

Introducing SLAMBench, a performance and accuracy benchmarking methodology for SLAM

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The University of Manchester



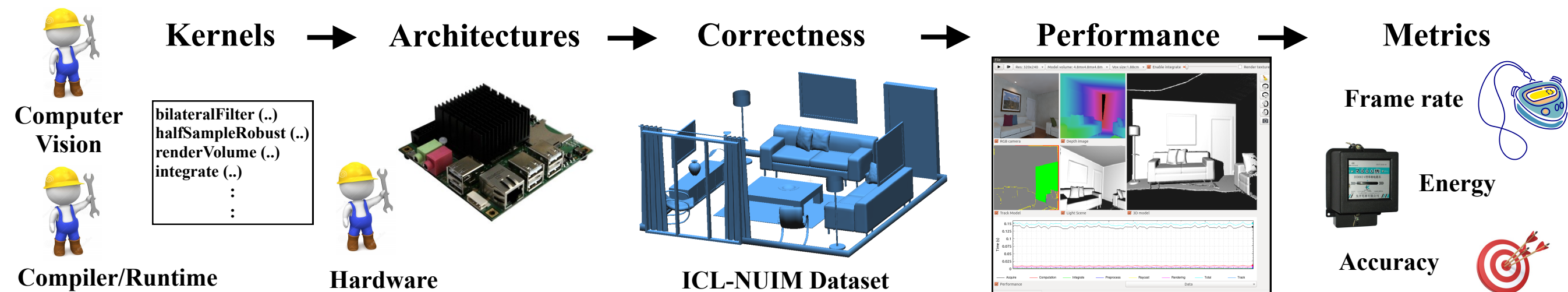
Imperial College
London



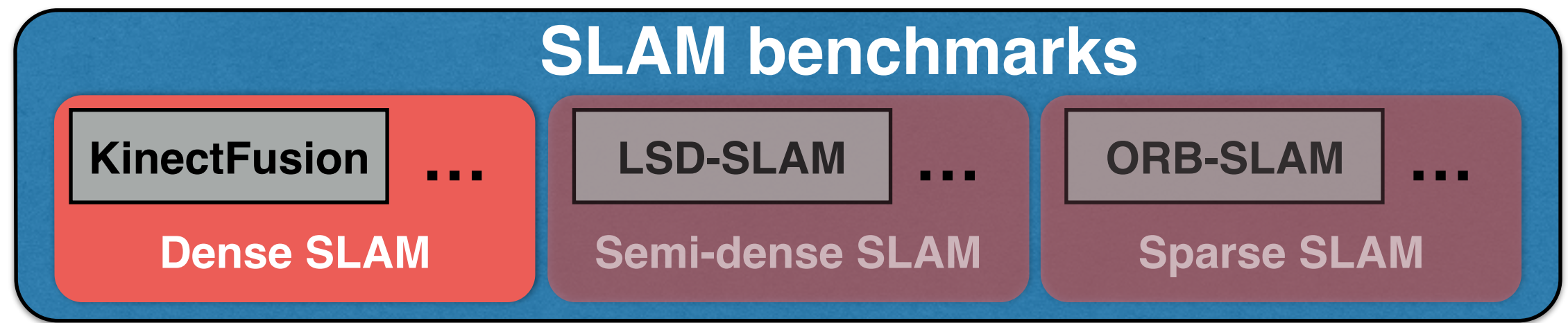
SLAMBench framework: holistic approach to SLAM “performance”

Three “Performance” metrics:

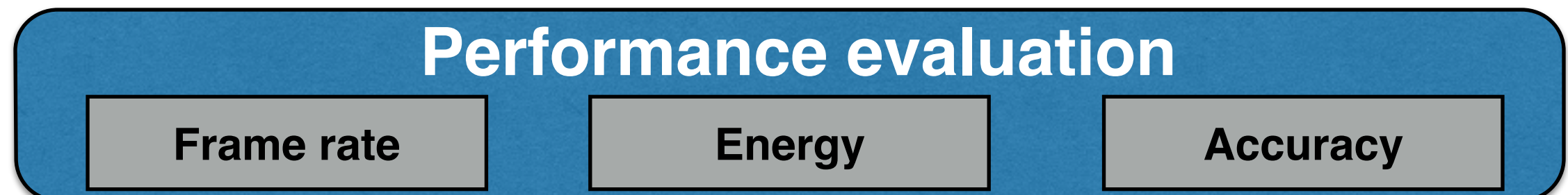
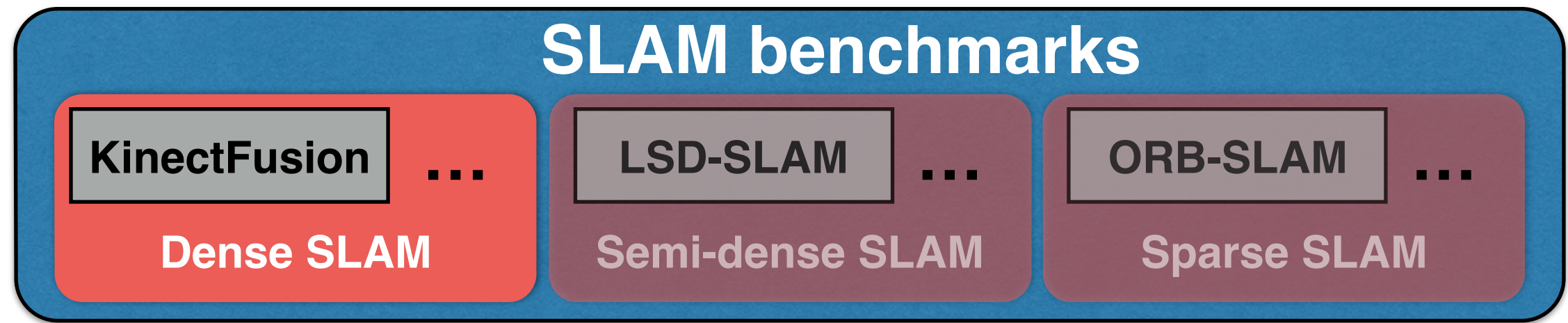
- Runtime
- Accuracy
- Energy



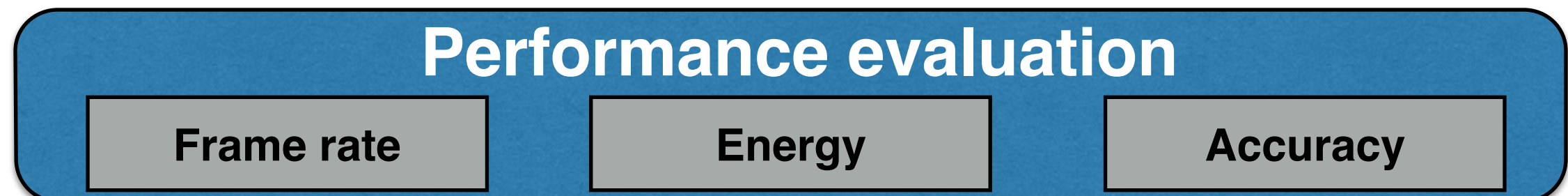
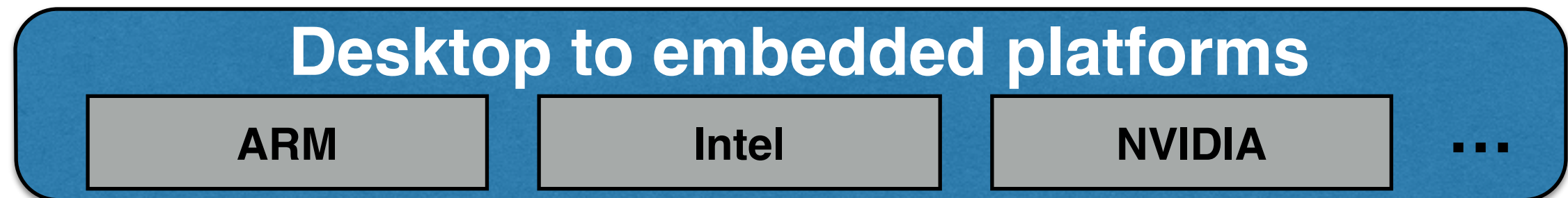
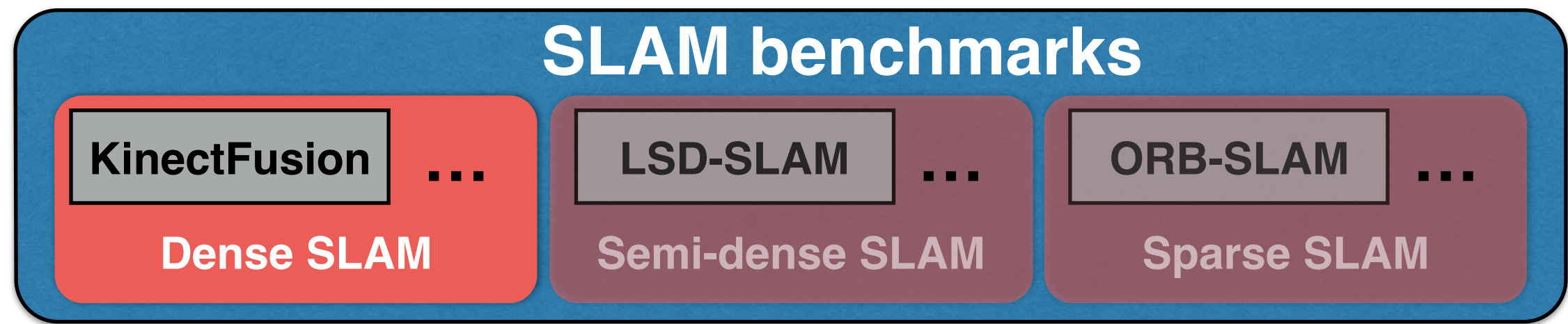
SLAMBench framework vision



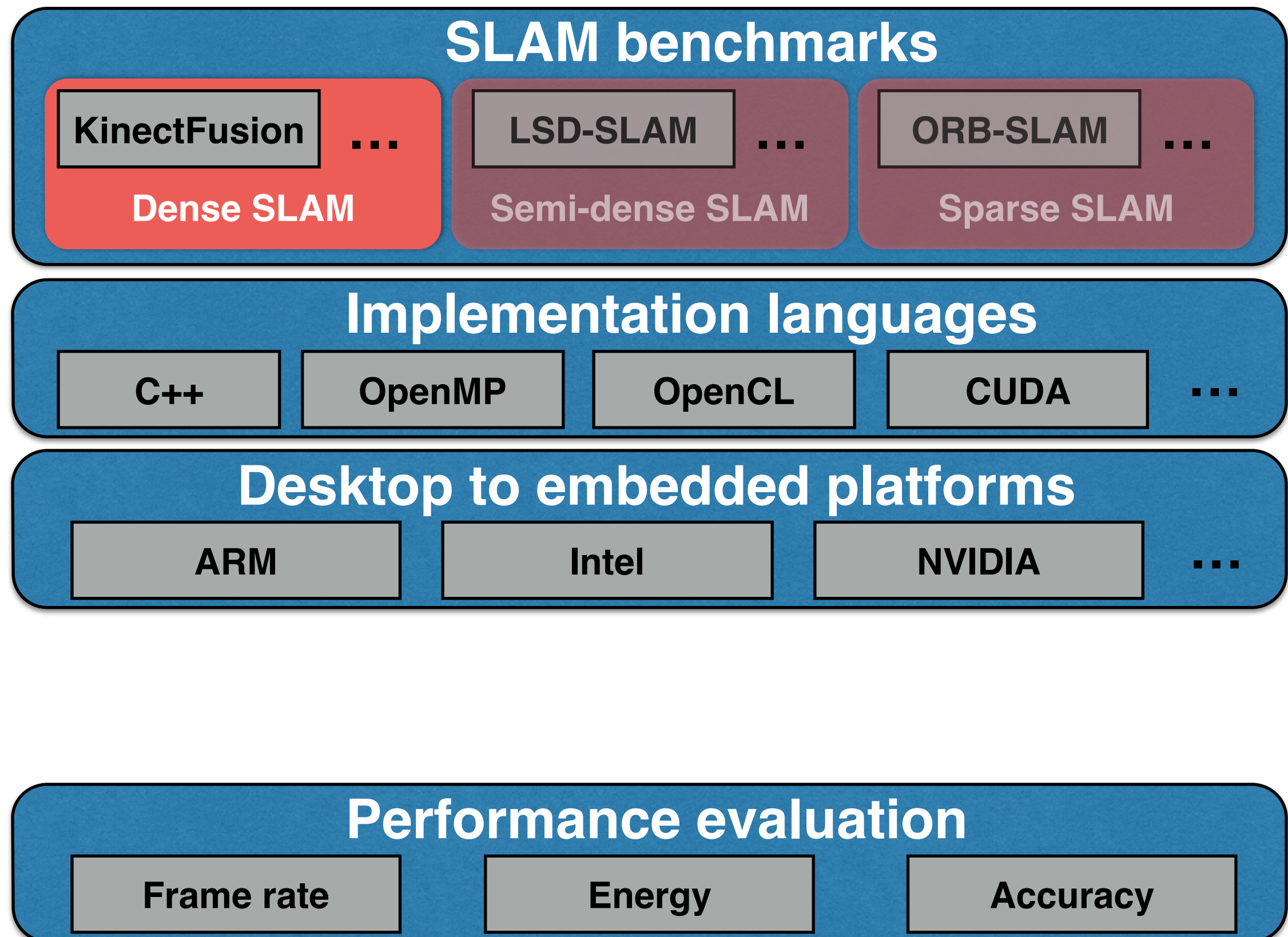
SLAMBench framework vision



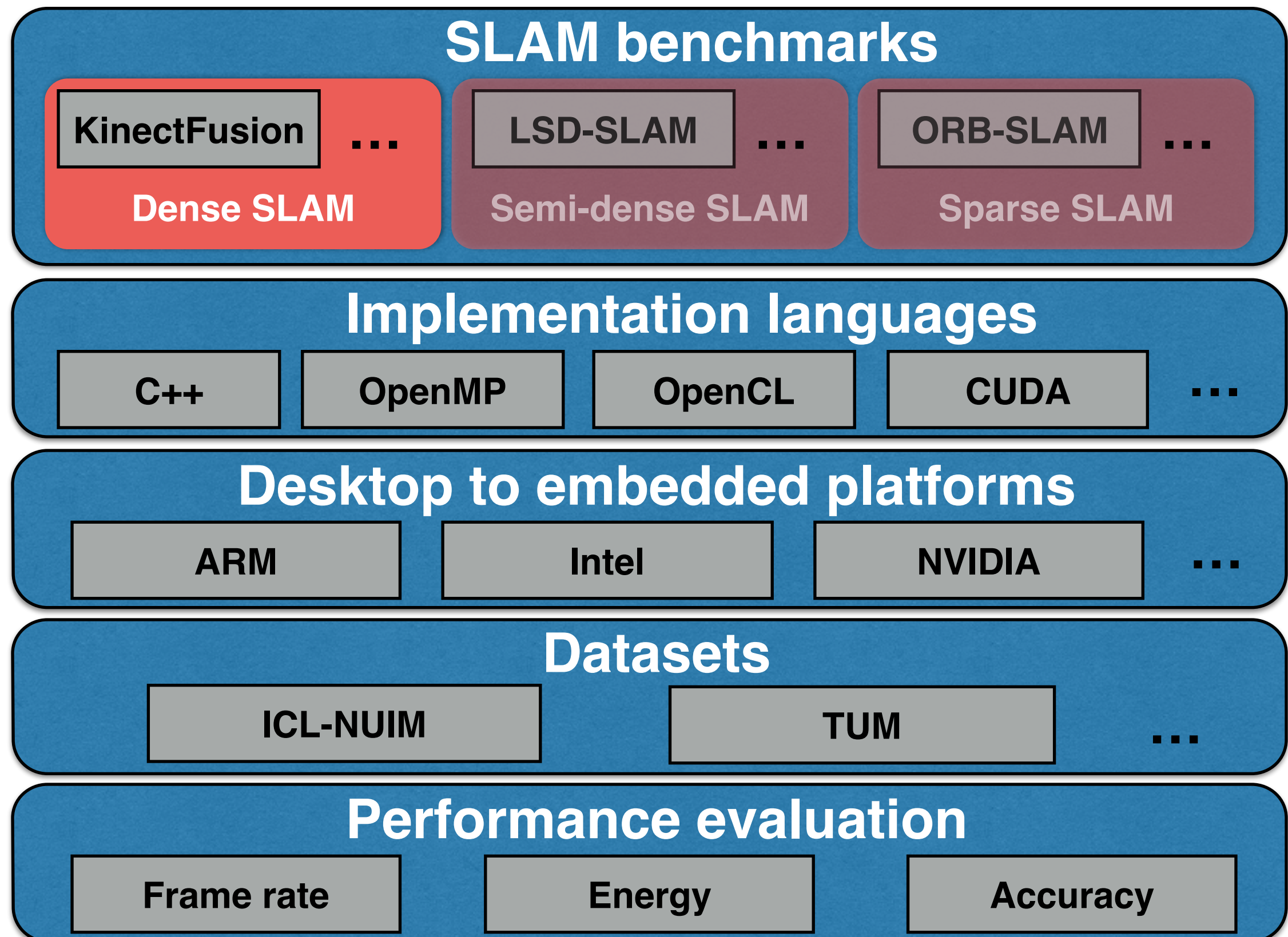
SLAMBench framework vision



SLAMBench framework vision



SLAMBench framework vision



Platforms testbed



TITAN
4998 GFLOPS
< 400 W



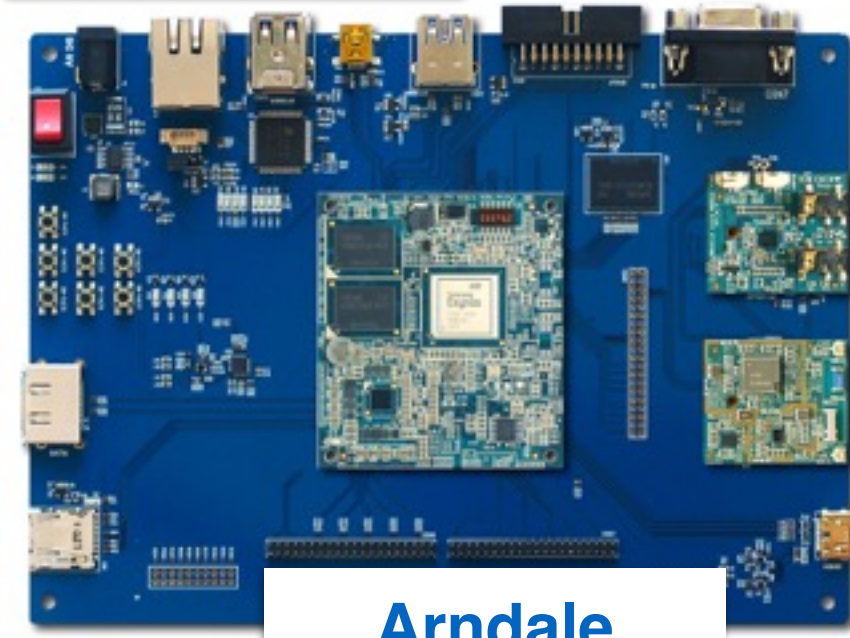
GTX 870M
2827 GFLOPS
< 100 W



TK1
404 GFLOPS
< 20 W



ODROID
170 GFLOPS
< 10 W



Arndale
87 GFLOPS
< 5 W

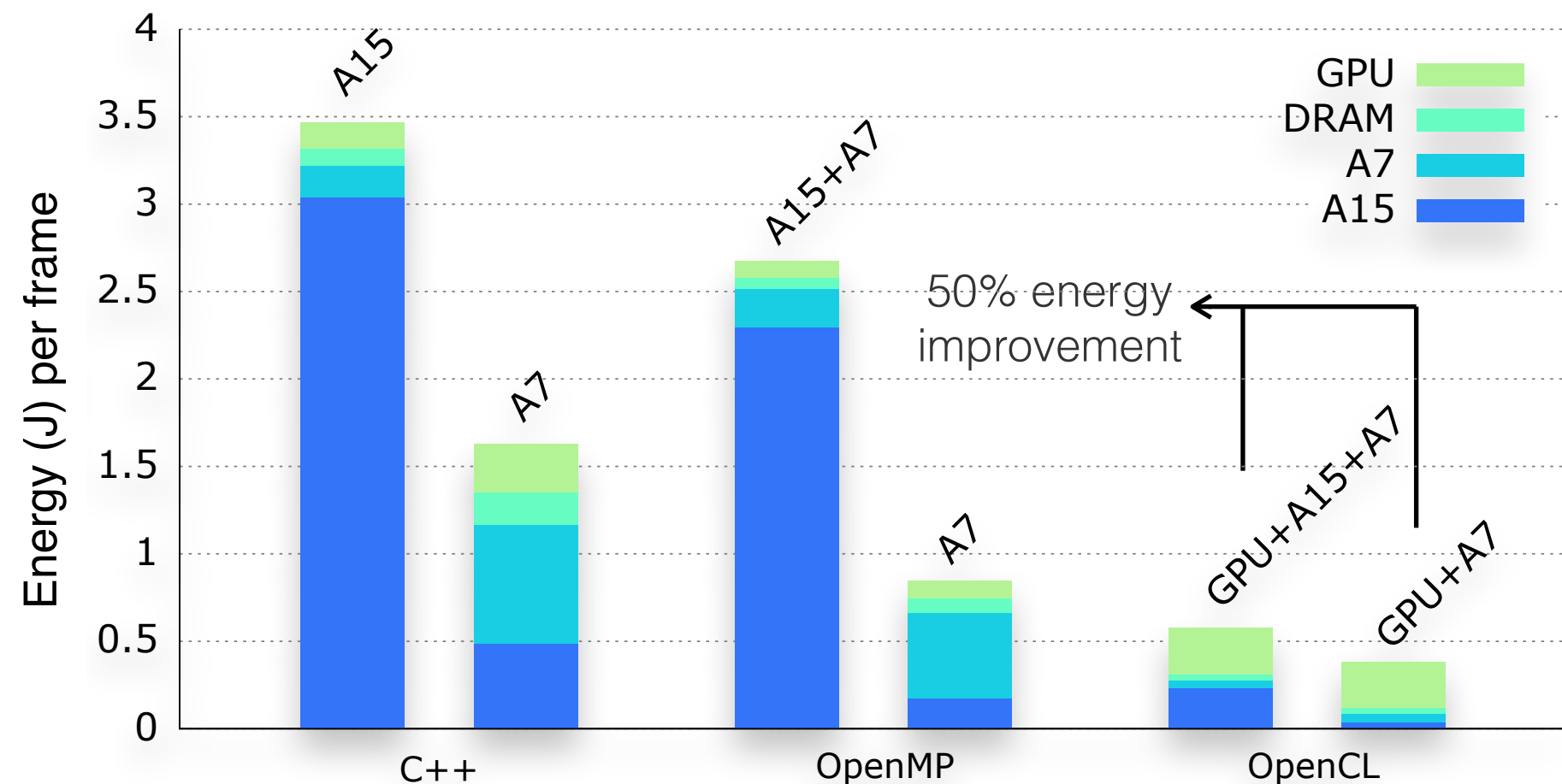
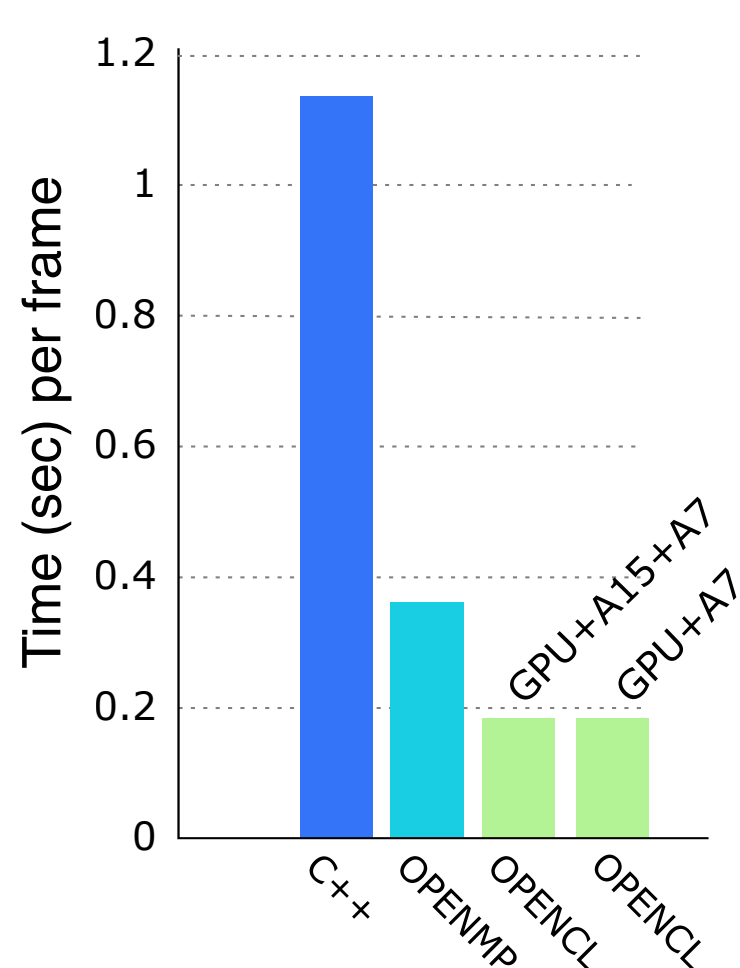
“Performance” on SLAMBench

- Runtime/energy/accuracy measurements
- Accuracy provided via absolute trajectory error (ATE)



ATE in cm	
C++	2.06
OpenMP	2.06
OpenCL	2.01

Machine	CPU	CPU name	CPU GFLOPS	CPU cores	GPU	GPU name	GPU GFLOPS	TDP Watts
Hardkernel ODROID-XU3	ARM A15 + A7	Exynos 5422	80	4 + 4	ARM	Mali-T628	60 + 30	10



SLAMBench today

- Publicly released
13/11/2014
(500 downloads)
- Early adopters:
 - Computer Vision
 - Compiler/runtime
 - Architecture



Web:

apt.cs.manchester.ac.uk/projects/PAMELA/tools/SLAMBench/

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- Author: HardKernel. ODROID-XU3 board. [Photograph]. Retrieved from http://www.hardkernel.com/main/products/prdt_info.php?g_code=G135235611947
- Author: PC Specialist Ltd. Vortex series laptop. [Photograph]. Retrieved from <https://www.pcspecialist.co.uk/forums/showthread.php?23366-My-new-beast-15-6-quot-Vortex-III>
- Author: Arndale.org. Arndale board. [Photograph]. Retrieved from http://www.arndaleboard.org/wiki/index.php/Main_Page
- Author: Unknown. Chip. [Image]. Retrieved from <https://cajalesygalileos.wordpress.com/2013/06/23/un-chip-ultrasensible-identifica-15-cepas-de-gripe/>

