Malleable Broadcasting of Monitoring Information in Heterogeneous Wireless Networks

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Abstract - The continuous innovations and advances in both high-end mobile devices and wireless communication technologies have increased the user demand and expectations for anywhere, anytime, any device high quality multimedia applications provisioning.we proposes CMT-QA that monitors and analyzes regularly each path's data handling capability and makes the data delivery adaptation decisions to select the qualified paths for concurrent data transfer. CMT-QA outperforms existing solutions in terms of performance and quality of service. CMT-QA achieve high data delivery efficiency while still remain fair to concurrent TCP-like non-CMT flows on bottleneck links in wireless networks.

Index Terms—Quality Awareness, Concurrent Multipath Transfer, Monitoring Information, Heterogeneous wireless network.

1. Introduction

In recent year, wireless communication technologies have experienced an extremely rapid development. Supported by the latest technological advances, mobile devices have also become smarter and many are already equipped with multiple network interface [1].Most of the organization they connect more numbers of systems to form a network to make their work easier to share their files and folders and to schedule the job. While connecting we want to monitor the network system activities for secure purpose. It deals with monitoring the Network Screen Activities [2]. It has two methodologies one for Base Station and another for Node. We introduce current session option to monitor the network systems at the same time and in the accesses folder option shows the username and user accessed folders and job scheduled. While Node logins to the Base Station, the Node IP Address and System names are added to the server [3]. Server will display all the user names, from server we can monitor the particular Node Screen Activities like that currently opened screens, what are all the files created, modified and deleted. Remote Desktop Services is one of Microsoft Windows components to access a remote computer through the network. Only the user interface of the application is presented at the Node. Any input is redirected over to the remote computer over the network. At work, we use Remote Desktop a great deal. It allows us to login to a remote server to perform health checks, deploy applications, troubleshoot problems, etc.

We also use remote desktop often when we do WFH (work from home). This project is an effort in to develop a simple IP Subnet Calculator tool only for class C IP. The IP Subnet Calculator was to give the user a quick and interactive method to calculate available subnet and hosts. Due to the repetitiveness of such calculates, tools such as an IP Subnet Calculator were developed to eliminate common mathematical mistakes. Furthermore, these tools also provide a means for the user to do such calculations without actually understanding the details behind calculating IP subnets. You have several choices for your Node application, including a range of web services. Here we proposes CMT-QA that monitors and analyzes regularly each path's data handling capability and makes the data delivery adaptation decisions to select the qualified paths for concurrent data transfer[4]. CMT-QA outperforms existing solutions in terms of performance and quality of service.

2. RELATED WORK:

P2P live streaming systems fall into three categories: tree based [12], [13] mesh-based [8], [10] and hybrid structure which combines both structures [32], Recently CMT has attracted extensive academic research interests. Dreibholz et al. [7] investigated the ongoing SCTP standardization progress in the IETF and gave an overview of activities and challenges in the areas of concurrent multipath transport and security. CMT-PF reduces the detection latency of link failures and improves CMT's throughput. However, CMT-PF uses the same round-robin schedule of CMT to send packets equally over all the paths, despite their very likely different capacities. We showed that it achieves the global optimum. However, none of the above works consider the dynamic path selection according to the likely variation of the current network conditions.

2.1 STREAM CONTROL TRANSPORT PROTOCOL (SCTP):

Mobile devices equipped with multiple network interfaces can increase their throughput by making use of parallel transmissions over multiple paths and bandwidth aggregation, enabled by the stream control transport protocol (SCTP).

Protocol goals:

1) Multihoming support in which one or both endpoints of a connection can consist of more than one IP address, enabling transparent fail-over between redundant network paths.
2) Delivery of chunks within independent streams eliminate unnecessary head-of-line blocking, as opposed to TCP byte-stream delivery.
3) Path selection and monitoring select a primary data transmission path and test the connectivity of the transmission path.
4) Validation and acknowledgment mechanisms protect against flooding attacks and provide notification of duplicated or missing data chunks.
5) Improved error detection suitable for Ethernet jumbo frames.

Bits	0–7	8–15	16–23	24–31
+0	Source port		Destination port	
32	Verification tag			
64	Checksum			
96	Chunk 1 type	Chunk 1 flags	Chunk 1 length	
128	Chunk 1 data			
…	…			
…	Chunk N type	Chunk N flags	Chunk N length	
…	Chunk N data			

Fig. 1. Delivery of Data Chunks

SCTP packets have a simpler basic structure than TCP packets. Each consists of two basic sections: The common header, which occupies the first 12 bytes and is highlighted in blue, and the data chunks, which occupy the remaining portion of the packet. The first chunk is highlighted in green, and the last of N chunks (Chunk N) is highlighted in red.

2.2 MESH-BASED STRUCTURE

A mesh-based system constructs a mesh out of the overlay nodes and swarms media contents by interchanging chunks with neighbors. At any given time, a peer has multiple neighbors, and can download/upload video from/to them .If a peer's neighbor leaves, the peer can download video from other neighbors. Mesh-based systems consume high bandwidth for frequent message exchanges and cannot guarantee chunk availability due to local neighbor search. Unlike the mesh-based systems, DCO does not need frequent message exchanges to ensure chunk availability due to system-wide search using DHT [5].

2.3 PATH QUALITY ESTIMATION MODEL

RTT is generally used as the most important parameter for path quality estimation. CMT-QA will not utilize directly RTT information to distribute the data waiting in the sender buffer to each path. Instead PQEM divides the total time of sending data into dissimilar periods in terms of the sending situation of distributed data.

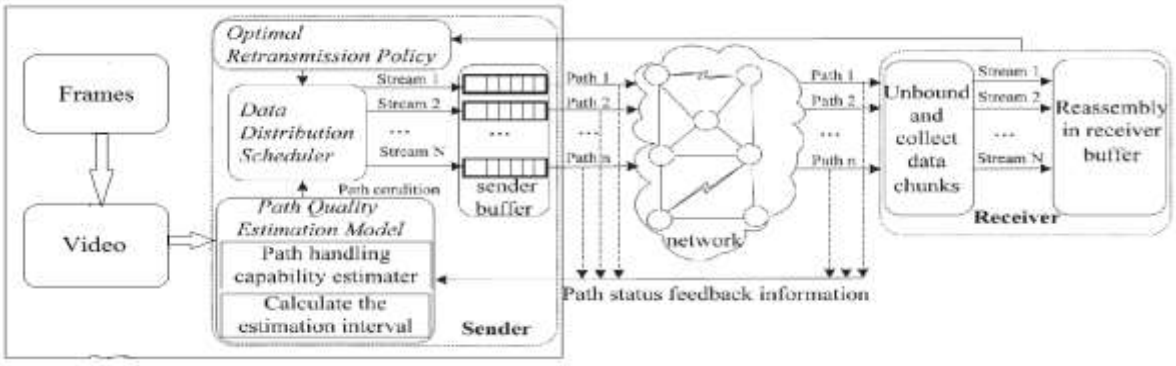

Fig. 2. Advanced CMT-QA architecture.

The transport layer can estimate very well each end-to-end path's transport capacity. To correctly estimate each path's quality and improve the transmission efficiency, in PQEM, the shared sender buffer is divided into individual sender sub buffers for each path and each path connection manages its own sender sub buffer independently. PQEM uses a dynamic buffer allocation mechanism to allocate different buffer space sizes to each path, according to its current transport capacity.

2.4 DATA DISTRIBUTION SCHEDULER

After estimating each path's data delivery capability, the receiver buffer is used to store all the data chunks received out-of-order and they are delivered to the application when all the missing data chunks are received only. To avoid buffer blocking, first it is essential to control the maximum data amount that can be sent in total to all the active paths at the sender.

2.5 OPTIMAL RETRANSMISSION POLICY

The frequency and time-varying characteristics of the wireless channel will cause unpredictable packet loss, so the retransmission is inevitable to guarantee the service quality. The SCTP standard defines two retransmission algorithms: fast retransmission and timeout retransmission .When packet loss occurs in one path, recognized either by the SACKs on gap report or after an RTO time (via T3-rtx timer expiration) without acknowledgment, a retransmission is required. In the heterogeneous wireless networks, packet loss can be classified into three categories: 1) packet loss due to congestion as there is limited bandwidth or buffer size;2) error loss caused by noise or interference in the wireless networks; and 3) path failure loss or handover loss. In the wireless network, most packet losses are due to dynamical wireless channel fluctuations or due to path failure and not due to congestion. The optimal retransmission policy which detects the cause of data loss and reacts in an optimum manner.

3. PERFORMANCE EVALUATION

This section evaluates Advanced CMT-QA's performance during conventional reliable FTP like data transmission and real-time video delivery, respectively. Advanced CMT-QA is compared with three SCTP-based CMT mechanisms: the original CMT [6], CMT-PF [7] and CMT-QA respectively.

3.1 REAL-TIME VIDEO DELIVERY

This section investigates how Advanced CMT-QA's performance compares with that of CMT, CMT-PF and CMT-QA for real-time video transmissions. Evalvid-CMT enables performing comprehensive video delivery quality evaluation when employing SCTP network simulations. It supports accurate objective video quality and user perceived quality assessments. Advanced CMT-QA achieves increasingly better results than CMT,CMT-PF and CMT-QA with the increase in the PLRs.

3.2 **NETWORK MONITORING**

The most of the organization they connect more numbers of systems to form a network to make their work easier to share their files and folders. While connecting we want to monitor the network system activities for secure purpose. This Project deals with monitoring the Network Screen Activities. It has two methodologies one for Client and another for Server. In the proposed system we introduce current session option to monitor the network systems at the same time and in the accesses folder option shows the username and user accessed folders. While client logins to the server, the Client IP Address and System names are added to the server. Server will display all the user names, from server we can monitor the particular Client Screen Activities like that currently opened screens, what are all the files created, modified and deleted.

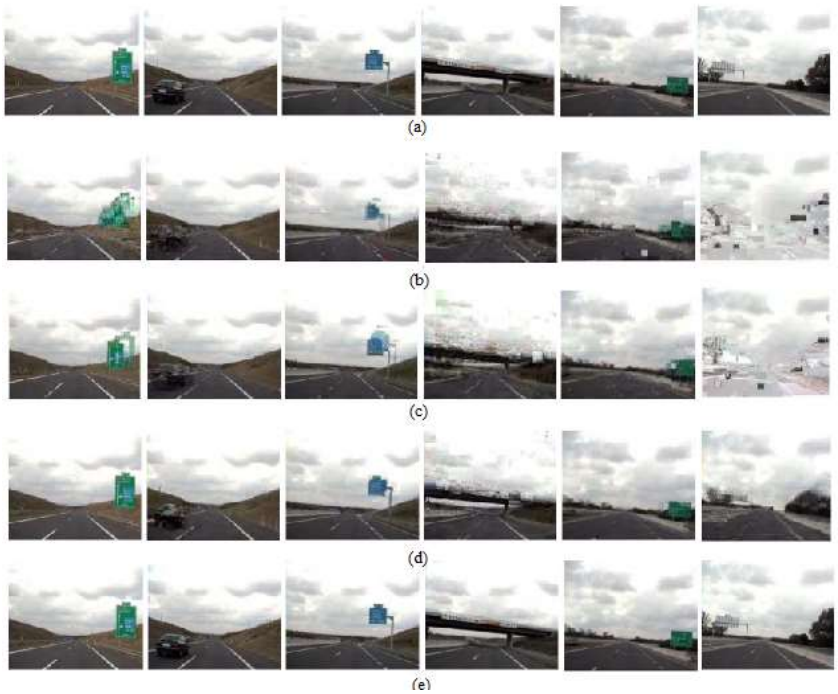

Fig.3 Frames taken from received and reconstructed videos. (a) Sent video (b) versus received video using CMT, (c) CMT-PF, (d) CMT-QA, and (e) Advanced CMT-QA respectively.

CONCLUSION

CMT-QA differentiates between different kinds of packet loss and accelerates the retransmission if required to improve data delivery efficiency. Advanced CMT-QA obtains better performance results for both reliable data transmission and real-time video delivery than classic SCTP CMT and CMT-PF mechanisms. Advanced CMT-QA achieve high data delivery efficiency while still remain fair to concurrent TCP-like non CMT flows on bottleneck links in wireless networks.

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