

The Speed of Light Isn't What it Used to Be

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Abstract

As computer designs run up against the limits of physics, we increasingly see communication latencies limited by the speed of light. However, the "speed of light" is far less than the usual rule of thumb, "one nanosecond per foot of distance"; on-chip traces will

soon be able to move signals at only 4% of the speed of light. This accelerates the need for ways to cope with an ever-increasing ratio of communication to computation time, cost, and power consumption in modern computer designs. We examine the impact this has on designers and users, and present some novel approaches for dealing with this effect both in hardware and software.