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Network Mobiles

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I. INTRODUCTION

Mobile devices are becoming increasingly popular for delivering multimedia content, particularly by means of streaming. The main disadvantage of these devices is their limited battery life. Unfortunately, streaming of multimedia content causes the battery of the device to discharge very fast, often causing the battery to deplete before the streaming task finishes, resulting in user dissatisfaction. It is generally not possible to charge the device while on the go as electricity socket and charger are required. Therefore, to avoid this user dissatisfaction, it is necessary to find ways to prolong the battery lifetime and to support the completion of the multimedia streaming tasks. A typical architecture for mobile multimedia streaming is presented In this architecture, a wired server streams multimedia content over a wireless IP network to a number of client devices. These devices could be PDAs, smartphones or any other mobile device with 802.11 connectivity. In relation to possible power savings, the multimedia streaming process can be described as consisting of three stages: reception, decoding and playing. Other researchers have shown that energy savings can be made in each stage, for example by using pre-buffering in the reception stage, feedback control during decoding and backlight adjustment for playing. However, it is not a common practice to combine energy savings in the three stages in order to achieve the best

Overall savings. Due to the large amount of power used by the network interface card, the reception stage is the largest consumer of the batteryThis paper proposes the Adaptive-Buffer Power Save Mechanism (AB-PSM) that provides significant power savings in the reception stage, and hence to the overall battery life. ABPSM

Introduces an additional buffer which hides data from the station it is intended for, allowing it to return to sleep and consequently save power. Data is eventually delivered in one of the station's following attempts to receive it. The proposed

AB-PSM improves the existing Power Save Mechanism (PSM) without making any modifications to it. The following section of this paper describes the related

Works proposed to provide power savings for each stage of the multimedia streaming process. The legacy PSM in the 802.11 standard is then described and its weaknesses identified.

1.1 Objective

A large amount of research has been carried out in both multimedia streaming and power saving techniques in wireless communications. However, few researchers have considered power saving in multimedia streaming and even fewer have considered the streaming process as a whole. Instead they have concentrated on only one of the three stages: reception, decoding or playing. In the following sections, some of these research findings are described

1.2 Reception Stage

Chandra and Vahdat propose an application-specific server side traffic shaping mechanism that can offer energy savings by allowing the client to sleep for longer periods of time. The system architecture consists of a client side proxy and a server side proxy. The server side proxy informs the client side proxy of the next data arrival. It is then the responsibility of the client side proxy to transition the client.

To a low power sleep state. The client can then sleep between data transfers. Although this scheme looks promising, it is not compatible with the 802.11 standard as it ignores the beacon interval which is the basis of the standard power-save mechanism. Another scheme for power saving in the reception stage is proposed at Energy efficient CPU scheduler for mobile devices, particularly those that run real time multimedia applications. To save power, the pre-buffering method for multimedia output

is used, where output frames of real-time multimedia applications are temporarily stored in buffers. The proposed algorithm monitors the buffer occupancy and adjusts the CPU frequency accordingly. Although good results are shown to be achieved in simulations, this scheme relies on a low power hardware technique, such as Dynamic Voltage Scaling and on the prebuffering method, which makes it difficult to be implemented on a real system or device.

1.3 Playing Stage

The majority of the research which has been proposed in relation to the playing stage of the multimedia streaming process is related to the display of the device, in particular the back light. Pascrich propose an adaptive middlewarebased approach to optimize back light power consumption for mobile handheld devices when streaming MPEG-1 video. Another back light power management scheme is proposed by Shim, Chang and Pedram. In this case, a back light power management framework for color TFT LCD panels is proposed. The authors extend Dynamic Luminance Scaling (DLS) to cope with transflective LCD panels, which operate both with and without a back light, depending on the remaining

battery energy and the ambient luminance. The scheme, known as Extended DLS or EDLS, compensates for loss of brightness when there is a rich or moderated power budget and compensates for loss of contrast when the power budget is low.

1,4 General Power Saving in Multimedia Streaming

Acquaviva, Benini and Ricco propose a softwarecontrolled approach for adaptively minimizing energy in embedded systems for real time multimedia processing. Energy is optimized by modifying the clock speed settings. This is a very low level solution involving hardware and it is not independent of the platform. Korhonen and Wang study the impact of the burst length and peak transmission rate for observed packet loss and delay characteristics. They then implement an adaptive burst length mechanism which provides an improved trade off between power efficiency and congestion tolerance. Anastasi address energy saving by including periodic transmission interruptions in the schedule of audio frames at the server. In this way the Network Interface Card (NIC) at the server can be set to low power state, achieving power savings. Mohapatra propose an integrated power management approach that unifies low level architectural optimizations, OS power saving mechanisms

1.5 FACTORS THAT INFLUENCE BATTERY POWER IN MULTIMEDIA STREAMING PROCESS

The multimedia streaming process can be seen as comprising of three distinct stages. The reception stage refers to all of the network related tasks in the multimedia streaming process. The decoding stage involves the received media being power can be made in the reception stage. As expected, for the decoding stage, the higher the bit rate, the faster the battery is consumed. Various tests were

performed in the playing stage. The test results show that both the brightness level of the screen and the volume of the speakers have a significant effect on the battery consumption rate.

1,6 LEGACY POWER SAVE MECHANISM IN 802.11

The reception stage is the most significant power drainer in the streaming process due to the fact that the Network Interface Card (NIC) consumes a large amount of energy in a mobile device. For this reason, methods to save battery power during

this stage are being devised. Within the 802.11 standard, there is a built in powersave mechanism (PSM). A station informs the access point whether or not it is using power management by setting the Power Management bit within the Frame Control field of the transmitted frames. This bit is set to 1 if power management is being used and to 0 if it is not. When using power management, a station can enter a low power sleep state when it is not receiving traffic. This is how the station saves power. If the access point receives packets for a station that is in sleep mode, then it will buffer these packets.

1.7 ADAPTIVE-BUFFER POWER SAVE MECHANISM

This paper proposes a novel power save scheme, known as Adaptive-Buffer Power Save Mechanism (AB-PSM). ABPSM introduces a second buffer, in addition to the data buffer that is included at the Access Point. The new buffer, called the application Buffer, effectively hides packets from the default Access Point Buffer. When a beacon is received, the TIM only reports traffic which is waiting in the Access Point Buffer and is not influenced by the data that is in the Application Buffer. Assuming that the Listen Interval is set to one, as is generally the case, the station will wake up every beacon interval to receive the beacon. If the TIM indicates traffic, the station will stay awake to receive it, otherwise it will return to the low power sleep mode.

1.8 TESTS AND RESULTS

To examine the effectiveness of AB-PSM, tests were performed which compared it to the case when streaming is performed over 802.11 with no power save mechanism employed and with the legacy PSM, respectively.

II. TEST SETUP & SCENARIO

For the tests, a 3GHz Pentium 4 desktop computer with 1GB of RAM was used as the server. The client was a Personal Digital Assistant (PDA), with a 520MHz CPU, 64MB RAM and running Microsoft Windows Mobile 5 operating system. The multimedia content was sent from the server, to an 802.11b access point and then via the wireless network to the client. The tests involved continuously sending multimedia packets to the client.

1.9 Analysis of Results

The results are presented. The interval between sent packets is represented in terms of milliseconds and ranges from 25ms to 200ms. The packet sizes, or more specifically the size of the multimedia data chunks before lower layer fragmentation, are also shown and range from 512B(ytes) to 4096B. The graph shows four bars, each representing a different power saving scheme. The top bar refers to the 802.11 standard with the PSM switched off, with a 25ms interval and

a packet size of 512B. The next bar shows the legacy 802.11 PSM with the same settings. The last two bars correspond to the proposed AB-PSM. The first has an inter-packet sending interval of 100ms and a packet size of 2048B and the second

has an interval of 200ms and a packet size of 4096B. It should be noted that an identical amount of data is sent in all cases. The results show significant increases in the battery life when AB-PSM is used in comparison with both other cases: when no power saving and when the legacy PSM is employed respectively. There is an increase of 140% in the battery life when first AB-PSM scenario was considered and an increase of 160% battery life in the second AB-PSM test, both in comparison with the same legacy IEEE 802.11 PSM.

III. CONCLUSION

The multimedia streaming process is divided into three stages: reception, decoding and playing. As the reception stage is the biggest consumer of power, the largest power savings can be obtained in this stage. To obtain power saving in the reception stage, the Adaptive- Buffer Power Save Mechanism (AB-PSM) is proposed. This is a mechanism that makes use of an extra Application Buffer

in order to ”hide” packets from the station they are intended for, hence allowing it to sleep for longer periods and save power. Real-world tests show significant increases in battery life when AB-PSM is used. For example, tests presented in

this paper show that when AB-PSM is used, the battery life increased by 160% in comparison to the legacy power save mode described in the IEEE 802.11 standard.

REFERENCES:

[1] “IEEE 802.11: Wireless lan medium access control (MAC) and physical layer (PHY) specification,” 2000.

[2] “IEEE 802.11b: Higher-speed physical layer (PHY) extension in the2.4ghz band,” 2001.

[3] “IEEE 802.11g: Further higher-speed physical layer extension in the 2.4 ghz band,” 2003.

[4] J. Adams and G.-M. Muntean, “Power-dependent adaptation algorithm for mobile multimedia networking,” *IEEE International Symposium onBroadband Multimedia Systems and Broadcasting*, April 2006.

[5] S. Chandra and A. Vahdat, “Application-specific network management for energy-aware streaming of popular multimedia formats,” *Proceedings of the General Track. 2002 USENIX Annual Technical Conference*,pp. 329 – 42, 2002.

[6] [6] J. Korhonen and Y. Wang, “Power-efficient streaming for mobile terminals,” *Proceedings of the 15th International Workshop on Network*

[7] *and Operating Systems Support for Digital Audio and Video. NOSSDAV 2005*, pp. 39 – 44, 2005.

[8] [7] G. Bae, J. Kim, D. Kim, and D. Park, “Low-power multimedia scheduling using output pre-buffering,” *13th IEEE International Symposium on Modeling, Analysis, and Simulation of Computer and Telecommunication*

[9] *Systems*, pp. 389 – 96, 2005.

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