Improving End-to-End Delay in Optical-Burst-Switching Networks through Enhancing Burst-Assembly and Offset-Time Scheme

Abstract

Over optical networks, Optical Burst Switching (OBS) method was introduced to provide the appropriate and desired optical switching for next generation Internet traffic in more flexible and efficient way. In OBS network, burst assembly is the first process performed at the ingress node where packets are aggregated into data bursts, while offset-time, which is the delay time required to allow the Burst Header Packet (BHP), configures the resources prior to sending the data burst. Thus, the burst assembly process and offset-time create extra delay for aggregating packets, burstification and switching. This delay could affect Constant Bit Rate (CBR) traffic requirements, where it has to arrive at the destination on time. CBR traffic has its own Quality of Service (QoS) end-to-end delay requirements, which must be guaranteed over OBS networks. However, the available burst assembly and offset-time schemes still do not guarantee such requirements over OBS network. This paper aims at solving the delay problem and achieving QoS requirements by manipulating Maximum Cell Transfer Delay (MaxCTD) in CBR real time traffic requirement parameters. As a result, a new scheme named Enhancing Burst-assembly and Offset-time Delay time Requirements (EBODR) is proposed. EBODR algorithm is applied in burst assembly and offset-time processes in order to meet CBR real time traffic QoS requirements. The proposed scheme is evaluated using NCTUns 6.0 network simulator. The results of analysis showed that the scheme reduces end-to-end delay based on CBR traffic delay time requirements. This in turn guarantees CBR traffic delay time requirements over OBS networks. In addition, EBODR scheme has another advantage, in which it does not increase the burst loss rate as opposed to some current schemes explained in this paper. This scheme is also analyzed and compared to the standard OBS and is found to be effective and efficient.