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Energy-Minimized Multipath Feature Transport on Versatile Apparatuses on Wireless Networks Using Steganography

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***Abstract*—In wireless network correspondence frameworks quickly the data transmission accumulation for simultaneous video transfer to handheld gadgets. Be that as it may, video transfer to the versatile terminals is get up to with confronting specialized issues: 1) superb constant video gushing is throughput-requesting and delay- constrained 2) Mobile devices vitality and video quality are not satisfactorily considered in ordinary multipath conventions; 3) remote systems are error prone and transfer speed restricted. To empower the vitality effective and quality-ensured live video gushing over remote get to systems, this paper proposes an Energy-Video aware multipath transport Protocol (EVIS).). First, we present a mathematical framework to analysis the frame-level energy quality tradeoff for delay-constrained vitalityvideo communication over multiple communication paths. Second, we develop scheduling algorithms for prioritized With minimum device energy consumption using steganography [7].**

We can demonstrate our project in network simulation. Emulation results demonstrate that EVIS advances the state-of-the-art with extraordinary improvements in energy conservation, video Peak Signal-to-Noise Ratio (PSNR), end-to-end delay, and throughput.

***Keywords*— Multipath transport protocol, energy efficiency, Real-time video, wireless networks, steganography**

I. INTRODUCTION

In wireless infrastructures and handheld devices enable mobile users to receive rich multimediacontents with universal access options, e.g., cellular networks, wireless local area networks (802.11 family), and broadband wireless networks (LTE, WiMAX). Supported by the novel achievements in communication technologies, mobile video streaming[1] services (e.g., YouTube, online gaming, live sports program, video call, etc.) have pass off explosive growth during the past few years. According to the latest market research of the Cisco company [1], video streaming accounts for 55% of the mobile data traffic over the Internet in 2014 and will exceed 72% by 2019. In parallel, the global mobile data is predicted to increase 10- fold in the next five years. The exponential growth of mobile video traffic significantly outruns the network capacity of wireless platforms. Resource restrictions of single wireless networks immediate the link (bandwidth) integration of heterogeneous access medium for concurrent video transmission .The state-of-the-art mobile terminals (e.g., the Samsung S5 smart phones [8] and Mushroom products [9]) are equipped with different radio interfaces to concurrently receive data through multiple wireless access networks. With the popularity of such multihomed mobile terminals, the future wireless networking is expected to incorporate heterogeneous[3] access options for providing high-quality mobile services.

II. RELATED WORK

Energy-Video aware Multipath Transport Protocols [EVIS]: EVIS [5] minimizes the device energy consumption by taking advantage of priority-aware frame scheduling and Unequal loss protection.

A. SCTP(Stream Control Transmission Protocol):

An end-to-endconnection-oriented transport protocol that transports data in independent sequencedstreams. The Signaling Transport (SIGTRAN) group of the Internet Engineering Task Force (IETF) defines SCTP standards in RFC 2960 (October 2000).Transport layer protocol which operates on top of an unreliable connectionless network layer such as IP.SCTP could be implemented in network systems and applications that deliver voice/data and support quality real-time services (e.g., streaming video and multimedia)

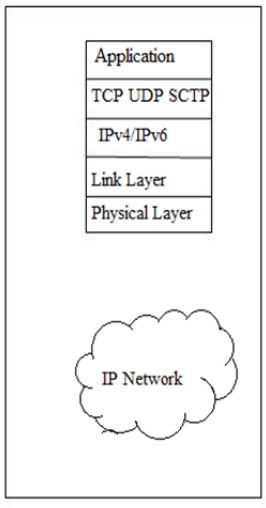

Fig 1. End-to-end reliable transportation service over IP networks

1) *Support multiple streams:* Multiple streams per associatiosolve HOL blocking problem and enables partial ordering.

2) *Support for multi-homed hosts:* Multiple IP addresses per host, More tolerant to network failures.
3) *Message-oriented:* conserves message boundaries.
4) *Unordered delivery:* SCTP can deliver message as ordered or unordered.
5) *Congestion Control:* SCTP congestion control is similar to TC, Enables seamless introduction of SCTP into IP networks.
6) SCTP is rate adaptive similar to TCP.

B. *MPTCP [Multipath Transmission Control Protocol]:* An IETF working group has lately been created to specify a multipath protocol for the transport layer. They propose MPTCP [4] (Multipath TCP), an extension of TCP to handle multiple paths in between two endpoints. MPTCP is designed with three major goals:

1) *Improve throughput:* the performance of a multipath flow should be at least as good as this of a single path stream on the best route.
2) *Do no harm:* a multi-path flow should not take up any more capacity on any one of its paths than a single path flow using that route.
3) *Balance congestion:* a multi-path flow should move as much traffic as possible away from the most congested paths.
4) Propose a multipath[4] transport protocol that effectivelyintegrates the following components: a prioritized frame scheduling algorithm leveragingthe frame filtering and path selection to achievetarget quality with minimal energy consumption.an unequal loss protection scheme taking advantageof the code rate and symbol size adaptation tominimize sum of total video distortion.

III. PERFORMANCE EVALUATION

We present the evaluation methodology and results to demonstrate the efficacy of the proposed EVIS protocol. we present and discuss the evaluation results. The component twice validation is shown in the end of this section. Specifically, the performance evaluation results are summarized as follows:

1) EVIS reduces the energy consumption by up to 95.2 (35.6%), 107 (41.3%), 121 (43.3%) and 145 (52.2%) J(Joule) compared MPRTP [10] while achieving approximatelythe same video PSNR in 300 seconds.
With about the same energy consumption level, EVIS achievesthe following performance gains:
2) improves video PSNR by up to 5.7 (22.5%), 6.3 (29.5%), 7.2 (29.5%) and 8.7 (38.7%) dB compared to MPRTP, respectively increases good put by up to 0.23 (19.3%), 0.31 (26.6%),0.36 (29.5%) and 0.43 (33.2%) Mbps compared to MPRTP, reduces end-to-end packet delay by up to 22.3 (31.5%),35.8(35.2%), 47.3 (39.5%) and 58.2 (43.3%) ms compared to MPRTP.

A. Network Emulator:

Inorder to implement the emulations with video streaming. We integrate the source code and develop an application layer protocol of "Video Transmission". Using EVIS protocol.

B. Performance Metrics:

1) *Energy and power consumption:*
The energyconsumption is expressed in units of Joule (J) and the power consumption value is presented in units of milliWalt (mW). Specifically, the average energy consumption is estimated using the energy model [6]. The real-time power consumption is measured using the Monsoon monitor and the receiving traces of different transmission schemes in mobile trajectory III (Wi-Fi+LTE networks).
2) *PSNR:*
PSNR is the standard metric to measure the objective video quality. This parameter is expressed as a function of the MSE between the original and the received video frames. If a video frame either experiences transmission or overdue loss, it is considered to be dropped and may be concealed by copying the payload from the last received frame before it.
3) *Delay:*
The end-to-end and inter-packet delays are measured in the emulations to reflect the delay performance of the competing schemes. The ratio of overdue frames is also measured to reveal the playback fluency of the transmission schemes.
4) *Throughput:*
Throughput is the application-level throughput, *i.e.*, the amount of traffic data successfully received by the destination within the imposed deadline. The amount of useful data excludes the protocol overhead bits.

IV. LITERATURE SURVEY

[1] ID.Poornima1 , S.Vijayashaarathi2(2015) have proposed A Review on Challenging Issues of Video Streaming Over Heterogeneous Wireless Networks[1].The author propose video streaming various studies and analysis of different techniques on video streaming issues of Heterogeneous Wireless Networks has been presented. Also this survey focus on analysing different benchmarks for video streaming as rate allocation, bandwidth aggregation, multi user streaming, available bandwidth, link delay, frame lost, throughput, reliability, network congestion and concurrent multipath transfer over heterogeneous wireless networks.

[2] JunaidQadir, Anwaar Ali, Kok- Lim Alvin Yau, ArjunaSathiaseelan, Jon Crowcroft (2015) have proposed "Exploiting the power of multiplicity: a holistic survey of network-layer multipath" the author propose The aim of this paper is to provide a comprehensive survey of the literature of network-layer multipath solutions. We will present a detailed investigation of two important design issues, namely the control plane problem of how to compute and select the routes, and the data plane problem of how to split the flow on the computed paths.

[3] Karl Andersson(2012) have proposed "Interworking Techniques an Architectures for Heterogeneous Wireless Networks" the author propose solutions integrating those new 4G networks with existing

legacy wireless networks are important building blocks in order to achieve cost-efficient solutions, offer smooth migration paths from legacy systems, and to provide means for load balancing among different radio access technologies.

[4] Tianjiao Liu, Jianfeng Guan, Hongke Zhang(2013) have proposed "CMT-QA: Quality-Aware Adaptive Concurrent Multipath Data Transfer in Heterogeneous Wireless Networks" the author propose This paper proposes a novel quality-aware adaptive concurrent multipath transfer solution (CMT-QA) that utilizes SCTP for FTP-like data transmission and real-time video delivery in wireless heterogeneous networks. CMT-QA monitors and analyses regularly each path's data handling capability and makes data delivery adaptation decisions to select the qualified paths for concurrent data transfer. CMT-QA includes a series of mechanisms to distribute data chunks over multiple paths intelligently and control the data traffic rate of each path independently. CMT-QA's goal is to mitigate the out-of-order data reception by reducing the reordering delay and unnecessary fast retransmissions. CMT-QA can effectively differentiate between different types of packet loss to avoid unreasonable congestion window adjustments for retransmissions. Simulations show how CMT-QA outperforms existing solutions in terms of performance and quality of service.

[5] Sangchun Han, HyunchulJoo, Dongju Lee, and Hwangjun Song(2011) have proposed "An End-to-End Virtual Path Construction System for Stable Live Video Streaming over Heterogeneous Wireless Networks" the author propose packetization-aware fountain code to integrate multiple physical paths efficiently and increase the fountain decoding probability over wireless packet switching networks. Second, we present a simple but effective physical path selection algorithm to maximize the effective video encoding rate while satisfying delay and fountain decoding failure rate constraints. The proposed system is fully implemented in software and examined over real WLAN and HSDPA networks.

[6] Jiyan Wu, Member, IEEE, Chau Yuen, Senior Member, IEEE, Bo Cheng, Member, IEEE,Yuan Yang, Ming Wang, and JunliangChen"Bandwidth-Efficient Multipath Transport Protocol for Quality-Guaranteed Real-Time Video Over Heterogeneous Wireless Networks(2016)" this paper proposes a bandwidth-efficient multipath streaming (BEMA) protocol featured by the priority-aware data scheduling and forward error correction-based reliable transmission.

[7] RichaKhare, Dr. KuldeepRaghuwanshiVol. 2, Issue 10, October 2013 "A REVIEW OF VIDEO STEGANOGRAPHY METHODS" While the proposed scheme can be used for all video watermarking applications, such as copyright protection, in this paper, we focus on authentication and tampering detection.Eachapplication,including authentication, has its own requirements.With the requirements of an authentication application,here we design a semifragile watermarking method.

V. CONCLUSION

Versatile video administrations have experienced exponential development in the previous couple of years . The future remote environment is relied upon to be a joined framework that fuses distinctive get to systems with assorted transmission components and capacities. Multipath video transport is a promising answer for coordinate the system assets for giving excellent portable spilling administrations. Building up a viable transport convention is a basic stride to streamline the vitality proficiency and media nature of multipath video transfer through mobile devices Towards this end, this paper proposes an Energy Video aware multIpathtranSport (EVIS) protocol. In particular, we develop solutions for prioritized frame scheduling and unequal loss protection to achieve least energy consumption while achieving target video quality. The performance of EVIS is evaluated through extensive emulations .. Evaluation results show that EVIS advances the state-of-the-art with appreciable improvements in device energy conservation, video PSNR, goodput and end-to-end delay.

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