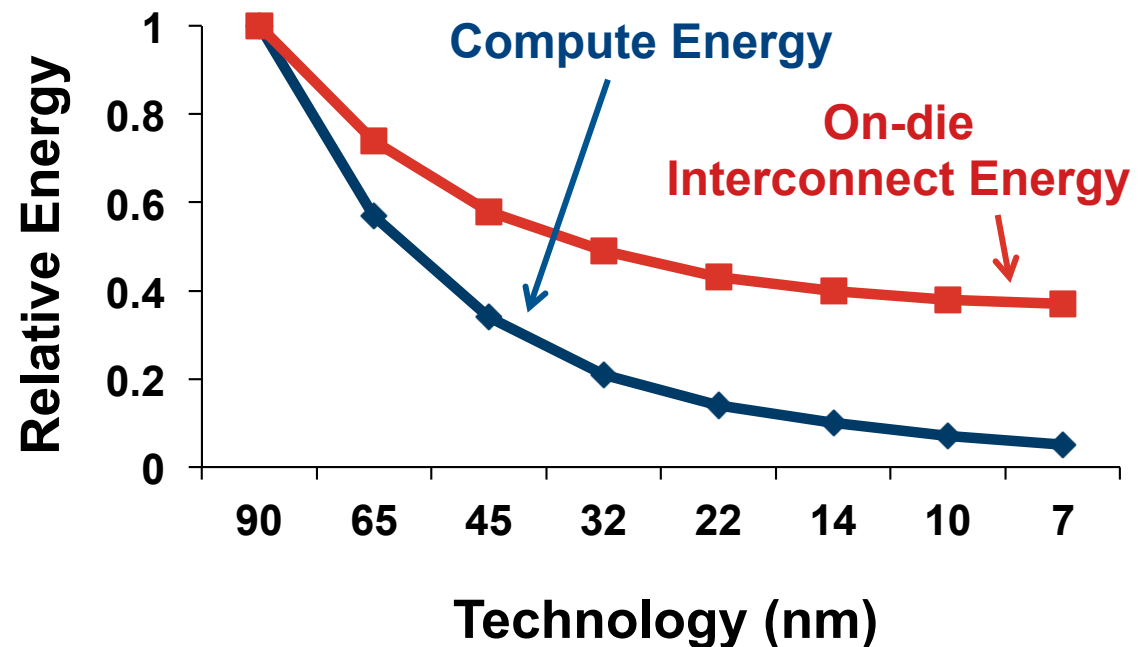# The High Cost of Data Movement

A significant and growing fraction of on-die energy is spent in data movement.

Long, capacitive interconnects consume most of the LLC access energy.
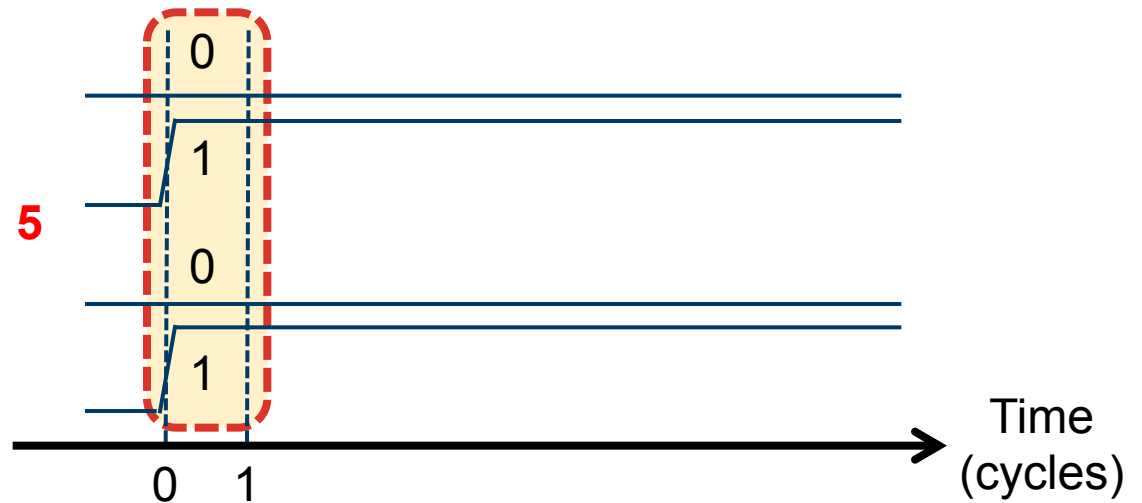

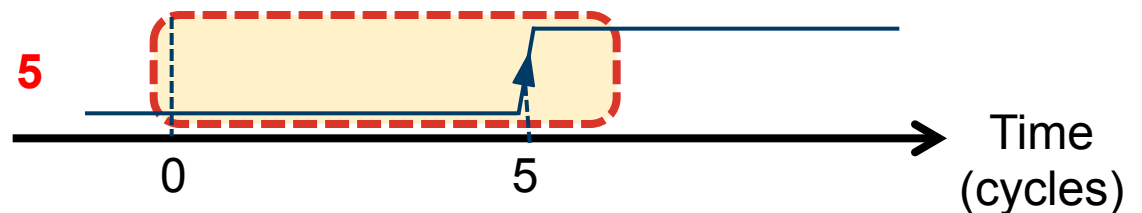*Shekhar Borkar, Journal of Lightwave Technology, 2013*

Proposal: Time Based Data Transfer

Key idea:
represent information by the number of clock cycles between two consecutive pulses to reduce the interconnect activity factor.

Parallel Communication

DESC Communication

DESC: Energy-Efficient Data Exchange using Synchronized Counters
Mahdi Nazm Bojnordi and Engin Ipek

UNIVERSITY of ROCHESTER

Summary of Results

DESC reduces LLC energy by 1.8x at the cost of a 2% increase in execution time.

DESC expands the Pareto frontier in energy-efficient cache design.