

With its low cost, flexibility, and extensibility, software router based on commodity PC hardware and open source operating systems is gaining more and more interest from both scientific researchers and small business users. It provides an opportunity to implement new router operations and modify or extend router functions to suit small business needs. However, software and hardware issues may affect the overall performance of a PC-based router. In this paper, we evaluate and analyze several potential hardware bottlenecks that may exist on a PC-based router by running different sets of Click configurations. We found that, by applying polling extension of network driver and buffer recycling techniques, one moderate processor can forward as much as 1.5M minimum-size packets per second, which satisfies the forwarding capabilities of multiple Gigabit network ports on the same PCI-X bus. However, a Gigabit network port cannot send the minimum-size Ethernet packets at full speed. In addition, for both the minimum-size and maximum size Ethernet packets, the PCI bus is a potential bottleneck in the forwarding path. The reception and transmission capabilities of individual port as well as multiple ports on the same bus are correlated in a nonlinear way.