

Simulation of the ODROID-XU4/Exynos5422 will be integrated in to Gem5, that would closely resemble its CPU operating parameters. A SmartPower3 [6], power monitor unit will be used along ODROID-XU4 as represented in Figure. 2, to measure overall power consumption on the hardware, while most of the peripheral modules on it will be kept to reduce any variation or impact on the measured data. In addition, the perf

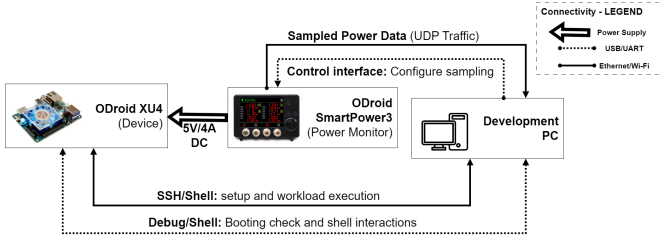


Fig. 2. Experiment setup for power data gathering from ODROID-XU4 [5] hardware

[7] will be used to gather PMC data-points. A summary of data-points being gathered for this modeling exercise is listed in Table I.

TABLE I
POWER AND PERFORMANCE FEATURE GATHERED FROM MENTIONED EXPERIMENT SETUP

Feature/Statistics Type	Feature details	
	Source	Details
CPU Clock Cycles	perf[x]	CPU cycles, us cycles, instructions, CPU frequency, CPU idle state statistics
Instruction Branches	perf[x]	Branch instruction and speculative operation statistics
Caches	perf[x]	Data/Instruction cache references, misses at L1, Last-Level-Cache levels
Board Level Power	SmartPower3 [6]	Current, Power drawn from power supply.
Misc. Performance	perf[x]	CPU Migrations, Context switches, Virtual memory

A set of preliminary workloads that would induce resource load for CPU and memory will be executed on the ODROID-XU4 device, while the power consumption and PMC data are simultaneously recorded. Few of the workloads that are being considered as listed in Table II. As of now, a total of 5 workloads have been employed. Furthermore, integration of SPEC2017 will allow inclusion of up to 43 feasible benchmarks to improve quantity of data.

TABLE II
LIST OF WORKLOADS BEING USED FOR DATA GATHERING AND VALIDATION

Workload Type	Workload details and status of integration	
	Workloads	Status
Stress Test	stress command [8]	✓
Video Encoding	ffmpeg encode [8]	✓
File Compression	gzip, bzip2, xz on complex datasets [9]	✓
Benchmark Suite	SPEC2017 CPU Benchmarks [10]	Planned

III. PHASE-2 PROGRESS

test

IV. PHASE-2 OBSERVATIONS AND RESULTS

test

V. DISCUSSION ON PHASE-2 OUTCOMES

VI. NEXT STEP

A. Modeling and Empirical Model generation

B. Power Model Integration to Gem5

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