks with Cooperative Communications"** to improve the network capacity in MANETs by jointly considering both upper layer network capacity and physical layer cooperative communications. Cooperative communication typically refers to a system where users share and coordinate their resources to enhance the information transmission quality. Two constraint conditions need to be taken into consideration in the COCO topology control scheme. One is network connectivity, which is the basic requirement in topology control. The other aspect that determines network capacity is the path length. An end-to-end transmission that traverses more hops will import more data packets into the network. Topology control is originally developed for wireless sensor networks, MANET, and wireless mesh networks to reduce energy consumption and interference. The expected network capacity is determined by various factors: wireless channel data rate in the physical layer, spatial reuse scheduling and interference in the link layer In order to derive the network capacity in a MANET with cooperative communications; we need to obtain the link capacity and inference model when a specific transmission manner is used.

W.-P.Ken Yiu et.al (2007) have proposed **"VMesh: Distributed Segment Storage for Peer-to-Peer Interactive Video Streaming"** which efficiently supports random seeking functionality. Provisioning random access functions in peer-to-peer on-demand video streaming is challenging, due to not only the asynchronous user interactivity but also the unpredictability of group dynamics. In VMesh, videos are divided into segments and stored at peers' local storage in a distributed manner. VMesh utilizes distributed hash table to locate these segments. DHT is a structured overlay constructed among peers. It works like a traditional hash table, which is given a hashed key; it returns the corresponding object or its location. The difference is that the table entries are not located in the same place but distributed among the peers in the network. In VMesh, peers use a DHT built among the peers to bootstrap a new video streaming session. It takes advantage of the large aggregate storage capacity of peers to improve the segment supply so as to support efficient interactive commands in a scalable manner.

Che-Liang Liu et.al (2010) have proposed **"Cross-Layer Mobile Chord P2P Protocol Design for VANET"** to provide scalable content distribution in vehicular networks, Chord peer-to-peer overlay could be applied. Most P2P protocols, including Chord, are de-signed for wired-line network, and might perform poorly in mobile networks. Mobile Chord is proposed to enhance the P2P performance over Vehicular Ad Hoc Network. The design mechanisms of Mobile Chord to reduce protocol overhead in Mobile Chord as P2P protocol and the frequent topological change are, Aggressive table update try to use any available information to update finger table and over-lay table for Mobile Chord. Overlay table broadcasting used to broadcast P2P overlay information to neighboring Mobile Chord nodes instead of using unicasting for keep-alive mechanism in Chord. Greedy forwarding used to select the closest node in the overlay table rather than the best finger in the Chord finger. Passive bootstrapping defined as a new node learns the P2P overlay network information by listening to overlay table broadcasting rather than joining P2P overlay through hook nodes.

Hyung Rai Oh et.al (2011), have proposed **"An Effective Mesh-Pull-Based P2P Video Streaming System using Fountain Codes with Variable Symbol Sizes"** for video-on-demand services. Basically, Fountain codes are adopted in system to simplify the handshaking procedure, which causes a large initial latency, and to support a robust video streaming service despite packet losses. The first useful attribute is that the receiver-peer can easily reconstruct the original video stream from encoded symbols using the synchronized pseudo-random number generator if the number of arrived symbols is sufficient. The second helpful feature is that Fountain codes can provide high quality video streaming service despite uncertainty and instability (such as node failure, link failure, packet loss, etc.) over P2P networks because they are rateless and possess error correction capabilities. P2P video streaming is composed of a peer selection mechanism to guarantee seamless playback, a feedback- based Fountain encoding mechanism to determine the size of Fountain codes in order to minimize computational complexity with a short initial latency. In addition, the Fountain code symbol size is continuously adjusted to minimize additional computational overhead required for Fountain encoding/decoding P2P streaming.

Consider a large-scale mesh-based P2P system for the distribution of real-time video content. Ana Paula Couto da Silva et.al(2011) have proposed **"Chunk Distribution in Mesh-Based Large-Scale P2P Streaming Systems: A Fluid Approach"** for different design choices adopted while building the overlay topology may have on the system performance. Fluid models allows to compare the performance of different strategies providing a guidance for the design of new and more efficient systems and random topologies have excellent performance when the peer upload capacity is the transmission bottleneck. Location-aware topologies usually take the lead when the bottleneck is due to the congestion control mechanism. Hybrid scheme takes the best of the two, it always presents performance very close to those of the best scheme. The creation of a cluster of large-bandwidth peers can be convenient when heterogeneous peer access capacity is considered yet, it is important that connectivity of large-bandwidth peers with narrow bandwidth peers is guaranteed. In particular, the system performance can be significantly improved when possibly available information about peers location and/or peer access bandwidth is carefully exploited in the overlay topology formation process.

Wang.S.et.al(2006) have proposed **"A Qos Aware Routing Metric Based on Bandwidth for Wireless Networks"** that incorporates an admission control scheme and a feedback scheme to meet the Quality of Service requirements of real-time applications. The novel part of this Quality of Service aware routing protocol is the use of the approximate bandwidth estimation to react to network traffic. To estimate the available bandwidth, intuitively, each host can listen to the channel to track the traffic state and determine how much free bandwidth it has available every second. The IEEE 802.11 MAC utilizes both a physical carrier sense and a virtual carrier sense which can be used to determine the free and busy times. The MAC detects that the channel is free when the following three requirements are met as NAV's value is less than the current time, receive state is idle, send state is idle. A host estimates its available bandwidth for new data transmissions as the channel bandwidth times the ratio of free time to overall time, divided by a weight factor and achieves a service based on bandwidth.

III. CONCLUSION

The proposed technique AdHoc On-demand Multipath Distance Vector Protocol used to choose the multiple paths for multicasting the video data, based on the rate-distortion metric instead of finding the disjoint paths. The multimedia packets are multicasting to neighbours and receive at multiple of nodes. Route Selection includes the process of route discovery and initiate the process of incoming multimedia text. By making use of Multipath Routing using AOMDV ensures the efficient video delivery between mobile nodes achieves high packet rate delivery, lower routing overhead and improve throughput.

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