Tradeoffs

The original uPIMulator models UPMEM's(was specified in the host repo) architecture, where all inter-DPU, inter-rank, and inter-channel communication is mediated by the host CPU. This accurately reflects the commercial hardware but imposes significant communication overhead, especially for collective operations.

GitHub link: https://github.com/uG2005/uPIMulator

Summary of Observed Behavior

Reduction in Instruction and Logic Cycles (VA benchmark)

Comparing 4-DPU and 8-DPU VA logs:

- Instructions per DPU reduced from ~122k to ~64k (≈48% reduction).
- Logic cycles reduced from ~168k to ~98k (≈42%).
- Scheduler run-time reduced proportionally.
- DMA overhead reduced from ~38k to ~30k.
- Backpressure reduced from 1,377 to ~775 (≈43%).

This indicates that direct interconnects substantially reduce synchronization overhead and eliminate host-mediated stalls.

Memory System Load Decrease

- Memory cycles drop from ~1.0M to ~0.59M (≈42%).
- Row activations, precharges, reads, and writes all drop by about 50%.

The interconnect removes redundant host copies, eliminating approximately half of the memory traffic.

Improved Tasklet Utilization

4-DPU VA logs show uneven load distribution among tasklets, with some heavily loaded and others underutilized.
8-DPU VA logs show a more uniform distribution, indicating that interconnect-level routing enables more even work assignment and reduces contention inside the DPU pipeline.

Cross-Benchmark Tradeoffs

VA (Vector Add)

VA primarily tests communication latency and routing correctness.
With interconnects, both cycle count and memory traffic are reduced by nearly half.

BS (Broadcast/Scatter)

Broadcast and scatter operations show extremely high overhead in the original framework due to repeated host-mediated transfers. In our version:

- Logic cycles are roughly 4.7M instead of host-driven multi-step transfers.
- Memory cycles (~28M) remain high due to replication inherent to BS, but routing is significantly faster than in the baseline.

RED (Reduction)

Reduction benefits the most from the interconnect changes.

- Very low DMA cost (~2100 cycles).
- Lower overall instruction count (~88k).
- Reduced memory cycles (~839k).
- Backpressure remains moderate but manageable.
- Moving from 1 channel to 2 channels (4 dpu each) halves the per-DPU work and memory pressure (≈52–53% of the original per-DPU values), while the total system work stays about the same.

The ability to perform tree-style reductions directly within memory ranks dramatically lowers communication overhead compared to the baseline.

Architectural Tradeoffs

Advantages

- Significant reduction in communication latency.
- 40–50% reduction in instruction and memory cycles for VA.
- Large improvement for collective workloads such as RED and BS.
- More balanced tasklet utilization and reduced pipeline stalls.
- Memory traffic roughly halved due to the elimination of host copies.

Costs and Complexity

- Additional hardware resources for routers, rings, and mesh links.
- Increased area and wiring complexity inside ranks and across channels.
- Additional buffering, flow-control, and arbitration logic.
- Potential increase in power consumption due to higher on-DIMM activity.
- More complex verification constraints to ensure timing correctness with DRAM protocols.

- The simulator must now model per-hop packet routing, potential congestion points, and flow-control states.

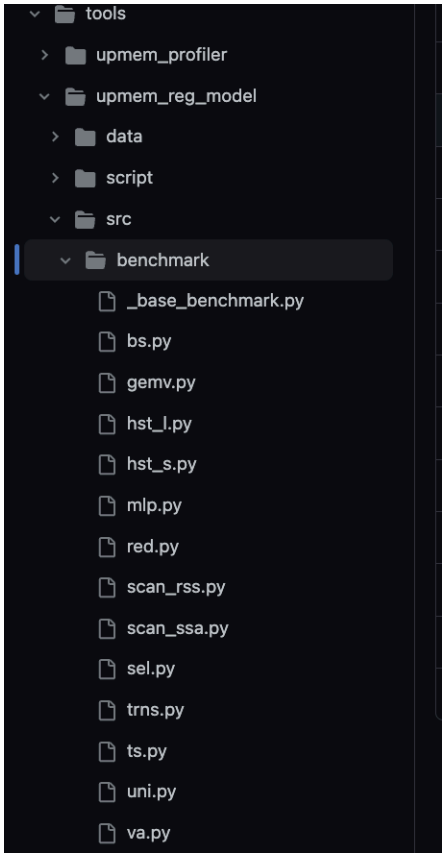
What is what?

What are tasklets?

Tasklets are lightweight hardware-managed threads that run on each DPU's 24-bit RISC core. Each DPU can run up to 24 tasklets, though most workloads use 6–16.

What are RED, BS, VA?

RED, BS, VA are among the different benchmark programs available by default in the uPIMulator repository. We have used different benchmarks to check the overall performance across different type of instructions. Unfortunately, whenever we tried to change the number of ranks it always resulted in the process being killed regardless of which benchmark we were running. Also, when we changed the channel in BS, the process was being killed repeatedly. We are not sure as to why that was happening, however because of the repeated kills, we have limited our data set to 6.



DRAM Limitations

There are several fundamental DRAM constraints that limit the extent of achievable speedup:

1. DMA cost dominates runtime for BS

Evidence from logs:

- ThreadScheduler[0_0_0]_breakdown_dma: 3,483,801 (BS, 1ch×1r×4DPU) vs Logic[0_0_0]_logic_cycle: 4,769,044 : DMA cycles are on the same order as logic cycles (very large).
- MemoryController[0_0_0]_memory_cycle: 28,614,264 and RowBuffer[0_0_0]_num_reads: 797,760 : enormous memory activity accompanies the large DMA count.

Implication: a significant fraction of execution time is spent servicing DMA/memory transfers rather than useful on-DPU computation; DMA is the bottleneck for BS. The same follows for VA and RED.

2. DMA traffic creates heavy memory-scheduler queuing and backpressure.

Evidence from logs:

- MemoryScheduler[0_0_0]_num_fcfs: 770,913 (BS, 1ch×1r×4DPU) and similarly large _num_fcfs for other DPUs.
- Logic[0_0_1]_backpressure: 171,868 / Logic[0_0_3]_backpressure: 230,203 (BS/BS-like runs) : very high backpressure concurrent with high DMA and memory cycles.

Implication: DMA request volume overwhelms the memory scheduler's service rate, causing long queues and backpressure that stall tasklets and reduce pipeline efficiency. The same follows for VA and RED.

Future Extensions

1. **Smarter Traffic Routing**

   Current Problem: BS shows DPU_3 does 30% more work than DPU_0 (1,502,272 vs 1,127,280 instructions)

   Solution: Somehow, we should teach the interconnect to avoid overloaded DPUs and find less-busy paths. It can result in reduction of overall time required for processing.

2. **Compress Data Before Sending**

Problem: VA moves 131,072 bytes but many values might be zeros or duplicates

Solution: Perhaps compression of data or removal and identification of useless bits could reduce overall processing time

3. Near-Memory Caching

Problem: DRAM latency is fixed and relatively high, and BS/VA repeatedly access the same MRAM locations.

Solution: Introduce a small SRAM or cache layer close to the DPU (e.g., row-buffer caching, line prediction, or a near-memory scratchpad). This would absorb repeated accesses, reduce MRAM pressure, and lower overall execution time especially for memory-intensive collectives like BS.

4. Power and Thermal Modeling

Problem: With the new interconnects, DPUs and routing paths stay active more frequently, increasing dynamic power and causing certain ranks or channels to heat up faster than others.

Solution: Add models for interconnect power consumption, DRAM bank activity energy, and temperature-aware throttling.

Data that we have collected

VA - 1dpu x 1 rank x 1 channel

ThreadScheduler[0_0_0]_breakdown_dma: 6327

ThreadScheduler[0_0_0]_breakdown_etc: 12449

ThreadScheduler[0_0_0]_breakdown_run: 13400

Logic[0_0_0]_active_tasklets_6: 307

Logic[0_0_0]_active_tasklets_8: 301

Logic[0_0_0]_active_tasklets_9: 296

Logic[0_0_0]_active_tasklets_10: 276

Logic[0_0_0]_active_tasklets_15: 438

Logic[0_0_0]_active_tasklets_4: 17162

Logic[0_0_0]_backpressure: 412

Logic[0_0_0]_active_tasklets_13: 302

Logic[0_0_0]_active_tasklets_16: 2676

Logic[0_0_0]_logic_cycle: 32588

Logic[0_0_0]_active_tasklets_11: 360

Logic[0_0_0]_active_tasklets_12: 351

Logic[0_0_0]_active_tasklets_14: 409

Logic[0_0_0]_num_instructions: 13400

Logic[0_0_0]_active_tasklets_2: 2906

Logic[0_0_0]_active_tasklets_3: 2077

Logic[0_0_0]_active_tasklets_5: 357

Logic[0_0_0]_active_tasklets_7: 303

Logic[0_0_0]_active_tasklets_0: 1883

Logic[0_0_0]_active_tasklets_1: 2184

CycleRule[0_0_0]_cycle_rule: 328

MemoryController[0_0_0]_memory_cycle: 195528

MemoryScheduler[0_0_0]_num_fcfs: 1518

RowBuffer[0_0_0]_read_bytes: 8192

RowBuffer[0_0_0]_num_activations: 18

RowBuffer[0_0_0]_num_precharges: 17

RowBuffer[0_0_0]_num_writes: 512

RowBuffer[0_0_0]_write_bytes: 4096

RowBuffer[0_0_0]_num_reads: 1024

VA- 4 dpu x 1 rank x 1 channel

ThreadScheduler[0_0_0]_breakdown_etc: 6138

ThreadScheduler[0_0_0]_breakdown_run: 122492

ThreadScheduler[0_0_0]_breakdown_dma: 38460

Logic[0_0_0]_active_tasklets_2: 5679

Logic[0_0_0]_active_tasklets_3: 2777

Logic[0_0_0]_active_tasklets_9: 17103

Logic[0_0_0]_active_tasklets_13: 10515

Logic[0_0_0]_num_instructions: 122492

Logic[0_0_0]_active_tasklets_5: 10358

Logic[0_0_0]_active_tasklets_7: 9959

Logic[0_0_0]_backpressure: 1377

Logic[0_0_0]_active_tasklets_15: 8722

Logic[0_0_0]_active_tasklets_16: 14166

Logic[0_0_0]_active_tasklets_1: 6579

Logic[0_0_0]_logic_cycle: 168467

Logic[0_0_0]_active_tasklets_4: 12217

Logic[0_0_0]_active_tasklets_0: 4304

Logic[0_0_0]_active_tasklets_11: 10302

Logic[0_0_0]_active_tasklets_12: 8500

Logic[0_0_0]_active_tasklets_6: 6646

Logic[0_0_0]_active_tasklets_8: 18001

Logic[0_0_0]_active_tasklets_10: 14548

Logic[0_0_0]_active_tasklets_14: 8091

CycleRule[0_0_0]_cycle_rule: 1036

MemoryController[0_0_0]_memory_cycle: 1010802

MemoryScheduler[0_0_0]_num_fcfs: 24248

RowBuffer[0_0_0]_read_bytes: 131072

RowBuffer[0_0_0]_num_activations: 328

RowBuffer[0_0_0]_num_precharges: 327

RowBuffer[0_0_0]_num_writes: 8192

RowBuffer[0_0_0]_write_bytes: 65536

RowBuffer[0_0_0]_num_reads: 16384

ThreadScheduler[0_0_1]_breakdown_etc: 6138

ThreadScheduler[0_0_1]_breakdown_run: 122492

ThreadScheduler[0_0_1]_breakdown_dma: 38460

Logic[0_0_1]_active_tasklets_3: 2777

Logic[0_0_1]_active_tasklets_4: 12217

Logic[0_0_1]_active_tasklets_0: 4304

Logic[0_0_1]_num_instructions: 122492

Logic[0_0_1]_active_tasklets_2: 5679

Logic[0_0_1]_active_tasklets_7: 9959

Logic[0_0_1]_backpressure: 1377

Logic[0_0_1]_active_tasklets_15: 8722

Logic[0_0_1]_active_tasklets_16: 14166

Logic[0_0_1]_active_tasklets_1: 6579

Logic[0_0_1]_active_tasklets_8: 18001

Logic[0_0_1]_active_tasklets_9: 17103

Logic[0_0_1]_active_tasklets_10: 14548

Logic[0_0_1]_logic_cycle: 168467

Logic[0_0_1]_active_tasklets_5: 10358

Logic[0_0_1]_active_tasklets_6: 6646

Logic[0_0_1]_active_tasklets_11: 10302

Logic[0_0_1]_active_tasklets_12: 8500

Logic[0_0_1]_active_tasklets_13: 10515

Logic[0_0_1]_active_tasklets_14: 8091

CycleRule[0_0_1]_cycle_rule: 1036

MemoryController[0_0_1]_memory_cycle: 1010802

MemoryScheduler[0_0_1]_num_fcfs: 24248

RowBuffer[0_0_1]_num_reads: 16384

RowBuffer[0_0_1]_read_bytes: 131072

RowBuffer[0_0_1]_num_activations: 328

RowBuffer[0_0_1]_num_precharges: 327

RowBuffer[0_0_1]_num_writes: 8192

RowBuffer[0_0_1]_write_bytes: 65536

ThreadScheduler[0_0_2]_breakdown_etc: 6138

ThreadScheduler[0_0_2]_breakdown_run: 122492

ThreadScheduler[0_0_2]_breakdown_dma: 38460

Logic[0_0_2]_active_tasklets_15: 8722

Logic[0_0_2]_logic_cycle: 168467

Logic[0_0_2]_backpressure: 1377

Logic[0_0_2]_active_tasklets_9: 17103

Logic[0_0_2]_active_tasklets_12: 8500

Logic[0_0_2]_active_tasklets_13: 10515

Logic[0_0_2]_active_tasklets_14: 8091

Logic[0_0_2]_active_tasklets_1: 6579

Logic[0_0_2]_active_tasklets_2: 5679

Logic[0_0_2]_active_tasklets_8: 18001

Logic[0_0_2]_active_tasklets_0: 4304

Logic[0_0_2]_active_tasklets_10: 14548

Logic[0_0_2]_active_tasklets_16: 14166

Logic[0_0_2]_active_tasklets_3: 2777

Logic[0_0_2]_active_tasklets_5: 10358

Logic[0_0_2]_active_tasklets_6: 6646

Logic[0_0_2]_active_tasklets_7: 9959

Logic[0_0_2]_active_tasklets_11: 10302

Logic[0_0_2]_num_instructions: 122492

Logic[0_0_2]_active_tasklets_4: 12217

CycleRule[0_0_2]_cycle_rule: 1036

MemoryController[0_0_2]_memory_cycle: 1010802

MemoryScheduler[0_0_2]_num_fcfs: 24248

RowBuffer[0_0_2]_num_precharges: 327

RowBuffer[0_0_2]_num_writes: 8192

RowBuffer[0_0_2]_write_bytes: 65536

RowBuffer[0_0_2]_num_reads: 16384

RowBuffer[0_0_2]_read_bytes: 131072

RowBuffer[0_0_2]_num_activations: 328

ThreadScheduler[0_0_3]_breakdown_etc: 6138

ThreadScheduler[0_0_3]_breakdown_run: 122492

ThreadScheduler[0_0_3]_breakdown_dma: 38460

Logic[0_0_3]_num_instructions: 122492

Logic[0_0_3]_active_tasklets_4: 12217

Logic[0_0_3]_active_tasklets_14: 8091

Logic[0_0_3]_logic_cycle: 168467

Logic[0_0_3]_active_tasklets_2: 5679

Logic[0_0_3]_active_tasklets_5: 10358

Logic[0_0_3]_active_tasklets_8: 18001

Logic[0_0_3]_active_tasklets_13: 10515

Logic[0_0_3]_active_tasklets_12: 8500

Logic[0_0_3]_active_tasklets_15: 8722

Logic[0_0_3]_active_tasklets_16: 14166

Logic[0_0_3]_active_tasklets_3: 2777

Logic[0_0_3]_backpressure: 1377

Logic[0_0_3]_active_tasklets_0: 4304

Logic[0_0_3]_active_tasklets_10: 14548

Logic[0_0_3]_active_tasklets_11: 10302

Logic[0_0_3]_active_tasklets_1: 6579

Logic[0_0_3]_active_tasklets_6: 6646

Logic[0_0_3]_active_tasklets_7: 9959

Logic[0_0_3]_active_tasklets_9: 17103

CycleRule[0_0_3]_cycle_rule: 1036

MemoryController[0_0_3]_memory_cycle: 1010802

MemoryScheduler[0_0_3]_num_fcfs: 24248

RowBuffer[0_0_3]_num_reads: 16384

RowBuffer[0_0_3]_read_bytes: 131072

RowBuffer[0_0_3]_num_activations: 328

RowBuffer[0_0_3]_num_precharges: 327

RowBuffer[0_0_3]_num_writes: 8192

RowBuffer[0_0_3]_write_bytes: 65536

VA- 4dpu x 1 rank x 2 channel

ThreadScheduler[0_0_0]_breakdown_etc: 3171

ThreadScheduler[0_0_0]_breakdown_run: 64348

ThreadScheduler[0_0_0]_breakdown_dma: 30292

Logic[0_0_0]_active_tasklets_4: 10479

Logic[0_0_0]_active_tasklets_6: 6507

Logic[0_0_0]_active_tasklets_0: 3559

Logic[0_0_0]_active_tasklets_16: 14116

Logic[0_0_0]_logic_cycle: 98586

Logic[0_0_0]_active_tasklets_14: 2184

Logic[0_0_0]_active_tasklets_11: 7162

Logic[0_0_0]_active_tasklets_7: 5803

Logic[0_0_0]_active_tasklets_12: 2466

Logic[0_0_0]_active_tasklets_13: 2368

Logic[0_0_0]_active_tasklets_3: 2337

Logic[0_0_0]_num_instructions: 64348

Logic[0_0_0]_active_tasklets_2: 5393

Logic[0_0_0]_active_tasklets_5: 8488

Logic[0_0_0]_active_tasklets_8: 5302

Logic[0_0_0]_backpressure: 775

Logic[0_0_0]_active_tasklets_9: 5380

Logic[0_0_0]_active_tasklets_10: 4436

Logic[0_0_0]_active_tasklets_1: 6161

Logic[0_0_0]_active_tasklets_15: 6445

CycleRule[0_0_0]_cycle_rule: 684

MemoryController[0_0_0]_memory_cycle: 591516

MemoryScheduler[0_0_0]_num_fcfs: 12139

RowBuffer[0_0_0]_num_reads: 8192

RowBuffer[0_0_0]_read_bytes: 65536

RowBuffer[0_0_0]_num_activations: 149

RowBuffer[0_0_0]_num_precharges: 148

RowBuffer[0_0_0]_num_writes: 4096

RowBuffer[0_0_0]_write_bytes: 32768

ThreadScheduler[0_0_1]_breakdown_etc: 3171

ThreadScheduler[0_0_1]_breakdown_run: 64348

ThreadScheduler[0_0_1]_breakdown_dma: 30292

Logic[0_0_1]_active_tasklets_3: 2337

Logic[0_0_1]_active_tasklets_7: 5803

Logic[0_0_1]_active_tasklets_8: 5302

Logic[0_0_1]_backpressure: 775

Logic[0_0_1]_active_tasklets_9: 5380

Logic[0_0_1]_active_tasklets_14: 2184

Logic[0_0_1]_active_tasklets_2: 5393

Logic[0_0_1]_num_instructions: 64348

Logic[0_0_1]_active_tasklets_5: 8488

Logic[0_0_1]_active_tasklets_0: 3559

Logic[0_0_1]_logic_cycle: 98586

Logic[0_0_1]_active_tasklets_10: 4436

Logic[0_0_1]_active_tasklets_11: 7162

Logic[0_0_1]_active_tasklets_12: 2466

Logic[0_0_1]_active_tasklets_16: 14116

Logic[0_0_1]_active_tasklets_6: 6507

Logic[0_0_1]_active_tasklets_4: 10479

Logic[0_0_1]_active_tasklets_13: 2368

Logic[0_0_1]_active_tasklets_15: 6445

Logic[0_0_1]_active_tasklets_1: 6161

CycleRule[0_0_1]_cycle_rule: 684

MemoryController[0_0_1]_memory_cycle: 591516

MemoryScheduler[0_0_1]_num_fcfs: 12139

RowBuffer[0_0_1]_num_writes: 4096

RowBuffer[0_0_1]_write_bytes: 32768

RowBuffer[0_0_1]_num_reads: 8192

RowBuffer[0_0_1]_read_bytes: 65536

RowBuffer[0_0_1]_num_activations: 149

RowBuffer[0_0_1]_num_precharges: 148

ThreadScheduler[0_0_2]_breakdown_etc: 3171

ThreadScheduler[0_0_2]_breakdown_run: 64348

ThreadScheduler[0_0_2]_breakdown_dma: 30292

Logic[0_0_2]_active_tasklets_0: 3559

Logic[0_0_2]_active_tasklets_9: 5380

Logic[0_0_2]_active_tasklets_13: 2368

Logic[0_0_2]_active_tasklets_15: 6445

Logic[0_0_2]_active_tasklets_2: 5393

Logic[0_0_2]_active_tasklets_4: 10479

Logic[0_0_2]_active_tasklets_5: 8488

Logic[0_0_2]_active_tasklets_6: 6507

Logic[0_0_2]_active_tasklets_8: 5302

Logic[0_0_2]_active_tasklets_10: 4436

Logic[0_0_2]_active_tasklets_14: 2184

Logic[0_0_2]_active_tasklets_16: 14116

Logic[0_0_2]_num_instructions: 64348

Logic[0_0_2]_active_tasklets_7: 5803

Logic[0_0_2]_active_tasklets_11: 7162

Logic[0_0_2]_active_tasklets_12: 2466

Logic[0_0_2]_active_tasklets_1: 6161

Logic[0_0_2]_logic_cycle: 98586

Logic[0_0_2]_active_tasklets_3: 2337

Logic[0_0_2]_backpressure: 775

CycleRule[0_0_2]_cycle_rule: 684

MemoryController[0_0_2]_memory_cycle: 591516

MemoryScheduler[0_0_2]_num_fcfs: 12139

RowBuffer[0_0_2]_num_reads: 8192

RowBuffer[0_0_2]_read_bytes: 65536

RowBuffer[0_0_2]_num_activations: 149

RowBuffer[0_0_2]_num_precharges: 148

RowBuffer[0_0_2]_num_writes: 4096

RowBuffer[0_0_2]_write_bytes: 32768

ThreadScheduler[0_0_3]_breakdown_etc: 3171

ThreadScheduler[0_0_3]_breakdown_run: 64348

ThreadScheduler[0_0_3]_breakdown_dma: 30292

Logic[0_0_3]_active_tasklets_2: 5393

Logic[0_0_3]_active_tasklets_4: 10479

Logic[0_0_3]_active_tasklets_6: 6507

Logic[0_0_3]_active_tasklets_16: 14116

Logic[0_0_3]_logic_cycle: 98586

Logic[0_0_3]_num_instructions: 64348

Logic[0_0_3]_active_tasklets_7: 5803

Logic[0_0_3]_active_tasklets_9: 5380

Logic[0_0_3]_active_tasklets_10: 4436

Logic[0_0_3]_active_tasklets_14: 2184

Logic[0_0_3]_active_tasklets_1: 6161

Logic[0_0_3]_active_tasklets_5: 8488

Logic[0_0_3]_backpressure: 775

Logic[0_0_3]_active_tasklets_0: 3559

Logic[0_0_3]_active_tasklets_11: 7162

Logic[0_0_3]_active_tasklets_12: 2466

Logic[0_0_3]_active_tasklets_13: 2368

Logic[0_0_3]_active_tasklets_15: 6445

Logic[0_0_3]_active_tasklets_3: 2337

Logic[0_0_3]_active_tasklets_8: 5302

CycleRule[0_0_3]_cycle_rule: 684

MemoryController[0_0_3]_memory_cycle: 591516

MemoryScheduler[0_0_3]_num_fcfs: 12139

RowBuffer[0_0_3]_write_bytes: 32768

RowBuffer[0_0_3]_num_reads: 8192

RowBuffer[0_0_3]_read_bytes: 65536

RowBuffer[0_0_3]_num_activations: 149

RowBuffer[0_0_3]_num_precharges: 148

RowBuffer[0_0_3]_num_writes: 4096

ThreadScheduler[0_0_4]_breakdown_etc: 3171

ThreadScheduler[0_0_4]_breakdown_run: 64348

ThreadScheduler[0_0_4]_breakdown_dma: 30292

Logic[0_0_4]_active_tasklets_1: 6161

Logic[0_0_4]_logic_cycle: 98586

Logic[0_0_4]_active_tasklets_4: 10479

Logic[0_0_4]_active_tasklets_8: 5302

Logic[0_0_4]_active_tasklets_9: 5380

Logic[0_0_4]_num_instructions: 64348

Logic[0_0_4]_active_tasklets_3: 2337

Logic[0_0_4]_active_tasklets_6: 6507

Logic[0_0_4]_backpressure: 775

Logic[0_0_4]_active_tasklets_2: 5393

Logic[0_0_4]_active_tasklets_7: 5803

Logic[0_0_4]_active_tasklets_12: 2466

Logic[0_0_4]_active_tasklets_15: 6445

Logic[0_0_4]_active_tasklets_13: 2368

Logic[0_0_4]_active_tasklets_14: 2184

Logic[0_0_4]_active_tasklets_16: 14116

Logic[0_0_4]_active_tasklets_5: 8488

Logic[0_0_4]_active_tasklets_0: 3559

Logic[0_0_4]_active_tasklets_10: 4436

Logic[0_0_4]_active_tasklets_11: 7162

CycleRule[0_0_4]_cycle_rule: 684

MemoryController[0_0_4]_memory_cycle: 591516

MemoryScheduler[0_0_4]_num_fcfs: 12139

RowBuffer[0_0_4]_num_activations: 149

RowBuffer[0_0_4]_num_precharges: 148

RowBuffer[0_0_4]_num_writes: 4096

RowBuffer[0_0_4]_write_bytes: 32768

RowBuffer[0_0_4]_num_reads: 8192

RowBuffer[0_0_4]_read_bytes: 65536

ThreadScheduler[0_0_5]_breakdown_etc: 3171

ThreadScheduler[0_0_5]_breakdown_run: 64348

ThreadScheduler[0_0_5]_breakdown_dma: 30292

Logic[0_0_5]_active_tasklets_13: 2368

Logic[0_0_5]_active_tasklets_16: 14116

Logic[0_0_5]_active_tasklets_7: 5803

Logic[0_0_5]_active_tasklets_0: 3559

Logic[0_0_5]_active_tasklets_10: 4436

Logic[0_0_5]_active_tasklets_15: 6445

Logic[0_0_5]_active_tasklets_4: 10479

Logic[0_0_5]_active_tasklets_8: 5302

Logic[0_0_5]_active_tasklets_9: 5380

Logic[0_0_5]_backpressure: 775

Logic[0_0_5]_active_tasklets_11: 7162

Logic[0_0_5]_active_tasklets_2: 5393

Logic[0_0_5]_active_tasklets_3: 2337

Logic[0_0_5]_active_tasklets_6: 6507

Logic[0_0_5]_active_tasklets_5: 8488

Logic[0_0_5]_active_tasklets_12: 2466

Logic[0_0_5]_active_tasklets_14: 2184

Logic[0_0_5]_active_tasklets_1: 6161

Logic[0_0_5]_logic_cycle: 98586

Logic[0_0_5]_num_instructions: 64348

CycleRule[0_0_5]_cycle_rule: 684

MemoryController[0_0_5]_memory_cycle: 591516

MemoryScheduler[0_0_5]_num_fcfs: 12139

RowBuffer[0_0_5]_num_reads: 8192

RowBuffer[0_0_5]_read_bytes: 65536

RowBuffer[0_0_5]_num_activations: 149

RowBuffer[0_0_5]_num_precharges: 148

RowBuffer[0_0_5]_num_writes: 4096

RowBuffer[0_0_5]_write_bytes: 32768

ThreadScheduler[0_0_6]_breakdown_etc: 3171

ThreadScheduler[0_0_6]_breakdown_run: 64348

ThreadScheduler[0_0_6]_breakdown_dma: 30292

Logic[0_0_6]_active_tasklets_6: 6507

Logic[0_0_6]_active_tasklets_7: 5803

Logic[0_0_6]_active_tasklets_12: 2466

Logic[0_0_6]_active_tasklets_8: 5302

Logic[0_0_6]_active_tasklets_9: 5380

Logic[0_0_6]_active_tasklets_15: 6445

Logic[0_0_6]_active_tasklets_1: 6161

Logic[0_0_6]_logic_cycle: 98586

Logic[0_0_6]_num_instructions: 64348

Logic[0_0_6]_active_tasklets_2: 5393

Logic[0_0_6]_backpressure: 775

Logic[0_0_6]_active_tasklets_0: 3559

Logic[0_0_6]_active_tasklets_10: 4436

Logic[0_0_6]_active_tasklets_11: 7162

Logic[0_0_6]_active_tasklets_3: 2337

Logic[0_0_6]_active_tasklets_4: 10479

Logic[0_0_6]_active_tasklets_5: 8488

Logic[0_0_6]_active_tasklets_13: 2368

Logic[0_0_6]_active_tasklets_14: 2184

Logic[0_0_6]_active_tasklets_16: 14116

CycleRule[0_0_6]_cycle_rule: 684

MemoryController[0_0_6]_memory_cycle: 591516

MemoryScheduler[0_0_6]_num_fcfs: 12139

RowBuffer[0_0_6]_read_bytes: 65536

RowBuffer[0_0_6]_num_activations: 149

RowBuffer[0_0_6]_num_precharges: 148

RowBuffer[0_0_6]_num_writes: 4096

RowBuffer[0_0_6]_write_bytes: 32768

RowBuffer[0_0_6]_num_reads: 8192

ThreadScheduler[0_0_7]_breakdown_etc: 3171

ThreadScheduler[0_0_7]_breakdown_run: 64348

ThreadScheduler[0_0_7]_breakdown_dma: 30292

Logic[0_0_7]_num_instructions: 64348

Logic[0_0_7]_active_tasklets_7: 5803

Logic[0_0_7]_active_tasklets_16: 14116

Logic[0_0_7]_active_tasklets_11: 7162

Logic[0_0_7]_active_tasklets_14: 2184

Logic[0_0_7]_active_tasklets_1: 6161

Logic[0_0_7]_active_tasklets_4: 10479

Logic[0_0_7]_backpressure: 775

Logic[0_0_7]_active_tasklets_0: 3559

Logic[0_0_7]_active_tasklets_10: 4436

Logic[0_0_7]_active_tasklets_2: 5393

Logic[0_0_7]_active_tasklets_8: 5302

Logic[0_0_7]_active_tasklets_12: 2466

Logic[0_0_7]_active_tasklets_13: 2368

Logic[0_0_7]_active_tasklets_15: 6445

Logic[0_0_7]_logic_cycle: 98586

Logic[0_0_7]_active_tasklets_3: 2337

Logic[0_0_7]_active_tasklets_5: 8488

Logic[0_0_7]_active_tasklets_6: 6507

Logic[0_0_7]_active_tasklets_9: 5380

CycleRule[0_0_7]_cycle_rule: 684

MemoryController[0_0_7]_memory_cycle: 591516

MemoryScheduler[0_0_7]_num_fcfs: 12139

RowBuffer[0_0_7]_num_reads: 8192

RowBuffer[0_0_7]_read_bytes: 65536

RowBuffer[0_0_7]_num_activations: 149

RowBuffer[0_0_7]_num_precharges: 148

RowBuffer[0_0_7]_num_writes: 4096

RowBuffer[0_0_7]_write_bytes: 32768

BS- 1 channels x 1 rank x 4 DPU

ThreadScheduler[0_0_0]_breakdown_etc: 35750

ThreadScheduler[0_0_0]_breakdown_run: 1127280

ThreadScheduler[0_0_0]_breakdown_dma: 3483801

Logic[0_0_0]_backpressure: 122213

Logic[0_0_0]_active_tasklets_0: 217919

Logic[0_0_0]_active_tasklets_16: 5789

Logic[0_0_0]_active_tasklets_2: 1548596

Logic[0_0_0]_active_tasklets_9: 294

Logic[0_0_0]_active_tasklets_10: 333

Logic[0_0_0]_active_tasklets_11: 326

Logic[0_0_0]_active_tasklets_12: 425

Logic[0_0_0]_num_instructions: 1127280

Logic[0_0_0]_active_tasklets_3: 1417412

Logic[0_0_0]_active_tasklets_5: 153643

Logic[0_0_0]_active_tasklets_7: 2742

Logic[0_0_0]_active_tasklets_8: 1168

Logic[0_0_0]_active_tasklets_13: 413

Logic[0_0_0]_active_tasklets_14: 375

Logic[0_0_0]_active_tasklets_1: 750129

Logic[0_0_0]_logic_cycle: 4769044

Logic[0_0_0]_active_tasklets_4: 647795

Logic[0_0_0]_active_tasklets_6: 21231

Logic[0_0_0]_active_tasklets_15: 454

CycleRule[0_0_0]_cycle_rule: 425736

MemoryController[0_0_0]_memory_cycle: 28614264

MemoryScheduler[0_0_0]_num_fcfs: 770913

MemoryScheduler[0_0_0]_num_fr: 140

RowBuffer[0_0_0]_num_precharges: 26706

RowBuffer[0_0_0]_num_reads: 797760

RowBuffer[0_0_0]_read_bytes: 6382080

RowBuffer[0_0_0]_num_activations: 26707

ThreadScheduler[0_0_1]_breakdown_etc: 39699

ThreadScheduler[0_0_1]_breakdown_run: 1309760

ThreadScheduler[0_0_1]_breakdown_dma: 3205733

Logic[0_0_1]_active_tasklets_5: 377131

Logic[0_0_1]_active_tasklets_8: 1543

Logic[0_0_1]_active_tasklets_15: 454

Logic[0_0_1]_logic_cycle: 4727060

Logic[0_0_1]_num_instructions: 1309760

Logic[0_0_1]_active_tasklets_9: 284

Logic[0_0_1]_active_tasklets_13: 413

Logic[0_0_1]_active_tasklets_14: 375

Logic[0_0_1]_active_tasklets_1: 464126

Logic[0_0_1]_active_tasklets_6: 84083

Logic[0_0_1]_backpressure: 171868

Logic[0_0_1]_active_tasklets_0: 236612

Logic[0_0_1]_active_tasklets_12: 425

Logic[0_0_1]_active_tasklets_16: 5789

Logic[0_0_1]_active_tasklets_2: 1154410

Logic[0_0_1]_active_tasklets_7: 10504

Logic[0_0_1]_active_tasklets_10: 333

Logic[0_0_1]_active_tasklets_11: 326

Logic[0_0_1]_active_tasklets_3: 1424125

Logic[0_0_1]_active_tasklets_4: 966127

CycleRule[0_0_1]_cycle_rule: 485263

MemoryController[0_0_1]_memory_cycle: 28362360

MemoryScheduler[0_0_1]_num_fcfs: 763014

MemoryScheduler[0_0_1]_num_fr: 140

RowBuffer[0_0_1]_num_activations: 26350

RowBuffer[0_0_1]_num_precharges: 26349

RowBuffer[0_0_1]_num_reads: 789504

RowBuffer[0_0_1]_read_bytes: 6316032

ThreadScheduler[0_0_2]_breakdown_etc: 36431

ThreadScheduler[0_0_2]_breakdown_run: 1308926

ThreadScheduler[0_0_2]_breakdown_dma: 3198692

Logic[0_0_2]_active_tasklets_3: 1444170

Logic[0_0_2]_active_tasklets_4: 959841

Logic[0_0_2]_active_tasklets_7: 10873

Logic[0_0_2]_backpressure: 171885

Logic[0_0_2]_active_tasklets_0: 232973

Logic[0_0_2]_active_tasklets_14: 375

Logic[0_0_2]_active_tasklets_16: 5789

Logic[0_0_2]_active_tasklets_1: 449658

Logic[0_0_2]_logic_cycle: 4715934

Logic[0_0_2]_num_instructions: 1308926

Logic[0_0_2]_active_tasklets_9: 284

Logic[0_0_2]_active_tasklets_12: 425

Logic[0_0_2]_active_tasklets_15: 454

Logic[0_0_2]_active_tasklets_6: 84695

Logic[0_0_2]_active_tasklets_8: 1429

Logic[0_0_2]_active_tasklets_10: 333

Logic[0_0_2]_active_tasklets_13: 413

Logic[0_0_2]_active_tasklets_2: 1153107

Logic[0_0_2]_active_tasklets_5: 370789

Logic[0_0_2]_active_tasklets_11: 326

CycleRule[0_0_2]_cycle_rule: 484910

MemoryController[0_0_2]_memory_cycle: 28295604

MemoryScheduler[0_0_2]_num_fcfs: 762076

MemoryScheduler[0_0_2]_num_fr: 120

RowBuffer[0_0_2]_num_reads: 788480

RowBuffer[0_0_2]_read_bytes: 6307840

RowBuffer[0_0_2]_num_activations: 26284

RowBuffer[0_0_2]_num_precharges: 26283

ThreadScheduler[0_0_3]_breakdown_etc: 44771

ThreadScheduler[0_0_3]_breakdown_run: 1502272

ThreadScheduler[0_0_3]_breakdown_dma: 2955830

Logic[0_0_3]_active_tasklets_1: 259816

Logic[0_0_3]_active_tasklets_4: 1209649

Logic[0_0_3]_active_tasklets_13: 413

Logic[0_0_3]_active_tasklets_15: 454

Logic[0_0_3]_active_tasklets_10: 333

Logic[0_0_3]_active_tasklets_12: 425

Logic[0_0_3]_logic_cycle: 4733076

Logic[0_0_3]_num_instructions: 1502272

Logic[0_0_3]_active_tasklets_2: 805922

Logic[0_0_3]_active_tasklets_6: 185831

Logic[0_0_3]_active_tasklets_8: 3221

Logic[0_0_3]_active_tasklets_5: 617638

Logic[0_0_3]_active_tasklets_9: 328

Logic[0_0_3]_active_tasklets_11: 326

Logic[0_0_3]_active_tasklets_14: 375

Logic[0_0_3]_active_tasklets_16: 5789

Logic[0_0_3]_active_tasklets_3: 1348401

Logic[0_0_3]_active_tasklets_7: 31858

Logic[0_0_3]_backpressure: 230203

Logic[0_0_3]_active_tasklets_0: 262297

CycleRule[0_0_3]_cycle_rule: 548751

MemoryController[0_0_3]_memory_cycle: 28398456

MemoryScheduler[0_0_3]_num_fcfs: 762869

MemoryScheduler[0_0_3]_num_fr: 340

RowBuffer[0_0_3]_read_bytes: 6316032

RowBuffer[0_0_3]_num_activations: 26295

RowBuffer[0_0_3]_num_precharges: 26294

RowBuffer[0_0_3]_num_reads: 789504

RED- 1 channels x 1 rank x 4 DPU

ThreadScheduler[0_0_0]_breakdown_etc: 3742

ThreadScheduler[0_0_0]_breakdown_run: 88752

ThreadScheduler[0_0_0]_breakdown_dma: 2106

Logic[0_0_0]_active_tasklets_8: 1280

Logic[0_0_0]_active_tasklets_5: 1367

Logic[0_0_0]_active_tasklets_7: 1309

Logic[0_0_0]_backpressure: 45295

Logic[0_0_0]_active_tasklets_9: 1325

Logic[0_0_0]_active_tasklets_10: 1437

Logic[0_0_0]_active_tasklets_15: 52496

Logic[0_0_0]_active_tasklets_3: 1650

Logic[0_0_0]_active_tasklets_6: 1431

Logic[0_0_0]_active_tasklets_0: 45310

Logic[0_0_0]_active_tasklets_11: 1693

Logic[0_0_0]_active_tasklets_13: 1876

Logic[0_0_0]_logic_cycle: 139895

Logic[0_0_0]_active_tasklets_2: 881

Logic[0_0_0]_active_tasklets_4: 1784

Logic[0_0_0]_active_tasklets_12: 2102

Logic[0_0_0]_active_tasklets_14: 1806

Logic[0_0_0]_active_tasklets_16: 20924

Logic[0_0_0]_active_tasklets_1: 1224

Logic[0_0_0]_num_instructions: 88752

CycleRule[0_0_0]_cycle_rule: 34421

MemoryController[0_0_0]_memory_cycle: 839370

MemoryScheduler[0_0_0]_num_fcfs: 16240

RowBuffer[0_0_0]_num_activations: 144

RowBuffer[0_0_0]_num_precharges: 143

RowBuffer[0_0_0]_num_reads: 16384

RowBuffer[0_0_0]_read_bytes: 131072

ThreadScheduler[0_0_1]_breakdown_etc: 3742

ThreadScheduler[0_0_1]_breakdown_run: 88752

ThreadScheduler[0_0_1]_breakdown_dma: 2106

Logic[0_0_1]_logic_cycle: 139895

Logic[0_0_1]_active_tasklets_2: 881

Logic[0_0_1]_active_tasklets_13: 1876

Logic[0_0_1]_active_tasklets_16: 20924

Logic[0_0_1]_active_tasklets_7: 1309

Logic[0_0_1]_active_tasklets_8: 1280

Logic[0_0_1]_active_tasklets_9: 1325

Logic[0_0_1]_active_tasklets_12: 2102

Logic[0_0_1]_num_instructions: 88752

Logic[0_0_1]_active_tasklets_5: 1367

Logic[0_0_1]_active_tasklets_0: 45310

Logic[0_0_1]_active_tasklets_11: 1693

Logic[0_0_1]_backpressure: 45295

Logic[0_0_1]_active_tasklets_10: 1437

Logic[0_0_1]_active_tasklets_14: 1806

Logic[0_0_1]_active_tasklets_15: 52496

Logic[0_0_1]_active_tasklets_1: 1224

Logic[0_0_1]_active_tasklets_3: 1650

Logic[0_0_1]_active_tasklets_4: 1784

Logic[0_0_1]_active_tasklets_6: 1431

CycleRule[0_0_1]_cycle_rule: 34421

MemoryController[0_0_1]_memory_cycle: 839370

MemoryScheduler[0_0_1]_num_fcfs: 16240

RowBuffer[0_0_1]_num_reads: 16384

RowBuffer[0_0_1]_read_bytes: 131072

RowBuffer[0_0_1]_num_activations: 144

RowBuffer[0_0_1]_num_precharges: 143

ThreadScheduler[0_0_2]_breakdown_etc: 3742

ThreadScheduler[0_0_2]_breakdown_run: 88752

ThreadScheduler[0_0_2]_breakdown_dma: 2106

Logic[0_0_2]_active_tasklets_2: 881

Logic[0_0_2]_active_tasklets_5: 1367

Logic[0_0_2]_active_tasklets_6: 1431

Logic[0_0_2]_active_tasklets_10: 1437

Logic[0_0_2]_active_tasklets_13: 1876

Logic[0_0_2]_active_tasklets_12: 2102

Logic[0_0_2]_active_tasklets_14: 1806

Logic[0_0_2]_logic_cycle: 139895

Logic[0_0_2]_active_tasklets_3: 1650

Logic[0_0_2]_active_tasklets_7: 1309

Logic[0_0_2]_active_tasklets_8: 1280

Logic[0_0_2]_backpressure: 45295

Logic[0_0_2]_active_tasklets_0: 45310

Logic[0_0_2]_active_tasklets_4: 1784

Logic[0_0_2]_active_tasklets_9: 1325

Logic[0_0_2]_active_tasklets_11: 1693

Logic[0_0_2]_active_tasklets_1: 1224

Logic[0_0_2]_num_instructions: 88752

Logic[0_0_2]_active_tasklets_15: 52496

Logic[0_0_2]_active_tasklets_16: 20924

CycleRule[0_0_2]_cycle_rule: 34421

MemoryController[0_0_2]_memory_cycle: 839370

MemoryScheduler[0_0_2]_num_fcfs: 16240

RowBuffer[0_0_2]_num_activations: 144

RowBuffer[0_0_2]_num_precharges: 143

RowBuffer[0_0_2]_num_reads: 16384

RowBuffer[0_0_2]_read_bytes: 131072

ThreadScheduler[0_0_3]_breakdown_etc: 3742

ThreadScheduler[0_0_3]_breakdown_run: 88752

ThreadScheduler[0_0_3]_breakdown_dma: 2106

Logic[0_0_3]_active_tasklets_3: 1650

Logic[0_0_3]_active_tasklets_9: 1325

Logic[0_0_3]_active_tasklets_11: 1693

Logic[0_0_3]_active_tasklets_12: 2102

Logic[0_0_3]_active_tasklets_13: 1876

Logic[0_0_3]_active_tasklets_14: 1806

Logic[0_0_3]_active_tasklets_2: 881

Logic[0_0_3]_active_tasklets_8: 1280

Logic[0_0_3]_active_tasklets_15: 52496

Logic[0_0_3]_active_tasklets_16: 20924

Logic[0_0_3]_active_tasklets_1: 1224

Logic[0_0_3]_logic_cycle: 139895

Logic[0_0_3]_num_instructions: 88752

Logic[0_0_3]_active_tasklets_4: 1784

Logic[0_0_3]_active_tasklets_7: 1309

Logic[0_0_3]_backpressure: 45295

Logic[0_0_3]_active_tasklets_5: 1367

Logic[0_0_3]_active_tasklets_6: 1431

Logic[0_0_3]_active_tasklets_0: 45310

Logic[0_0_3]_active_tasklets_10: 1437

CycleRule[0_0_3]_cycle_rule: 34421

MemoryController[0_0_3]_memory_cycle: 839370

MemoryScheduler[0_0_3]_num_fcfs: 16240

RowBuffer[0_0_3]_num_reads: 16384

RowBuffer[0_0_3]_read_bytes: 131072

RowBuffer[0_0_3]_num_activations: 144

RowBuffer[0_0_3]_num_precharges: 143

RED- 2 channels x 1 rank x 4 DPU

ThreadScheduler[0_0_0]_breakdown_etc: 3787ThreadScheduler[0_0_0]_breakdown_run: 46256
ThreadScheduler[0_0_0]_breakdown_dma: 2106 Logic[0_0_0]_num_instructions: 46256
Logic[0_0_0]_active_tasklets_2: 882 Logic[0_0_0]_active_tasklets_5: 1413
Logic[0_0_0]_active_tasklets_6: 1396 Logic[0_0_0]_active_tasklets_9: 1332
Logic[0_0_0]_active_tasklets_12: 2066 Logic[0_0_0]_active_tasklets_15: 22005
Logic[0_0_0]_active_tasklets_1: 1210 Logic[0_0_0]_active_tasklets_16: 9086
Logic[0_0_0]_active_tasklets_11: 1715 Logic[0_0_0]_active_tasklets_3: 1645
Logic[0_0_0]_active_tasklets_7: 1326 Logic[0_0_0]_active_tasklets_4: 1829
Logic[0_0_0]_active_tasklets_8: 1266 Logic[0_0_0]_backpressure: 22380
Logic[0_0_0]_active_tasklets_0: 22395 Logic[0_0_0]_active_tasklets_10: 1436
Logic[0_0_0]_active_tasklets_13: 1876 Logic[0_0_0]_active_tasklets_14: 1651
Logic[0_0_0]_logic_cycle: 74529 CycleRule[0_0_0]_cycle_rule: 17397
MemoryController[0_0_0]_memory_cycle: 447174 MemoryScheduler[0_0_0]_num_fcfs: 8120
RowBuffer[0_0_0]_num_activations: 72 RowBuffer[0_0_0]_num_precharges: 71
RowBuffer[0_0_0]_num_reads: 8192 RowBuffer[0_0_0]_read_bytes: 65536

ThreadScheduler[0_0_1]_breakdown_etc: 3787 ThreadScheduler[0_0_1]_breakdown_run: 46256
ThreadScheduler[0_0_1]_breakdown_dma: 2106 Logic[0_0_1]_active_tasklets_6: 1396
Logic[0_0_1]_backpressure: 22380 Logic[0_0_1]_active_tasklets_8: 1266
Logic[0_0_1]_active_tasklets_10: 1436 Logic[0_0_1]_active_tasklets_11: 1715
Logic[0_0_1]_active_tasklets_13: 1876 Logic[0_0_1]_active_tasklets_14: 1651
Logic[0_0_1]_active_tasklets_2: 882 Logic[0_0_1]_active_tasklets_7: 1326
Logic[0_0_1]_active_tasklets_0: 22395 Logic[0_0_1]_active_tasklets_12: 2066
Logic[0_0_1]_active_tasklets_15: 22005 Logic[0_0_1]_active_tasklets_16: 9086
Logic[0_0_1]_active_tasklets_1: 1210 Logic[0_0_1]_active_tasklets_3: 1645
Logic[0_0_1]_active_tasklets_4: 1829 Logic[0_0_1]_active_tasklets_5: 1413
Logic[0_0_1]_active_tasklets_9: 1332 Logic[0_0_1]_logic_cycle: 74529
Logic[0_0_1]_num_instructions: 46256 CycleRule[0_0_1]_cycle_rule: 17397
MemoryController[0_0_1]_memory_cycle: 447174 MemoryScheduler[0_0_1]_num_fcfs: 8120
RowBuffer[0_0_1]_num_reads: 8192 RowBuffer[0_0_1]_read_bytes: 65536
RowBuffer[0_0_1]_num_activations: 72 RowBuffer[0_0_1]_num_precharges: 71
ThreadScheduler[0_0_2]_breakdown_etc: 3787 ThreadScheduler[0_0_2]_breakdown_run: 46256
ThreadScheduler[0_0_2]_breakdown_dma: 2106 Logic[0_0_2]_active_tasklets_5: 1413
Logic[0_0_2]_active_tasklets_11: 1715 Logic[0_0_2]_active_tasklets_13: 1876
Logic[0_0_2]_active_tasklets_9: 1332 Logic[0_0_2]_active_tasklets_15: 22005
Logic[0_0_2]_active_tasklets_1: 1210 Logic[0_0_2]_logic_cycle: 74529
Logic[0_0_2]_active_tasklets_4: 1829 Logic[0_0_2]_active_tasklets_7: 1326
Logic[0_0_2]_active_tasklets_3: 1645 Logic[0_0_2]_active_tasklets_6: 1396
Logic[0_0_2]_backpressure: 22380 Logic[0_0_2]_active_tasklets_0: 22395
Logic[0_0_2]_active_tasklets_12: 2066 Logic[0_0_2]_active_tasklets_14: 1651
Logic[0_0_2]_active_tasklets_16: 9086 Logic[0_0_2]_num_instructions: 46256
Logic[0_0_2]_active_tasklets_2: 882 Logic[0_0_2]_active_tasklets_8: 1266
Logic[0_0_2]_active_tasklets_10: 1436 CycleRule[0_0_2]_cycle_rule: 17397
MemoryController[0_0_2]_memory_cycle: 447174 MemoryScheduler[0_0_2]_num_fcfs: 8120
RowBuffer[0_0_2]_num_reads: 8192 RowBuffer[0_0_2]_read_bytes: 65536
RowBuffer[0_0_2]_num_activations: 72 RowBuffer[0_0_2]_num_precharges: 71
ThreadScheduler[0_0_3]_breakdown_run: 46256 ThreadScheduler[0_0_3]_breakdown_dma: 2106
ThreadScheduler[0_0_3]_breakdown_etc: 3787 Logic[0_0_3]_active_tasklets_12: 2066
Logic[0_0_3]_num_instructions: 46256 Logic[0_0_3]_active_tasklets_4: 1829
Logic[0_0_3]_active_tasklets_8: 1266 Logic[0_0_3]_backpressure: 22380
Logic[0_0_3]_active_tasklets_2: 882 Logic[0_0_3]_active_tasklets_9: 1332
Logic[0_0_3]_active_tasklets_14: 1651 Logic[0_0_3]_active_tasklets_15: 22005
Logic[0_0_3]_active_tasklets_13: 1876 Logic[0_0_3]_active_tasklets_16: 9086
Logic[0_0_3]_active_tasklets_1: 1210 Logic[0_0_3]_active_tasklets_3: 1645
Logic[0_0_3]_active_tasklets_0: 22395 Logic[0_0_3]_active_tasklets_10: 1436
Logic[0_0_3]_active_tasklets_11: 1715 Logic[0_0_3]_logic_cycle: 74529
Logic[0_0_3]_active_tasklets_5: 1413 Logic[0_0_3]_active_tasklets_6: 1396
Logic[0_0_3]_active_tasklets_7: 1326 CycleRule[0_0_3]_cycle_rule: 17397
MemoryController[0_0_3]_memory_cycle: 447174 MemoryScheduler[0_0_3]_num_fcfs: 8120
RowBuffer[0_0_3]_num_activations: 72 RowBuffer[0_0_3]_num_precharges: 71

RowBuffer[0_0_3]_num_reads: 8192 RowBuffer[0_0_3]_read_bytes: 65536
ThreadScheduler[1_0_0]_breakdown_etc: 3787 ThreadScheduler[1_0_0]_breakdown_run: 46256
ThreadScheduler[1_0_0]_breakdown_dma: 2106 Logic[1_0_0]_active_tasklets_3: 1645
Logic[1_0_0]_active_tasklets_6: 1396 Logic[1_0_0]_num_instructions: 46256
Logic[1_0_0]_active_tasklets_8: 1266 Logic[1_0_0]_backpressure: 22380
Logic[1_0_0]_active_tasklets_13: 1876 Logic[1_0_0]_active_tasklets_15: 22005
Logic[1_0_0]_active_tasklets_1: 1210 Logic[1_0_0]_logic_cycle: 74529
Logic[1_0_0]_active_tasklets_5: 1413 Logic[1_0_0]_active_tasklets_14: 1651
Logic[1_0_0]_active_tasklets_2: 882 Logic[1_0_0]_active_tasklets_4: 1829
Logic[1_0_0]_active_tasklets_9: 1332 Logic[1_0_0]_active_tasklets_10: 1436
Logic[1_0_0]_active_tasklets_11: 1715 Logic[1_0_0]_active_tasklets_12: 2066
Logic[1_0_0]_active_tasklets_16: 9086 Logic[1_0_0]_active_tasklets_7: 1326
Logic[1_0_0]_active_tasklets_0: 22395 CycleRule[1_0_0]_cycle_rule: 17397
MemoryController[1_0_0]_memory_cycle: 447174 MemoryScheduler[1_0_0]_num_fcfs: 8120
RowBuffer[1_0_0]_read_bytes: 65536 RowBuffer[1_0_0]_num_activations: 72
RowBuffer[1_0_0]_num_precharges: 71 RowBuffer[1_0_0]_num_reads: 8192
ThreadScheduler[1_0_1]_breakdown_etc: 3787 ThreadScheduler[1_0_1]_breakdown_run: 46256
ThreadScheduler[1_0_1]_breakdown_dma: 2106 Logic[1_0_1]_active_tasklets_4: 1829
Logic[1_0_1]_active_tasklets_5: 1413 Logic[1_0_1]_active_tasklets_7: 1326
Logic[1_0_1]_active_tasklets_13: 1876 Logic[1_0_1]_active_tasklets_14: 1651
Logic[1_0_1]_active_tasklets_16: 9086 Logic[1_0_1]_active_tasklets_6: 1396
Logic[1_0_1]_active_tasklets_9: 1332 Logic[1_0_1]_logic_cycle: 74529
Logic[1_0_1]_active_tasklets_2: 882 Logic[1_0_1]_active_tasklets_12: 2066
Logic[1_0_1]_active_tasklets_15: 22005 Logic[1_0_1]_active_tasklets_10: 1436
Logic[1_0_1]_active_tasklets_11: 1715 Logic[1_0_1]_active_tasklets_1: 1210
Logic[1_0_1]_num_instructions: 46256 Logic[1_0_1]_active_tasklets_3: 1645
Logic[1_0_1]_active_tasklets_8: 1266 Logic[1_0_1]_backpressure: 22380
Logic[1_0_1]_active_tasklets_0: 22395 CycleRule[1_0_1]_cycle_rule: 17397
MemoryController[1_0_1]_memory_cycle: 447174 MemoryScheduler[1_0_1]_num_fcfs: 8120
RowBuffer[1_0_1]_num_reads: 8192 RowBuffer[1_0_1]_read_bytes: 65536
RowBuffer[1_0_1]_num_activations: 72 RowBuffer[1_0_1]_num_precharges: 71
ThreadScheduler[1_0_2]_breakdown_etc: 3787 ThreadScheduler[1_0_2]_breakdown_run: 46256
ThreadScheduler[1_0_2]_breakdown_dma: 2106 Logic[1_0_2]_active_tasklets_4: 1829
Logic[1_0_2]_active_tasklets_5: 1413 Logic[1_0_2]_active_tasklets_7: 1326
Logic[1_0_2]_active_tasklets_10: 1436 Logic[1_0_2]_active_tasklets_12: 2066
Logic[1_0_2]_active_tasklets_1: 1210 Logic[1_0_2]_active_tasklets_2: 882
Logic[1_0_2]_active_tasklets_0: 22395 Logic[1_0_2]_active_tasklets_3: 1645
Logic[1_0_2]_active_tasklets_8: 1266 Logic[1_0_2]_active_tasklets_6: 1396
Logic[1_0_2]_backpressure: 22380 Logic[1_0_2]_active_tasklets_9: 1332
Logic[1_0_2]_active_tasklets_14: 1651 Logic[1_0_2]_active_tasklets_15: 22005
Logic[1_0_2]_logic_cycle: 74529 Logic[1_0_2]_num_instructions: 46256
Logic[1_0_2]_active_tasklets_16: 9086 Logic[1_0_2]_active_tasklets_11: 1715
Logic[1_0_2]_active_tasklets_13: 1876 CycleRule[1_0_2]_cycle_rule: 17397
MemoryController[1_0_2]_memory_cycle: 447174 MemoryScheduler[1_0_2]_num_fcfs: 8120

RowBuffer[1_0_2]_read_bytes: 65536 RowBuffer[1_0_2]_num_activations: 72
RowBuffer[1_0_2]_num_precharges: 71 RowBuffer[1_0_2]_num_reads: 8192
ThreadScheduler[1_0_3]_breakdown_etc: 3787 ThreadScheduler[1_0_3]_breakdown_run: 46256
ThreadScheduler[1_0_3]_breakdown_dma: 2106 Logic[1_0_3]_active_tasklets_13: 1876
Logic[1_0_3]_active_tasklets_4: 1829 Logic[1_0_3]_active_tasklets_5: 1413
Logic[1_0_3]_active_tasklets_8: 1266 Logic[1_0_3]_logic_cycle: 74529
Logic[1_0_3]_num_instructions: 46256 Logic[1_0_3]_active_tasklets_3: 1645
Logic[1_0_3]_active_tasklets_6: 1396 Logic[1_0_3]_backpressure: 22380
Logic[1_0_3]_active_tasklets_0: 22395 Logic[1_0_3]_active_tasklets_15: 22005
Logic[1_0_3]_active_tasklets_16: 9086 Logic[1_0_3]_active_tasklets_1: 1210
Logic[1_0_3]_active_tasklets_2: 882 Logic[1_0_3]_active_tasklets_7: 1326
Logic[1_0_3]_active_tasklets_9: 1332 Logic[1_0_3]_active_tasklets_10: 1436
Logic[1_0_3]_active_tasklets_11: 1715 Logic[1_0_3]_active_tasklets_12: 2066
Logic[1_0_3]_active_tasklets_14: 1651 CycleRule[1_0_3]_cycle_rule: 17397
MemoryController[1_0_3]_memory_cycle: 447174 MemoryScheduler[1_0_3]_num_fcfs: 8120
RowBuffer[1_0_3]_num_activations: 72 RowBuffer[1_0_3]_num_precharges: 71
RowBuffer[1_0_3]_num_reads: 8192

RowBuffer[1_0_3]_read_bytes: 65536