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سخنرانی های علمی

Optical Network Architecture for On-chip Data Communication

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Abstract

The increasing interconnection bandwidth demands for chip multiprocessors (CMP) cannot be simply satisfied by the reduction of the transistor feature sizes and raising of the chip operation frequency. This problem stems from many limitations associated with electrical interconnects, such as latency, impedance, bandwidth, and power consumption. While NoC can improve bandwidth of electrical interconnections, it is unclear how electrical NoCs will continue to satisfy future bandwidth and latency requirements within the package power budget. Optics provides low power dissipation that remains independent of capacity and distance, as well as wavelength parallelism, ultra-high throughput, and minimal access latencies. Additionally, wavelength routing, bit rate transparency, high-capacity, low propagation loss, and low power dissipation of silicon photonics are attractive for realizing optical NoC (ONoC) in Chip Multi-Processors (CMPs). The realization of ONoC will bring major benefits for several classes of high-performance embedded applications. In particular, for streaming applications that process massive amounts of data in real time, computation is bandwidth-intensive .

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