Power Efficiency and Delay Tradeoff of 10GBase-T Energy Efficient Ethernet Protocol

ABSTRACT

Pervasive network component, Ethernet has been widely applied to various kinds of networks, such as data center networks, local area networks (LANs), metropolitan area networks (MANs) and wide area networks (WANs). The number of Ethernet devices is huge and growing with the evolution of network technologies. Meanwhile, it is estimated that the data rate of Ethernet increases at the pace of one order of magnitude every 10 years which significantly increases the power consumption of each Ethernet device. For example, the power consumption of a 1000Base-T Ethernet interface is only 0.5W while that of a 10GBase-T interface is 5W. Therefore, with the increase of the data rate, the huge numbers of Ethernet devices have imposed a heavy burden on the power consumption of communication networks.

EXISTING SYSTEM

In Existing System, a wakeup strategy called burst transmission (BTR) has attracted a lot of interest. The BTR strategy does not trigger the Wakeup at once when the first frame arrives after the beginning of the Sleep. Instead, the BTR strategy initializes a timer and a counter upon the first arrival and triggers the Wakeup when the timer or the counter reaches a predetermined threshold. The BTR strategy ensures that the duration of the sleeping periods is sufficiently long so that the number of frames that can be transmitted after each Wakeup is sufficiently large, thus improving the power efficiency. However, when these thresholds become too large, the BTR strategy may worsen the delay performance, since the interface is not allowed to transmit the frames that arrive during idle periods. This implies that there is a tradeoff between the power efficiency and the queueing delay.

DIS ADVANTAGES

- The BTR strategy may worsen the delay performance.
- It requires high power to implement the Sleep and Wakeup operations.

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PROPOSED SYSTEM

In Proposed System, The power efficiency and delay performance of the burst mode transmission (BTR) strategy for the IEEE 802.3az energy efficient Ethernet (EEE) protocol. In the BTR strategy, the Ethernet interface goes to sleep once its transmission buffer becomes empty and wakes up as soon as the first arrival has waited for time τ or the N-th frame arrives at the interface. Based on the number of arrivals during the vacation time, a new approach is proposed to analyze the M/G/1 queue with vacation times that are governed by the arrival process and the τ and N parameters of BTR strategy. Our key idea is to establish the connection between the vacation time and the arrival process to account for their dependency. We first derive the distribution of the number of arrivals during a vacation time based on an event tree of the BTR strategy, from which, we obtain the mean vacation time and the power efficiency. Next, from the condition on the number of arrivals at the end of a vacation period, we derive a generalized P-K formula of the mean delay for EEE systems, and prove that the classical P-K formula of the vacation model is only a special case when the vacation time is independent of the arrival process. Our analysis demonstrates that the τ policy and N policy of the BTR strategy are compensating each other. The τ policy ensures the frame delay is bounded when the traffic load is light, while the N policy ensures the queue length at the end of vacation times is bounded when the traffic load is heavy. These results, in turn, provide the rules to select appropriate τ and N. Our analytical results are confirmed by simulations.

ADVANTAGES

- It reduces power consumption.
- The power efficiency and mean delay can be obtained.

SYSTEM REQUIREMENTS

H/W System Configuration:-

Processor	-	Pentium –III
RAM	-	256 MB (min)

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Hard Disk - 20 GB

Key Board - Standard Windows Keyboard

Mouse - Two or Three Button Mouse

Monitor - SVGA

S/W System Configuration:-

Operating System : Windows95/98/2000/XP

Application Server : Tomcat5.0/6.X

Front End : HTML, Jsp

Scripts : JavaScript.

Server side Script : Java Server Pages.

Database : MySQL 5.0

Database Connectivity : JDBC

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