AN INNOVATIVE MPCM NETWORK DATA TRANSMISSION EFFICIENCY ENHANCEMENT

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ABSTRACT. *This paper presents an innovative multi-packet compression methodology (MPCM) to improve network data transmission enhancement efficiency. As more computers are connected to the Internet and the demand for bandwidth increases, the shortage in IPv4 addresses and expensive bandwidth has increased NAT Router use in the Internet environment to achieve bandwidth sharing and resolve the shortage in IPv4. However, as internal network packets are transmitted through the router, the router has a significant effect on the transmission efficiency of the overall network. This paper compares four data compression methods as follows: Run Length Encoding (RLE), Shannon Fano (SF), Huffman and Multi Packets Compress Method (MPCM) to compress the packets for transmission enhancement efficiency. The results of this investigation showed that the proposed MPCM was better in terms of network transmission efficiency enhancement. This paper presents simulation experiments that demonstrate that MPCM Hardware LZ could reduce network packet compression time.*
Keywords: Bandwidth, NIOS II, IPv4, Network, Packet compression

1. **Introduction.** In recent years, the router has been widely used in companies and households, and becoming an invaluable product. This is mainly because most companies and households save network service costs by sharing network bandwidth. The IPv4 system presently used can no longer meet the demand as the Internet becomes ubiquitous. To allow all computers to connect to the Internet, NAT (Network Address Translation) [1] has emerged. This is also the main function of a router, allowing computers without IPv4 addresses to connect to the Internet. However, all internal network packets use a router as the relay station to transmit packets, often making the router a bottleneck in the data transfer rate. Thus network data transmission efficiency is sacrificed.

This study is aimed at reducing network bandwidth service cost, while providing higher data transmission efficiency when the demand for network bandwidth increases. To solve this problem, a method to reduce network bandwidth cost and improve network performance is urgently needed. The rest of this study is organized as follows. Section 2 describes the literature review. The next section presents the system design. Section 4 presents the experimental results. The conclusion and future work are discussed in the final section.

2. **Literature Reviews.** This section discusses the three common methods currently used to solve network bandwidth insufficiency and then presents the related researches on network packet compression. To overcome the network performance bottleneck, the most direct method is to purchase wider network bandwidth. According to the ADSL rate