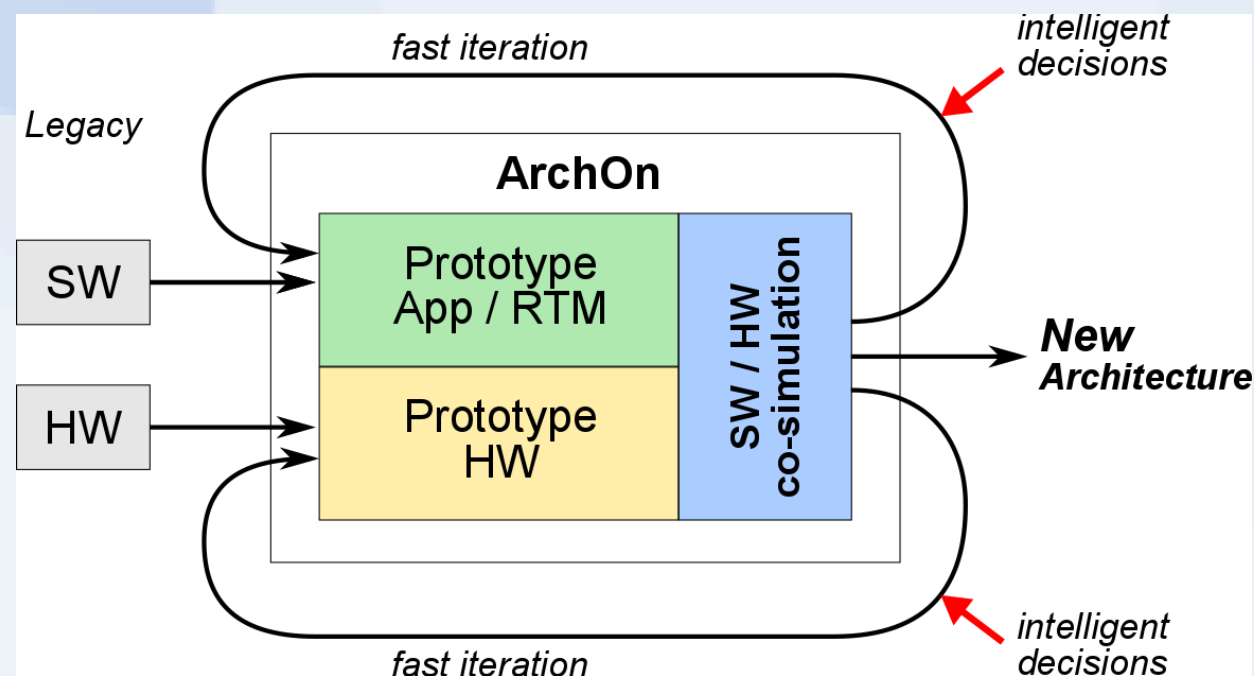


ArchOn – resource-driven modelling tool

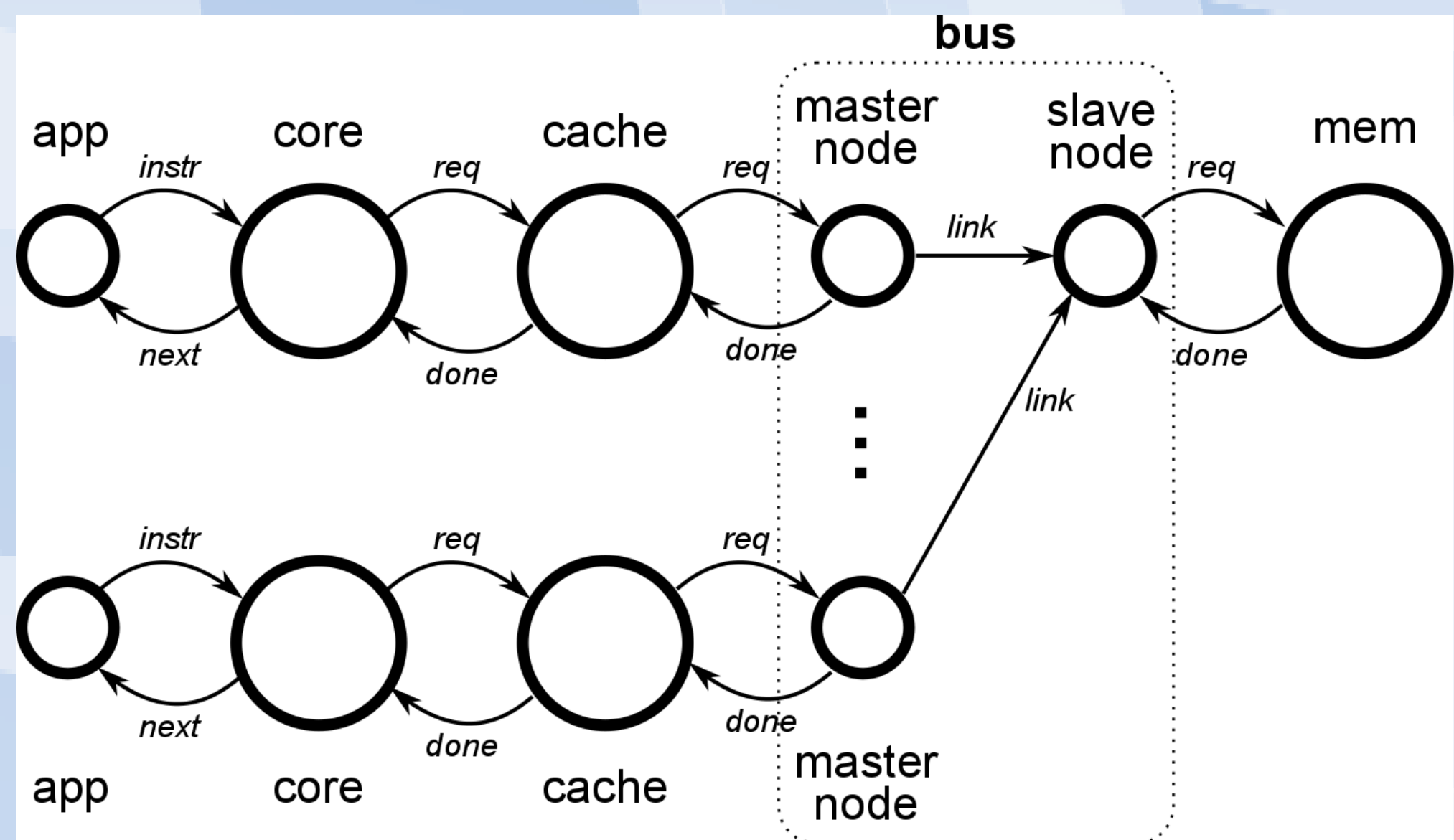
A. Rafiev, F. Xia, A. Iliasov, A. Romanovsky, A. Yakovlev

Introduction

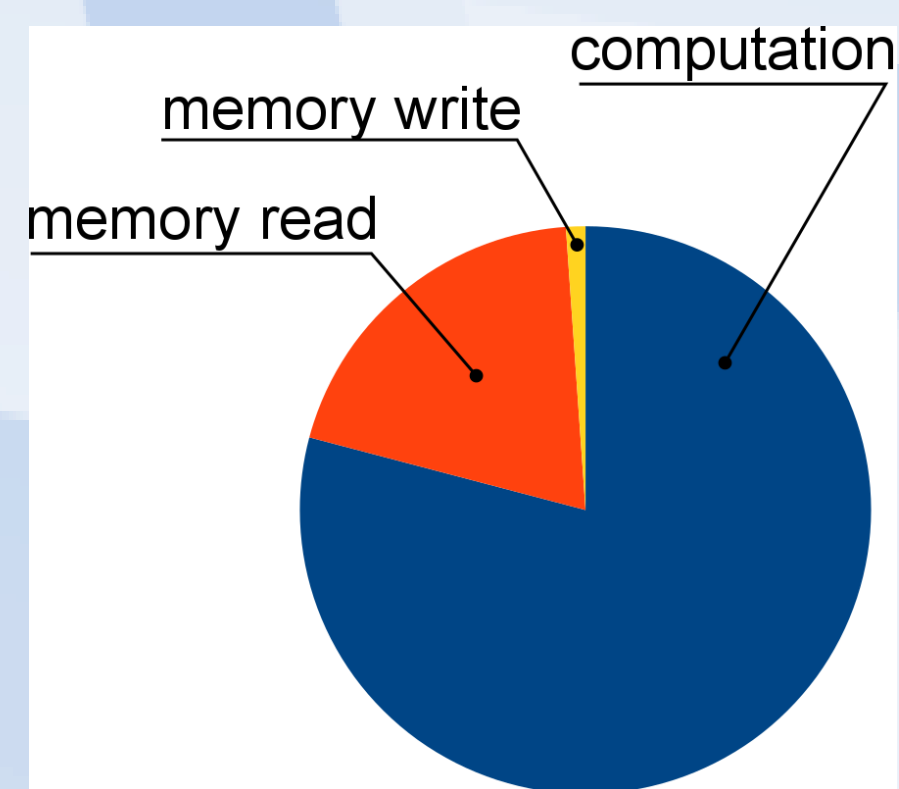
- ArchOn can help the designer find answers to the following questions:
 - What should be the architecture of my next-gen platform?
 - How we can do RTM in next-gen platforms?
- Starting from a very high level abstraction and gradually increasing fidelity, obtain power, performance and reliability estimates.
- Quick means of specifying new (non-extant) HW and SW, from ISA-agnostic to ISA-Specific
- Based on the resource graph concept
- System is a set of resources and their cross dependencies



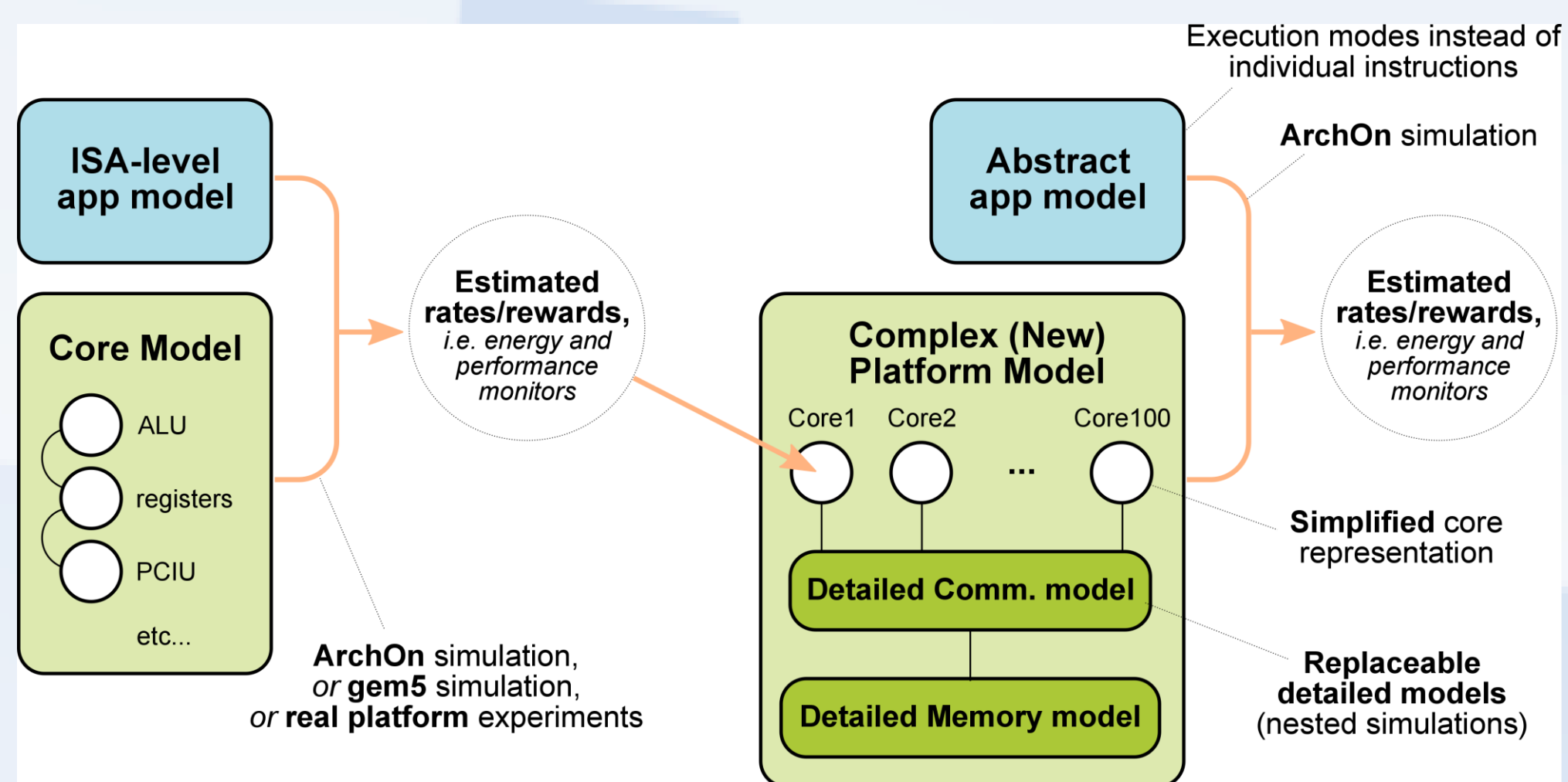
Model example



Abstract application model cannot execute actual ISA instructions. Instead, it models different modes of operation



Abstract modelling



- Abstraction* allows simulating hundreds of cores, modelled using characterization or design data.
- Parts* of the system can be modelled in higher level of detail for better fidelity, or remain abstract for quick prototyping

Model parameters

resource	required parameter	source
app convolution filter	number of computation instructions	ISA-level
	number of memory read instructions	ArchOn simulation
	number of memory write instructions	
core ARM A7 and A15	single comp. instruction time	experimental data from ODROID XU3
	energy of a single comp. instruction	
	core idle power	
mem based on LPDDR3	memory read/write times	online resources
	memory read/write energies	
	memory idle power	
cache big.LITTLE L1, L2	cache hit response time	online resources
	cache hit energy	
	cache idle power (leakage)	
bus AMBA bus	bus data transfer delay	online resources
	single data transfer energy	
	bus idle power	
noc router —	hop delay	—
	energy of a single hop	
	idle power	

Simulation results

Archon simulations are capable of providing estimation data for

- Performance (platform execution time)
- Power (active and idle)
- Memory response time

