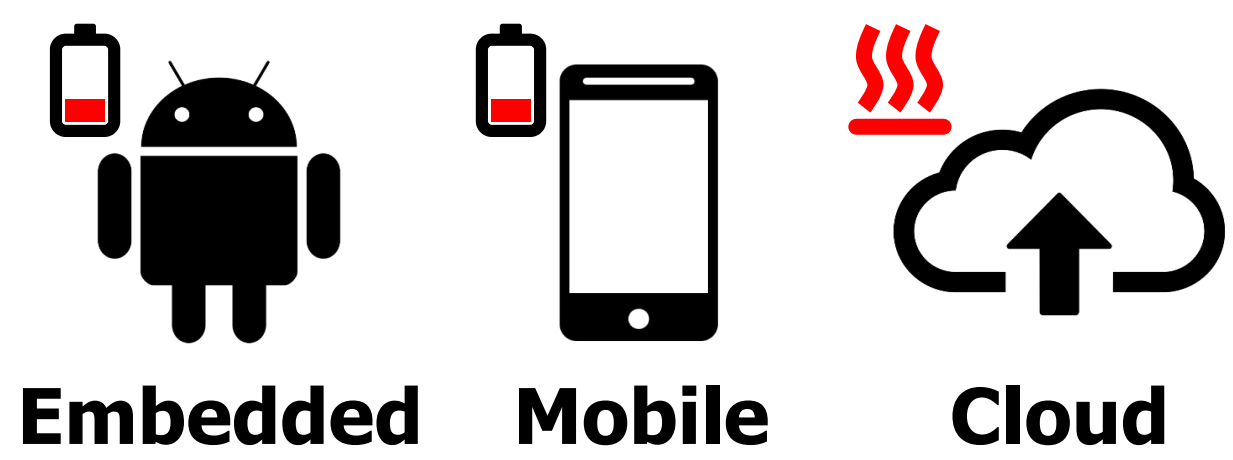


Accelergy: An Architecture-Level Energy Estimation Methodology for Designing Accelerator Architectures

Yannan Nellie Wu, Joel S. Emer, Vivienne Sze

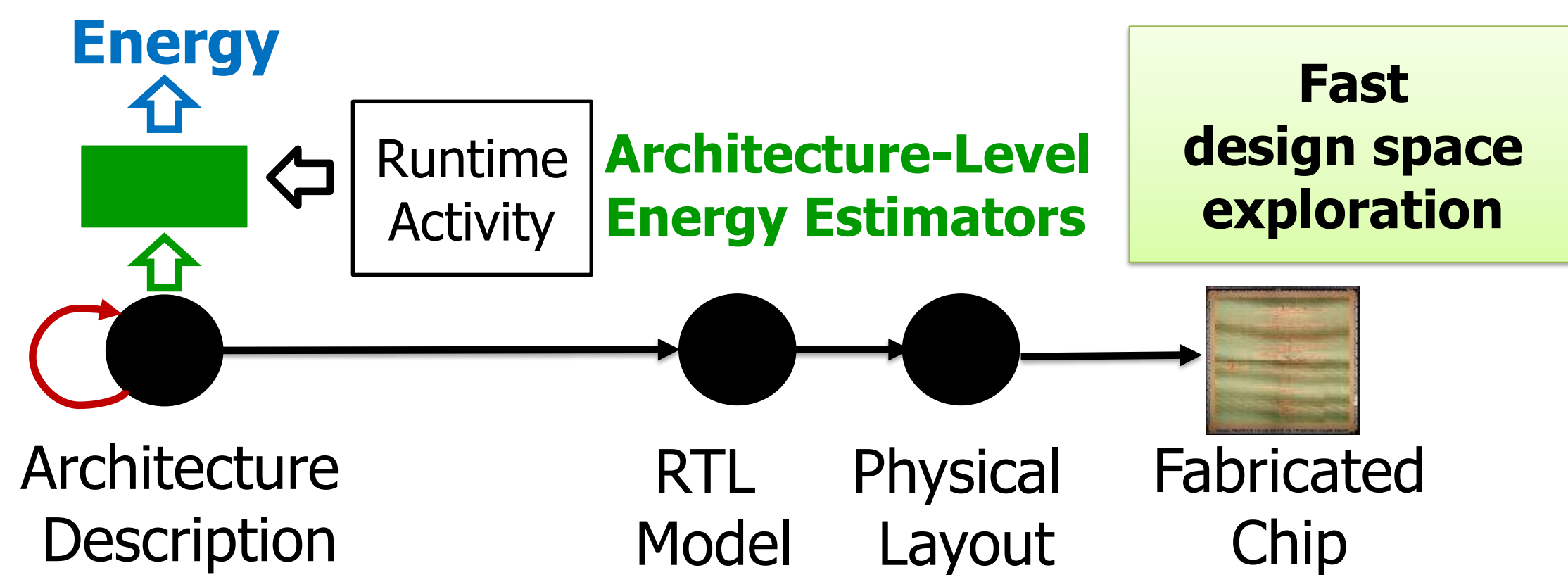
Motivation

• Domain-Specific accelerators



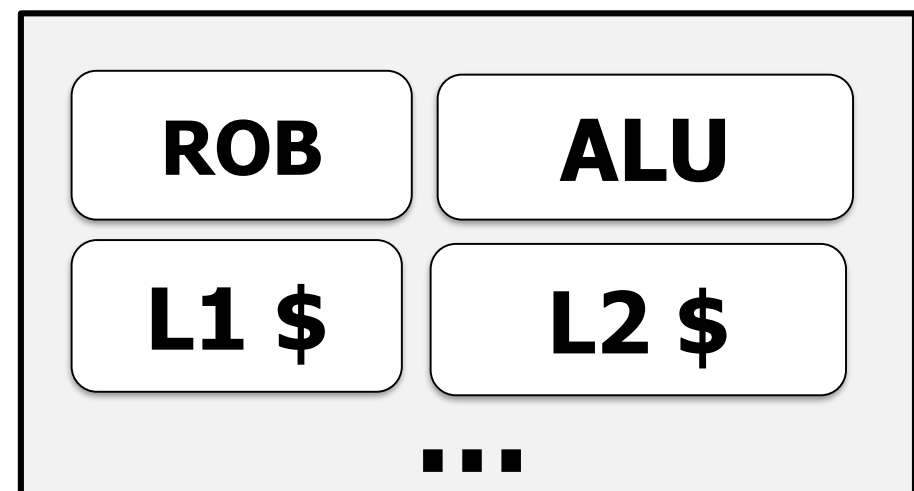
Accelerators are essential to meet the growing compute demands for high speed and energy efficiency

• Early-stage energy estimation is important



• Accelerator design space is large and diverse

CPU-centric Architecture

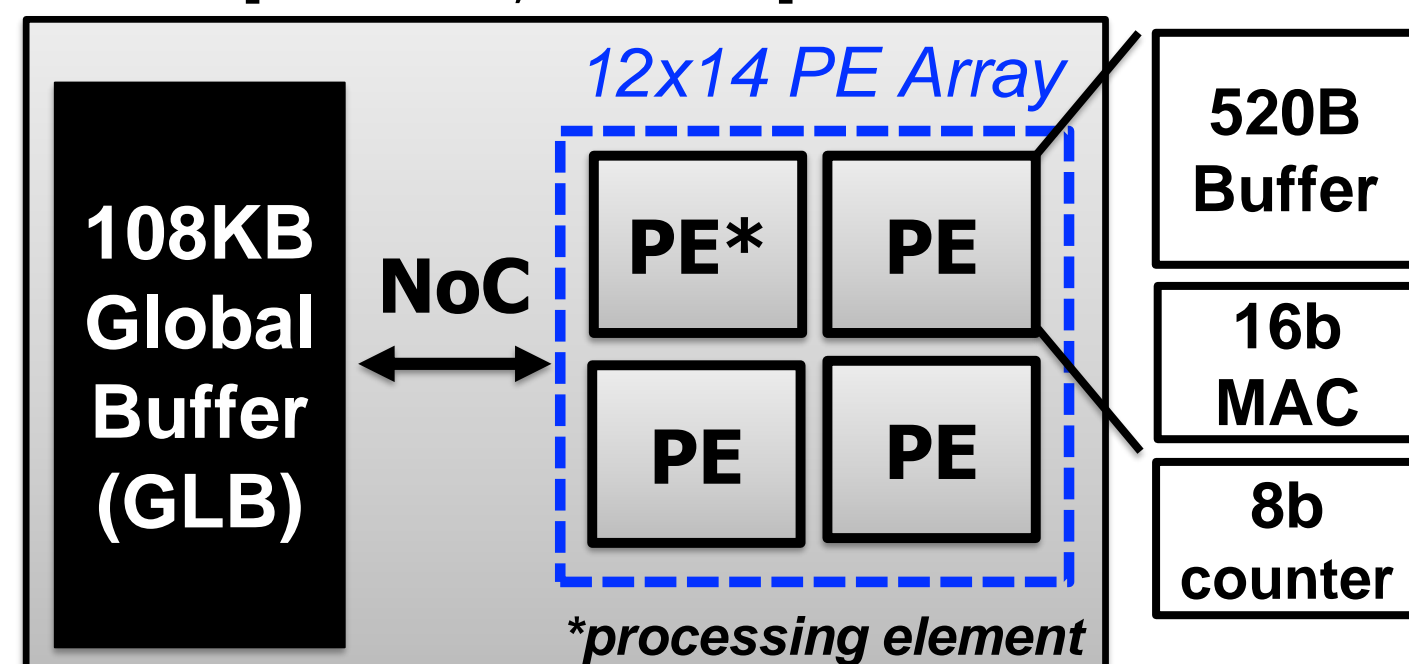


The fixed set of **compound components** used by CPU estimators is not sufficient to describe arbitrary accelerators

Eyeriss Accelerator (simplified)

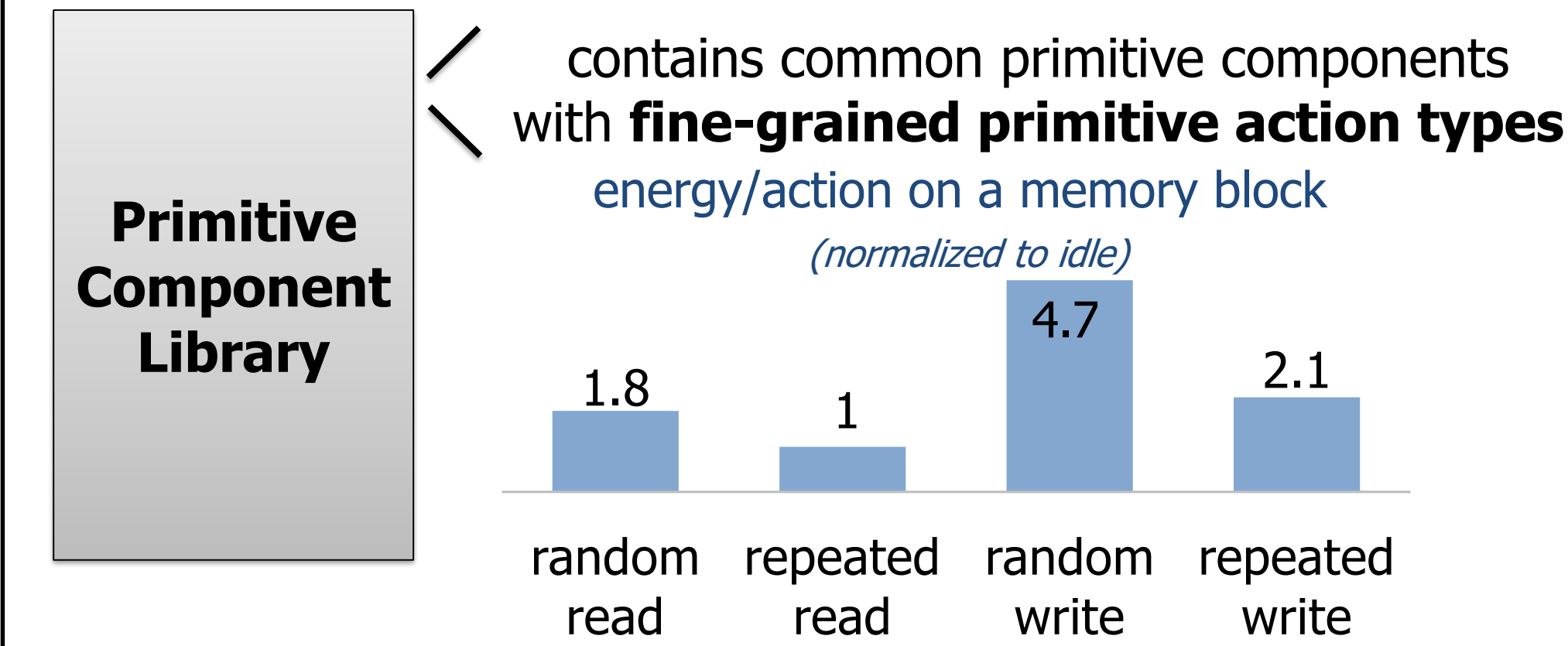
[Chen et al., ISCA2016]

Per-accelerator design estimations based on **primitive components** are tedious and not generalizable

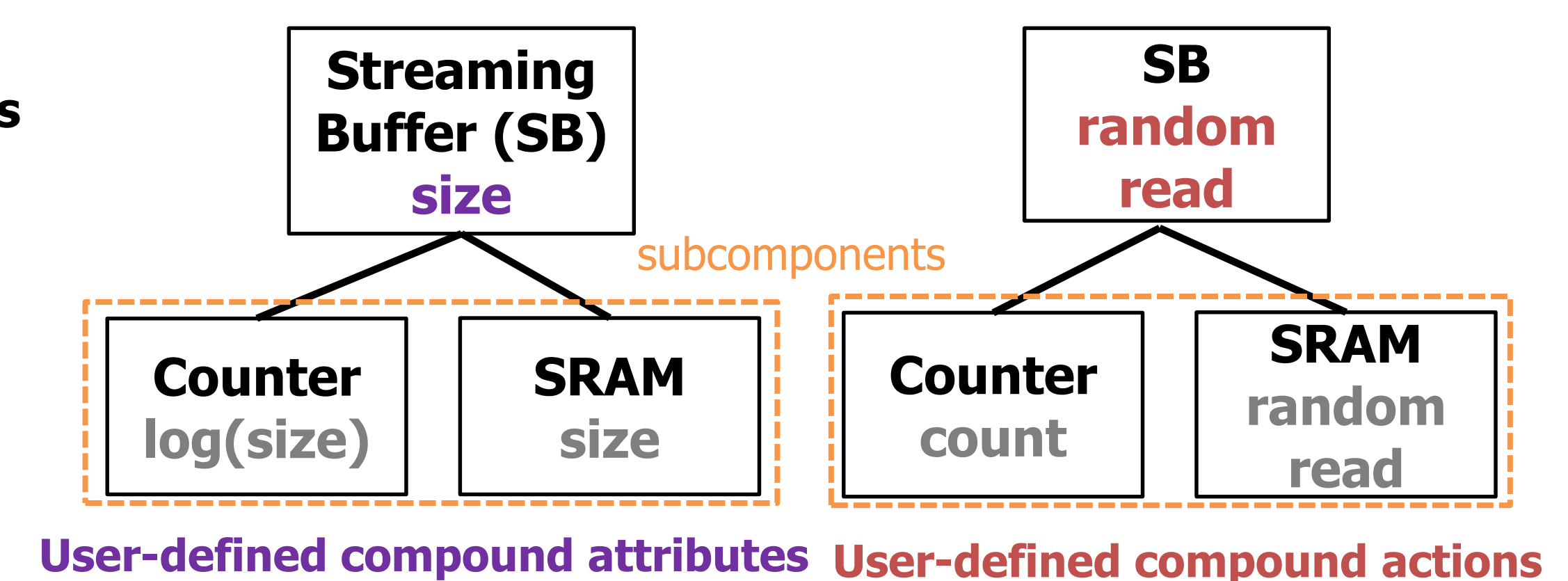


Energy Estimation Methodology for Accelerators

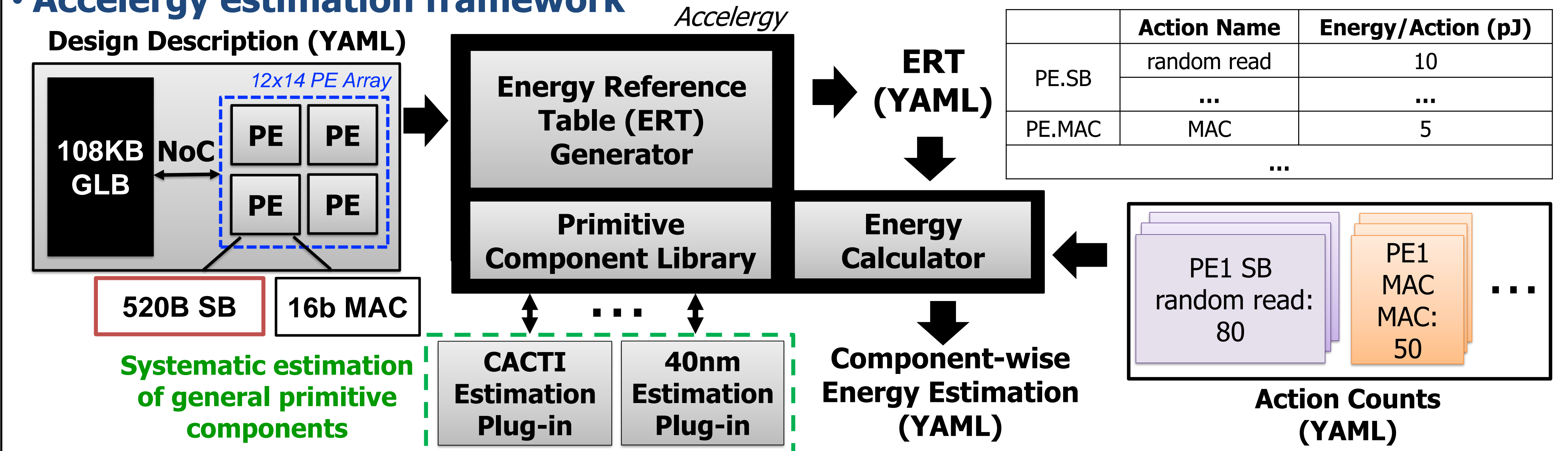
• Accurate primitive component energy



• User-defined compound components



• Accelergy estimation framework



Validation on Accelerator Design – Eyeriss

- Energy estimation achieves **95%** accuracy of post-layout simulation results
- Energy breakdowns at various granularities are accurately captured

