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RESEARCH ARTICLE

PERFORMANCE OF TAIL TIME MECHANISM TO SAVE ENERGY IN CELLULAR NETWORKS

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ABSTRACT

While using a cellular network inactivity timers are used to control and release of radio resources. The timeout time of inactivity timers is called Tail Time. In thus Tail Time wastage of a lot of energy in client devices and a lot of radio assets. To mitigate this problem Idle Leverage method is proposed. This is for batching and pre-fetching which automatically reduce energy consumption. Several modules are there in use namely, Radio optimization, Traffic aggregation, and a tail time mechanism. In this paper, reviews the Tail Time mechanism the important tool used in Idle Leverage process. It helps to developers determine amount of tail time and terminating the transmission rate.

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INTRODUCTION

In a present world, a mobile plays a vital role. But the recent smart phones have a limited battery life of its attractive and complex applications. In cellular networks, radio resources shared along with user devices (UEs e.g., smart phones) are called major power consumer in handsets (Carroll and Heiser, 2010; Falaki, 2011 and Shye, 2009). There are following reasons for energy waste and overflow of radio assets in cellular networks. They are after the consummation of a transmission the user device does not move from the high to the idle power state properly. Yet sits tight for a time of time (tail time), and a lot of tail time itself brings about huge energy waste. To overcome this problem using one of the prime tool of idele leverage method of tail time mechanism are proposed.

Objective

The timeout time of inactivity timers, known as the Tail time, a significant level of energy in client gadgets and a lot of radio assets are wasted.

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Background and Literature Review

3GPP Radio Resource Control in Practice

Author Name: Antonio Barbuzzi, Pekka H. J. Per¨al¨a, Gennaro Boggia, and Kostas Pentikousis 3GPP-standardized networks have been evolving at a very fast pace over the last decade. Cell capacities increased more than an order of magnitude, latencies have become considerably smaller, and worldwide deployment has changed the way people access services. In this evolution, efficient mechanisms for radio resource control (RRC) have played a key role. In this paper we will review the RRC state transition model and follow its development from its early stage backwards compatibility and integration with GPRS at the outset of UMTS Terrestrial Radio Access Network (UTRAN) deployments to state-of-the art HSPA-enhanced networks. This paper also overviews recent work on empirical measurements from 3G networks that study the "theory and practice" of RRC state transitions. Finally, we present our 3G Transition Triggering Tool (3G3T), and use it to study empirically network configuration parameters that prompt RRC transitions. Our results come to the aid of fully understanding the behavior of RRC state transitions and lead us from "theory" to "practice" on RRC mechanisms. This paper is an extended version of and contributes towards a better understanding of 3GPP/UMTS networks in practice in three distinct ways. First, we present a comprehensive overview of the 3GPP standards with respect to RRC. We summarize succinctly the evolution path and key technical choices made along the way until we reach the latest system releases. Second, after introducing 3G3T (3G Transition Triggering Tool), which can be used to trigger RRC state transitions, to measure one-way delay, and to determine the delay due to paging procedures and/or channel setup, we present its extended capabilities. Third, we use 3G3T in a comparative study carried out in four live UMTS networks in three different European countries. Our study is, to the best of our knowledge, the most extensive in the published literature concentrating on studying RRC state transitions. It is also the most up-to-date as we empirically study all currently-deployed 3GPP releases (i.e., Rel. 99, 05, and 06). We show how the operator network settings may differ drastically from each other and that one cannot always infer network behavior based on the available literature. 3G3T is so far the only tool useful to bridge this gap, especially since operators are typically not willing to share this type of information.

To the best of our knowledge, past literature mostly focused on analytical modeling and simulation studies of RRC. Previously published work aimed primarily on testing RRC management policies with regard to blocking and dropping rates as well as evaluating the overall system capacity and investigating the energy consumption of mobile device. RRC state transitions can be modeled in an analytical way using a discrete time Markov chain; see for example. The transition probabilities are calculated as the probabilities that the Tail times are longer than the timers used. Of course, the use of any analytical model presents a number of obvious limitations and such model is used mainly for energy consumption studies. The popular ns-2 network simulator (see www.isi.edu/nsnam/ns/) has also been employed in simulation studies. According to the authors, four generic states are common among the different packet switched cellular air interfaces (GRPS, EDGE, WCDMA, CDMA2000).

Each technology is modeled by mapping its own RRC states to the generic ones. The states are differentiated according to the available bandwidth, defined transitions, latencies of the transitions and delays. Specific channels features are not modeled, and both. We presented the evolution of RRC mechanisms in mobile cellular networks, from earlier GPRS systems to the latest 3GPP technology, mentioning the upcoming LTE. We detailed the evolution of standards, the step towards the process of unifying the radio layers GERAN to UTRAN and the implications in RRC. Furthermore, we practically showed how real networks behave and the differences with respect to the standards, analyzing RRC state transitions for real commercial networks. The work can be fruitfully exploited for understanding in depth RRC mechanisms, helping operators and researchers to improve the management and the evolution of present cellular networks and to propose new advanced services. Future work involves further developments of 3G3T as well as measurements in LTE networks. This has several limitations. The network did not carry out such transitions, but rather RRC transitions directly to idle mode. The absence of transitions to URA PCH states could not have been verified in all the networks, but their similar behavior suggests that this is not an isolated implementation case.

Tail Time Mechanism

Tail time is one of the techniques of idle leverage. In cellular networks after the every transmission the system could not move from high to idle state. To mitigate this, the idle leverage is introducing the tail time mechanism. A tail time are overcome the problem of delay and overflow of power state promotion during the every transmission time. In this tail time are utilize a *Virtual Tail Time* mechanism for achieve a goal.

Virtual tail time mechanism

Virtual Tail Time mechanism for stealing and determine the amount of tail time. It used for idle leverage moves from high to low power state immediately via fast dormancy (Tail Theft, in *Proc. ACM MobiArch*, Bethesda, MD, USA, Jun. 2011, pp. 31–36).

In virtual tail time are using following methods to leverage the tail time

- It maintains a tail time same as a physical one after a completion of every transmission
- It leverage the tail time for pre-fetching and delay transfer.
- Then it find the tail time and terminating a transmission rate.

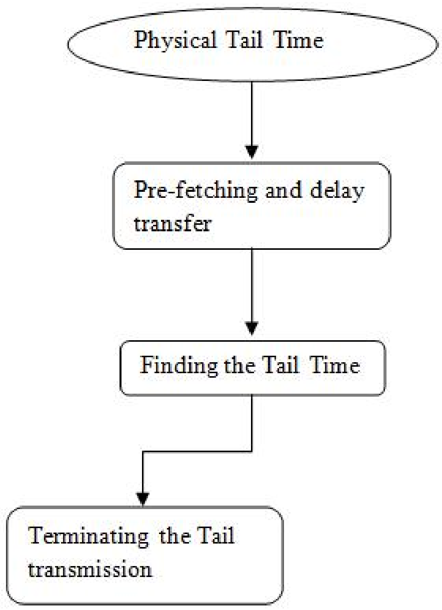

Figure 1. Virtual tail time mechanism

Pre-fetch and delay transfer are used to the transmission for a many applications, such as email, news etc. in order to pre-fetch these diverse transmissions, Idle Leverage provides API (Applications Indicates) for apps. In this case the data requests are pre-fetched in the tail time after the first transmission. The delay transfers case of idle leverage defers the tolerant data to be transferred in the Tail Time after the transmission. It denote the following figure. Fast Dormancy can be utilized to finding the tail time and terminating the tail time after the transmission completed immediately. Therefore the devices switch from high to idle state easily without any interface.

Performance Analysis

To evaluate efficiency of the Idle Leverage technique its enhanced performance than existing system of Tail Ender. The Tail Ender pre-fetch the normal time only. So it did not leverage the tail time. But the proposed system Tail Time mechanisms are pre-fetched all the tail time after the every transmission.

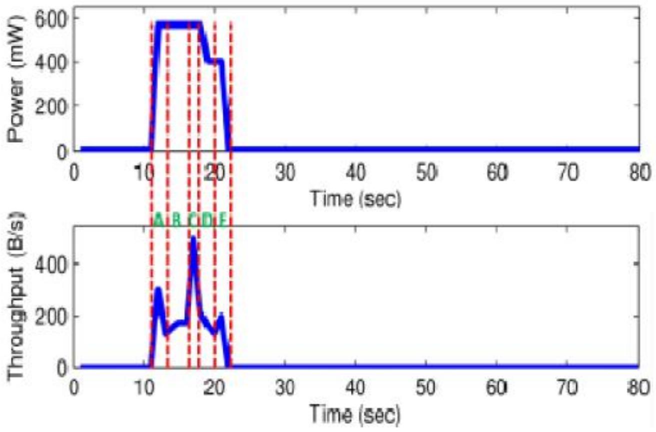

Figure 2. Pre-fetching in Idle Leverage

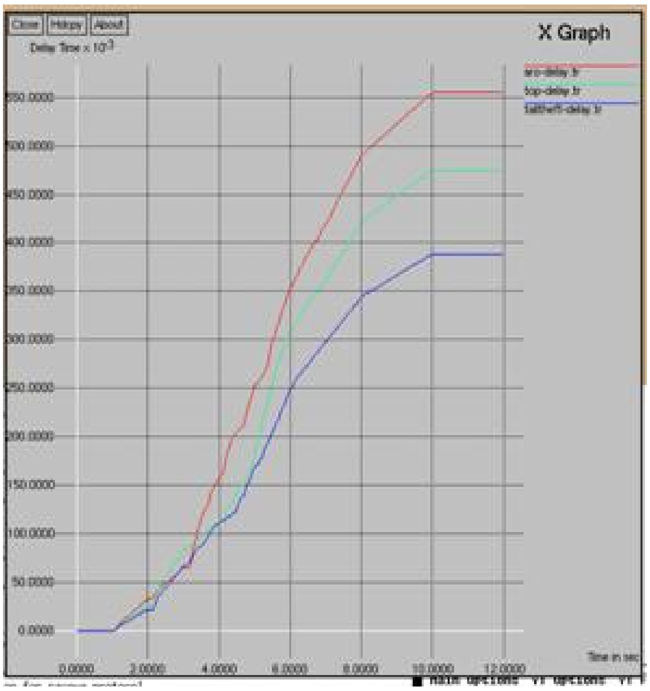

Figure 3. Performance of Tail Time

The above graph represent the tail time mechanism are better than Tail Ender and other existing methods. In this tail time mechanism, the energy consumption are significantly less, compared with the original case. Finally user performance also increased.

Then thus Idle Leverage process another two modules are used to saving energy. There are,

- Traffic shaping scheme
- Resource Optimizer

Traffic shaping scheme

Traffic aggregations used for the data requests are arranged in small transmissions into large one. So the energy consumption is reduced. It achieved via pre-fetched and delayed transfer.

Resource Optimizer

The mobile Application Resource Optimizer the most important tool that expose the cross layer communication for layers opening from radio assets management to application layer. Technique greatly helps developers decide resource usage inefficiencies and improve their applications.

Conclusion

In this paper proposed Tail Time mechanism. It steals the tail time for pre-fetching and delay transfer. The steals of tail time are achieved by a virtual tail time mechanism. It finding and terminating the tail time. And it helps for the client gadgets easily move from high to idle power sate of every transmission completed. By using this method the energy consumption is reduced.

REFERENCES

H. Liu, Y. Zhang, and Y. Zhou, "TailTheft: Leverageing the wasted time for saving energy in cellular communications," in *Proc. ACM MobiArch*, Bethesda, MD, USA, Jun. 2011, pp. 31–36.

Balasubramanian, N., A. Balasubramanian, and A. VenkataramSani. 2009. Energy consumption in mobile phones: A measurement study and implications for network applications. In Internet Measurement Conference.

Carroll, A. and G. Heiser, 2010. "An analysis of power consumption in a smartphone," in *Proc. USENIX ATC*, Berkeley, CA, USA, Jun. 2010, pp. 1–14.

Di Zhang, Yaoxue Zang, Yuezhi Zhou, member IEEE, and Hao Liu, "Leveraging the Tail Time For saving energy in cellular networks.

Falaki, H. *et al.*, 2011. "Diversity in smartphone usage," in *Proc. Int. Conf. MobiSys*, San Francisco, CA, USA, Jun. pp. 179–194.

Higgins, B. D. *et al.*, 2012. "Informed mobile prefetching," in *Proc. Int. Conf. MobiSys*, Low Wood Bay, U.K., Jun., pp. 155–168.

Shye, A., B. Scholbrock, and G. Memik, 2009. "Into the wild: Studying real user activity patterns to guide power optimizations for mobile architectures," in *Proc. IEEE/ACM Int. Symp. Microarchitecture*, New York, NY, USA, Dec. pp. 168–178.

Tamilselvan, K. and Suganya, 2008. "A mechanism of Tailtheft" proc ijaret[online] www.ijaret.com

The World in 2011: ICT Facts and Figures [Online]. Available: http://www.itu.int/ITU-D/ict/facts/2011/index.html

Traffic-Aware Techniques to Reduce 3G/LTE Wireless Energy Consumption Shuo Deng and Hari Balakrishnan

3GPP Release 8: 3GPP TS 25.331, 2008

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