Report-4

Shantonu Debnath
IIEST, Shibpur

Install ALPHA in Gem5

1. Download Gem5 file with ALPHA:
   https://drive.google.com/file/d/1vCn1MoTMLBI-hO18BtJV6jI214LEfk3U/view
2. First go to new Gem5 file and install ALPHA to use this command:
   build/ALPHA/gem5.opt -j9
3. We are installing alpha for runing –bench command.
4. Now we download benchmarks file to use this link
   https://github.com/timberjack/Project1_SPEC.git
   or, https://github.com/timberjack/Project1_SPEC
5. After download this copy past the file in Gem5 file.
6. Then run this command for run.
   build/ALPHA/gem5.opt configs/example/se.py –bench=namd
7. Successfully run the benchmarks with –bench command and ALPHA machine.

8. Answer:

```
---------- Begin Simulation Statistics ----------
final_tick                                2148839726500                       # Number of ticks from beginning of simulation (restored from checkpoints and never reset)
host_inst_rate                                 2304565                       # Simulator instruction rate (inst/s)
host_mem_usage                                  670396                       # Number of bytes of host memory used
host_op_rate                                   2304565                       # Simulator op (including micro ops) rate (op/s)
host_seconds                                  1864.84                       # Real time elapsed on the host
host_tick_rate                             1152288904                       # Simulator tick rate (ticks/s)
sim_freq                                 1000000000000                       # Frequency of simulated ticks
sim_insts                                   4297655713                       # Number of instructions simulated
sim_ops                                     4297655713                       # Number of ops (including micro ops) simulated
sim_seconds                                   2.148840                       # Number of seconds simulated
sim_ticks                                2148839726500                       # Number of ticks simulated
```

system.cpu.Branches 547769943 # Number of branches fetched
system.cpu.committedInsts 4297655713 # Number of instructions committed
system.cpu.committedOps 4297655713 # Number of ops (including micro ops) committed
system.cpu.dtb.data_accesses 1125530860 # DTB accesses
system.cpu.dtb.data_acv 0 # DTB access violations
system.cpu.dtb.data_hits 1125507164 # DTB hits
system.cpu.dtb.data_misses 23696 # DTB misses
system.cpu.dtb.fetch_accesses 0 # ITB accesses
system.cpu.dtb.fetch_acv 0 # ITB acv
system.cpu.dtb.fetch_hits 0 # ITB hits
system.cpu.dtb.fetch_misses 0 # ITB misses
system.cpu.dtb.read_accesses 919357413 # DTB read accesses
system.cpu.dtb.read_acv 0 # DTB read access violations
system.cpu.dtb.read_hits 919341118 # DTB read hits
system.cpu.dtb.read_misses 16295 # DTB read misses
system.cpu.dtb.write_accesses 206173447 # DTB write accesses
system.cpu.dtb.write_acv 0 # DTB write access violations
system.cpu.dtb.write_hits 206166046 # DTB write hits
system.cpu.dtb.write_misses 7401 # DTB write misses
system.cpu.idle_fraction 0.000000 # Percentage of idle cycles
system.cpu.itb.data_accesses 0 # DTB accesses
system.cpu.itb.data_acv 0 # DTB access violations
system.cpu.itb.data_hits 0 # DTB hits
system.cpu.itb.data_misses 0 # DTB misses
system.cpu.itb.fetch_accesses 4297679454 # ITB accesses
system.cpu.itb.fetch_acv 0 # ITB acv
system.cpu.itb.fetch_hits 4297679409 # ITB hits
system.cpu.itb.fetch_misses 45 # ITB misses
system.cpu.itb.read_accesses 0 # DTB read accesses
system.cpu.itb.read_acv 0 # DTB read access violations
system.cpu.itb.read_hits 0 # DTB read hits
system.cpu.itb.read_misses 0 # DTB read misses
system.cpu.itb.write_accesses 0 # DTB write accesses
system.cpu.itb.write_acv 0 # DTB write access violations
system.cpu.itb.write_hits 0 # DTB write hits

system.cpu.itb.write_misses 0 # DTB write misses
system.cpu.not_idle_fraction 1.000000 # Percentage of non-idle cycles
system.cpu.numCycles 4297679454 # number of cpu cycles simulated
system.cpu.numWorkItemsCompleted 0 # number of work items this cpu completed
system.cpu.numWorkItemsStarted 0 # number of work items this cpu started
system.cpu.num_busy_cycles 4297679453.998000 # Number of busy cycles
system.cpu.num_conditional_control_insts 466435113 # number of instructions that are conditional controls
system.cpu.num_fp_alu_accesses 1463866422 # Number of float alu accesses
system.cpu.num_fp_insts 1463866422 # number of float instructions
system.cpu.num_fp_register_reads 1960764606 # number of times the floating registers were read
system.cpu.num_fp_register_writes 1350308664 # number of times the floating registers were written
system.cpu.num_func_calls 29720310 # number of times a function call or return occured
system.cpu.num_idle_cycles 0.002000 # Number of idle cycles
system.cpu.num_int_alu_accesses 3177594591 # Number of integer alu accesses
system.cpu.num_int_insts 3177594591 # number of integer instructions
system.cpu.num_int_register_reads 4259086606 # number of times the integer registers were read
system.cpu.num_int_register_writes 2168009366 # number of times the integer registers were written
system.cpu.num_load_insts 919357413 # Number of load instructions
system.cpu.num_mem_refs 1125530860 # number of memory refs
system.cpu.num_store_insts 206173447 # Number of store instructions
system.cpu.num_vec_alu_accesses 0 # Number of vector alu accesses
system.cpu.num_vec_insts 0 # number of vector instructions
system.cpu.num_vec_register_reads 0 # number of times the vector registers were read

system.cpu.num_vec_register_writes 0 # number of times the vector registers were written
system.cpu.op_class::No_OpClass 40258538 0.94% 0.94% # Class of executed instruction
system.cpu.op_class::IntAlu 2099591144 48.85% 49.79% # Class of executed instruction
system.cpu.op_class::IntMult 3945352 0.09% 49.88% # Class of executed instruction
system.cpu.op_class::IntDiv 0 0.00% 49.88% # Class of executed instruction
system.cpu.op_class::FloatAdd 615847451 14.33% 64.21% # Class of executed instruction
system.cpu.op_class::FloatCmp 102426638 2.38% 66.60% # Class of executed instruction
system.cpu.op_class::FloatCvt 783766 0.02% 66.61% # Class of executed instruction
system.cpu.op_class::FloatMult 307613249 7.16% 73.77% # Class of executed instruction
system.cpu.op_class::FloatMultAcc 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::FloatDiv 14296 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::FloatMisc 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::FloatSqrt 257 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdAdd 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdAddAcc 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdAlu 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdCmp 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdCvt 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdMisc 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdMult 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdMultAcc 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdShift 0 0.00% 73.77% # Class of executed instruction

system.cpu.op_class::SimdShiftAcc 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdDiv 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdSqrt 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdFloatAdd 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdFloatAlu 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdFloatCmp 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdFloatCvt 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdFloatDiv 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdFloatMisc 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdFloatMult 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdFloatMultAcc 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdFloatSqrt 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdReduceAdd 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdReduceAlu 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdReduceCmp 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdFloatReduceAdd 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdFloatReduceCmp 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdAes 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdAesMix 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdSha1Hash 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdSha1Hash2 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdSha256Hash 0 0.00% 73.77% # Class of executed instruction

system.cpu.op_class::SimdSha256Hash2 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdShaSigma2 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdShaSigma3 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::SimdPredAlu 0 0.00% 73.77% # Class of executed instruction
system.cpu.op_class::MemRead 494965373 11.52% 85.29% # Class of executed instruction
system.cpu.op_class::MemWrite 195052580 4.54% 89.83% # Class of executed instruction
system.cpu.op_class::FloatMemRead 426059896 9.91% 99.74% # Class of executed instruction
system.cpu.op_class::FloatMemWrite 11120869 0.26% 100.00% # Class of executed instruction
system.cpu.op_class::IprAccess 0 0.00% 100.00% # Class of executed instruction
system.cpu.op_class::InstPrefetch 0 0.00% 100.00% # Class of executed instruction
system.cpu.op_class::total 4297679409 # Class of executed instruction
system.cpu.workload.numSyscalls 1055 # Number of system calls
system.membus.snoop_filter.hit_multi_requests 0 # Number of requests hitting in the snoop filter with multiple (>1) holders of the requested data.
system.membus.snoop_filter.hit_multi_snoops 0 # Number of snoops hitting in the snoop filter with multiple (>1) holders of the requested data.
system.membus.snoop_filter.hit_single_requests 0 # Number of requests hitting in the snoop filter with a single holder of the requested data.
system.membus.snoop_filter.hit_single_snoops 0 # Number of snoops hitting in the snoop filter with a single holder of the requested data.
system.membus.snoop_filter.tot_requests 0 # Total number of requests made to the snoop filter.
system.membus.snoop_filter.tot_snoops 0 # Total number of snoops made to the snoop filter.
system.membus.pwrStateResidencyTicks::UNDEFINED 2148839726500
Cumulative time (in ticks) in various power states
system.membus.trans_dist::ReadReq 5215352671 # Transaction distribution
system.membus.trans_dist::ReadResp 5217020527 # Transaction distribution
system.membus.trans_dist::WriteReq 204498190 # Transaction distribution

system.membus.trans_dist::WriteResp 204498190 # Transaction distribution
system.membus.trans_dist::LoadLockedReq 1667856 # Transaction distribution
system.membus.trans_dist::StoreCondReq 1667856 # Transaction distribution
system.membus.trans_dist::StoreCondResp 1667856 # Transaction distribution
system.membus.pkt_count_system.cpu.icache_port::system.mem_ctrls.port 8595358818 # Packet count per connected master and slave (bytes)
system.membus.pkt_count_system.cpu.dcache_port::system.mem_ctrls.port 2251014328 # Packet count per connected master and slave (bytes)
system.membus.pkt_count::total 10846373146 # Packet count per connected master and slave (bytes)
system.membus.pkt_size_system.cpu.icache_port::system.mem_ctrls.port 17190717636 # Cumulative packet size per connected master and slave (bytes)
system.membus.pkt_size_system.cpu.dcache_port::system.mem_ctrls.port 7920399347 # Cumulative packet size per connected master and slave (bytes)
system.membus.pkt_size::total 25111116983 # Cumulative packet size per connected master and slave (bytes)
system.membus.snoops 0 # Total snoops (count)
system.membus.snoopTraffic 0 # Total snoop traffic (bytes)
system.membus.snoop_fanout::samples 5423186573 # Request fanout histogram
system.membus.snoop_fanout::mean 0 # Request fanout histogram
system.membus.snoop_fanout::stdev 0 # Request fanout histogram
system.membus.snoop_fanout::underflows 0 0.00% 0.00% # Request fanout histogram
system.membus.snoop_fanout::0 5423186573 100.00% 100.00% # Request fanout histogram
system.membus.snoop_fanout::1 0 0.00% 100.00% # Request fanout histogram
system.membus.snoop_fanout::overflows 0 0.00% 100.00% # Request fanout histogram
system.membus.snoop_fanout::min_value 0 # Request fanout histogram
system.membus.snoop_fanout::max_value 0 # Request fanout histogram
system.membus.snoop_fanout::total 5423186573 # Request fanout histogram

system.voltage_domain.voltage 1 # Voltage in Volts
system.clk_domain.clock 1000 # Clock period in ticks
system.cpu_voltage_domain.voltage 1 # Voltage in Volts
system.mem_ctrls.pwrStateResidencyTicks::UNDEFINED 2148839726500
Cumulative time (in ticks) in various power states
system.mem_ctrls.bytes_read::.cpu.inst 17190717636 # Number of
bytes read from this memory
system.mem_ctrls.bytes_read::.cpu.data 6404316561 # Number of
bytes read from this memory
system.mem_ctrls.bytes_read::total 23595034197 # Number of
bytes read from this memory
system.mem_ctrls.bytes_inst_read::.cpu.inst 17190717636 # Number
of instructions bytes read from this memory
system.mem_ctrls.bytes_inst_read::total 17190717636 # Number of
instructions bytes read from this memory
system.mem_ctrls.bytes_written::.cpu.data 1516082786 # Number of
bytes written to this memory
system.mem_ctrls.bytes_written::total 1516082786 # Number of
bytes written to this memory
system.mem_ctrls.num_reads::.cpu.inst 4297679409 # Number of
read requests responded to by this memory
system.mem_ctrls.num_reads::.cpu.data 919341118 # Number of
read requests responded to by this memory
system.mem_ctrls.num_reads::total 5217020527 # Number of
read requests responded to by this memory
system.mem_ctrls.num_writes::.cpu.data 206166046 # Number of
write requests responded to by this memory
system.mem_ctrls.num_writes::total 206166046 # Number of
write requests responded to by this memory
system.mem_ctrls.bw_read::.cpu.inst 7999999918 # Total read
bandwidth from this memory (bytes/s)
system.mem_ctrls.bw_read::.cpu.data 2980360276 # Total read
bandwidth from this memory (bytes/s)
system.mem_ctrls.bw_read::total 10980360194 # Total read
bandwidth from this memory (bytes/s)
system.mem_ctrls.bw_inst_read::.cpu.inst 7999999918 # Instruction
read bandwidth from this memory (bytes/s)
system.mem_ctrls.bw_inst_read::total 7999999918 # Instruction
read bandwidth from this memory (bytes/s)
system.mem_ctrls.bw_write::.cpu.data 705535535 # Write
bandwidth from this memory (bytes/s)
system.mem_ctrls.bw_write::total 705535535 # Write bandwidth
from this memory (bytes/s)
system.mem_ctrls.bw_total::.cpu.inst 7999999918 # Total
bandwidth to/from this memory (bytes/s)

system.mem_ctrls.bw_total::.cpu.data 3685895811 # Total bandwidth to/from this memory (bytes/s)
system.mem_ctrls.bw_total::total 11685895729 # Total bandwidth to/from this memory (bytes/s)
system.mem_ctrls.priorityMinLatency 0.000000000000 # per QoS priority minimum request to response latency (s)
system.mem_ctrls.priorityMaxLatency 0.000000000000 # per QoS priority maximum request to response latency (s)
system.mem_ctrls.numReadWriteTurnArounds 0 # Number of turnarounds from READ to WRITE
system.mem_ctrls.numWriteReadTurnArounds 0 # Number of turnarounds from WRITE to READ
system.mem_ctrls.numStayReadState 0 # Number of times bus staying in READ state
system.mem_ctrls.numStayWriteState 0 # Number of times bus staying in WRITE state
system.mem_ctrls.readReqs 0 # Number of read requests accepted
system.mem_ctrls.writeReqs 0 # Number of write requests accepted
system.mem_ctrls.readBursts 0 # Number of DRAM read bursts, including those serviced by the write queue
system.mem_ctrls.writeBursts 0 # Number of DRAM write bursts, including those merged in the write queue
system.mem_ctrls.servicedByWrQ 0 # Number of DRAM read bursts serviced by the write queue
system.mem_ctrls.mergedWrBursts 0 # Number of DRAM write bursts merged with an existing one
system.mem_ctrls.neitherReadNorWriteReqs 0 # Number of requests that are neither read nor write
system.mem_ctrls.perBankRdBursts::0 0 # Per bank write bursts
system.mem_ctrls.perBankRdBursts::1 0 # Per bank write bursts
system.mem_ctrls.perBankRdBursts::2 0 # Per bank write bursts
system.mem_ctrls.perBankRdBursts::3 0 # Per bank write bursts
system.mem_ctrls.perBankRdBursts::4 0 # Per bank write bursts
system.mem_ctrls.perBankRdBursts::5 0 # Per bank write bursts
system.mem_ctrls.perBankRdBursts::6 0 # Per bank write bursts

system.mem_ctrls.perBankRdBursts::7 0 # Per bank write bursts
system.mem_ctrls.perBankRdBursts::8 0 # Per bank write bursts
system.mem_ctrls.perBankRdBursts::9 0 # Per bank write bursts
system.mem_ctrls.perBankRdBursts::10 0 # Per bank write bursts
system.mem_ctrls.perBankRdBursts::11 0 # Per bank write bursts
system.mem_ctrls.perBankRdBursts::12 0 # Per bank write bursts
system.mem_ctrls.perBankRdBursts::13 0 # Per bank write bursts
system.mem_ctrls.perBankRdBursts::14 0 # Per bank write bursts
system.mem_ctrls.perBankRdBursts::15 0 # Per bank write bursts
system.mem_ctrls.perBankWrBursts::0 0 # Per bank write bursts
system.mem_ctrls.perBankWrBursts::1 0 # Per bank write bursts
system.mem_ctrls.perBankWrBursts::2 0 # Per bank write bursts
system.mem_ctrls.perBankWrBursts::3 0 # Per bank write bursts
system.mem_ctrls.perBankWrBursts::4 0 # Per bank write bursts
system.mem_ctrls.perBankWrBursts::5 0 # Per bank write bursts
system.mem_ctrls.perBankWrBursts::6 0 # Per bank write bursts
system.mem_ctrls.perBankWrBursts::7 0 # Per bank write bursts
system.mem_ctrls.perBankWrBursts::8 0 # Per bank write bursts
system.mem_ctrls.perBankWrBursts::9 0 # Per bank write bursts
system.mem_ctrls.perBankWrBursts::10 0 # Per bank write bursts
system.mem_ctrls.perBankWrBursts::11 0 # Per bank write bursts
system.mem_ctrls.perBankWrBursts::12 0 # Per bank write bursts

system.mem_ctrls.perBankWrBursts::13 0 # Per bank write bursts
system.mem_ctrls.perBankWrBursts::14 0 # Per bank write bursts
system.mem_ctrls.perBankWrBursts::15 0 # Per bank write bursts
system.mem_ctrls.avgRdQLen 0.00 # Average read queue length when enqueuing
system.mem_ctrls.avgWrQLen 0.00 # Average write queue length when enqueuing
system.mem_ctrls.totQLat 0 # Total ticks spent queuing
system.mem_ctrls.totBusLat 0 # Total ticks spent in databus transfers
system.mem_ctrls.totMemAccLat 0 # Total ticks spent from burst creation until serviced by the DRAM
system.mem_ctrls.avgQLat nan # Average queueing delay per DRAM burst
system.mem_ctrls.avgBusLat nan # Average bus latency per DRAM burst
system.mem_ctrls.avgMemAccLat nan # Average memory access latency per DRAM burst
system.mem_ctrls.numRdRetry 0 # Number of times read queue was full causing retry
system.mem_ctrls.numWrRetry 0 # Number of times write queue was full causing retry
system.mem_ctrls.readRowHits 0 # Number of row buffer hits during reads
system.mem_ctrls.writeRowHits 0 # Number of row buffer hits during writes
system.mem_ctrls.readRowHitRate nan # Row buffer hit rate for reads
system.mem_ctrls.writeRowHitRate nan # Row buffer hit rate for writes
system.mem_ctrls.readPktSize::0 0 # Read request sizes (log2)
system.mem_ctrls.readPktSize::1 0 # Read request sizes (log2)
system.mem_ctrls.readPktSize::2 0 # Read request sizes (log2)
system.mem_ctrls.readPktSize::3 0 # Read request sizes (log2)
system.mem_ctrls.readPktSize::4 0 # Read request sizes (log2)

system.mem_ctrls.readPktSize::5 0 # Read request sizes (log2)
system.mem_ctrls.readPktSize::6 0 # Read request sizes (log2)
system.mem_ctrls.writePktSize::0 0 # Write request sizes (log2)
system.mem_ctrls.writePktSize::1 0 # Write request sizes (log2)
system.mem_ctrls.writePktSize::2 0 # Write request sizes (log2)
system.mem_ctrls.writePktSize::3 0 # Write request sizes (log2)
system.mem_ctrls.writePktSize::4 0 # Write request sizes (log2)
system.mem_ctrls.writePktSize::5 0 # Write request sizes (log2)
system.mem_ctrls.writePktSize::6 0 # Write request sizes (log2)
system.mem_ctrls.rdQLenPdf::0 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::1 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::2 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::3 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::4 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::5 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::6 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::7 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::8 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::9 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::10 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::11 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::12 0 # What read queue length does an incoming req see

system.mem_ctrls.rdQLenPdf::13 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::14 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::15 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::16 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::17 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::18 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::19 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::20 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::21 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::22 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::23 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::24 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::25 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::26 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::27 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::28 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::29 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::30 0 # What read queue length does an incoming req see
system.mem_ctrls.rdQLenPdf::31 0 # What read queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::0 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::1 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::2 0 # What write queue length does an incoming req see

system.mem_ctrls.wrQLenPdf::3 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::4 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::5 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::6 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::7 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::8 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::9 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::10 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::11 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::12 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::13 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::14 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::15 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::16 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::17 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::18 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::19 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::20 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::21 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::22 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::23 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::24 0 # What write queue length does an incoming req see

system.mem_ctrls.wrQLenPdf::25 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::26 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::27 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::28 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::29 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::30 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::31 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::32 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::33 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::34 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::35 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::36 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::37 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::38 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::39 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::40 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::41 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::42 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::43 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::44 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::45 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::46 0 # What write queue length does an incoming req see

system.mem_ctrls.wrQLenPdf::47 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::48 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::49 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::50 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::51 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::52 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::53 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::54 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::55 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::56 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::57 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::58 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::59 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::60 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::61 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::62 0 # What write queue length does an incoming req see
system.mem_ctrls.wrQLenPdf::63 0 # What write queue length does an incoming req see
system.mem_ctrls.bytesReadDRAM 0 # Total number of bytes read from DRAM
system.mem_ctrls.bytesReadWrQ 0 # Total number of bytes read from write queue
system.mem_ctrls.bytesWritten 0 # Total number of bytes written to DRAM
system.mem_ctrls.bytesReadSys 0 # Total read bytes from the system interface side
system.mem_ctrls.bytesWrittenSys 0 # Total written bytes from the system interface side

system.mem_ctrls.avgRdBW 0.00 # Average DRAM read bandwidth in MiByte/s
system.mem_ctrls.avgWrBW 0.00 # Average achieved write bandwidth in MiByte/s
system.mem_ctrls.avgRdBWSys 0.00 # Average system read bandwidth in MiByte/s
system.mem_ctrls.avgWrBWSys 0.00 # Average system write bandwidth in MiByte/s
system.mem_ctrls.peakBW 12800.00 # Theoretical peak bandwidth in MiByte/s
system.mem_ctrls.busUtil 0.00 # Data bus utilization in percentage
system.mem_ctrls.busUtilRead 0.00 # Data bus utilization in percentage for reads
system.mem_ctrls.busUtilWrite 0.00 # Data bus utilization in percentage for writes
system.mem_ctrls.totGap 0 # Total gap between requests
system.mem_ctrls.avgGap nan # Average gap between requests
system.mem_ctrls.pageHitRate nan # Row buffer hit rate, read and write combined
system.mem_ctrls.rank1.actEnergy 0 # Energy for activate commands per rank (pJ)
system.mem_ctrls.rank1.preEnergy 0 # Energy for precharge commands per rank (pJ)
system.mem_ctrls.rank1.readEnergy 0 # Energy for read commands per rank (pJ)
system.mem_ctrls.rank1.writeEnergy 0 # Energy for write commands per rank (pJ)
system.mem_ctrls.rank1.refreshEnergy 0 # Energy for refresh commands per rank (pJ)
system.mem_ctrls.rank1.actBackEnergy 0 # Energy for active background per rank (pJ)
system.mem_ctrls.rank1.preBackEnergy 825154455360 # Energy for precharge background per rank (pJ)
system.mem_ctrls.rank1.actPowerDownEnergy 0 # Energy for active power-down per rank (pJ)
system.mem_ctrls.rank1.prePowerDownEnergy 0 # Energy for precharge power-down per rank (pJ)
system.mem_ctrls.rank1.selfRefreshEnergy 0 # Energy for self refresh per rank (pJ)
system.mem_ctrls.rank1.totalEnergy 825154455360 # Total energy per rank (pJ)

system.mem_ctrls.rank1.averagePower 384.000000 # Core power per rank (mW)
system.mem_ctrls.rank1.totalIdleTime 0 # Total Idle time Per DRAM Rank
system.mem_ctrls.rank1.memoryStateTime::IDLE 2148839726500 # Time in different power states
system.mem_ctrls.rank1.memoryStateTime::REF 0 # Time in different power states
system.mem_ctrls.rank1.memoryStateTime::SREF 0 # Time in different power states
system.mem_ctrls.rank1.memoryStateTime::PRE_PDN 0 # Time in different power states
system.mem_ctrls.rank1.memoryStateTime::ACT 0 # Time in different power states
system.mem_ctrls.rank1.memoryStateTime::ACT_PDN 0 # Time in different power states
system.mem_ctrls.rank0.actEnergy 0 # Energy for activate commands per rank (pJ)
system.mem_ctrls.rank0.preEnergy 0 # Energy for precharge commands per rank (pJ)
system.mem_ctrls.rank0.readEnergy 0 # Energy for read commands per rank (pJ)
system.mem_ctrls.rank0.writeEnergy 0 # Energy for write commands per rank (pJ)
system.mem_ctrls.rank0.refreshEnergy 0 # Energy for refresh commands per rank (pJ)
system.mem_ctrls.rank0.actBackEnergy 0 # Energy for active background per rank (pJ)
system.mem_ctrls.rank0.preBackEnergy 825154455360 # Energy for precharge background per rank (pJ)
system.mem_ctrls.rank0.actPowerDownEnergy 0 # Energy for active power-down per rank (pJ)
system.mem_ctrls.rank0.prePowerDownEnergy 0 # Energy for precharge power-down per rank (pJ)
system.mem_ctrls.rank0.selfRefreshEnergy 0 # Energy for self refresh per rank (pJ)
system.mem_ctrls.rank0.totalEnergy 825154455360 # Total energy per rank (pJ)
system.mem_ctrls.rank0.averagePower 384.000000 # Core power per rank (mW)
system.mem_ctrls.rank0.totalIdleTime 0 # Total Idle time Per DRAM Rank
system.mem_ctrls.rank0.memoryStateTime::IDLE 2148839726500 # Time in different power states

system.mem_ctrls.rank0.memoryStateTime::REF 0 # Time in different power states
system.mem_ctrls.rank0.memoryStateTime::SREF 0 # Time in different power states
system.mem_ctrls.rank0.memoryStateTime::PRE_PDN 0 # Time in different power states
system.mem_ctrls.rank0.memoryStateTime::ACT 0 # Time in different power states
system.mem_ctrls.rank0.memoryStateTime::ACT_PDN 0 # Time in different power states
system.cpu_clk_domain.clock 500 # Clock period in ticks
system.cpu.numPwrStateTransitions 1 # Number of power state transitions
system.cpu.pwrStateResidencyTicks::ON 2148839726500 # Cumulative time (in ticks) in various power states

---------- End Simulation Statistics ----------