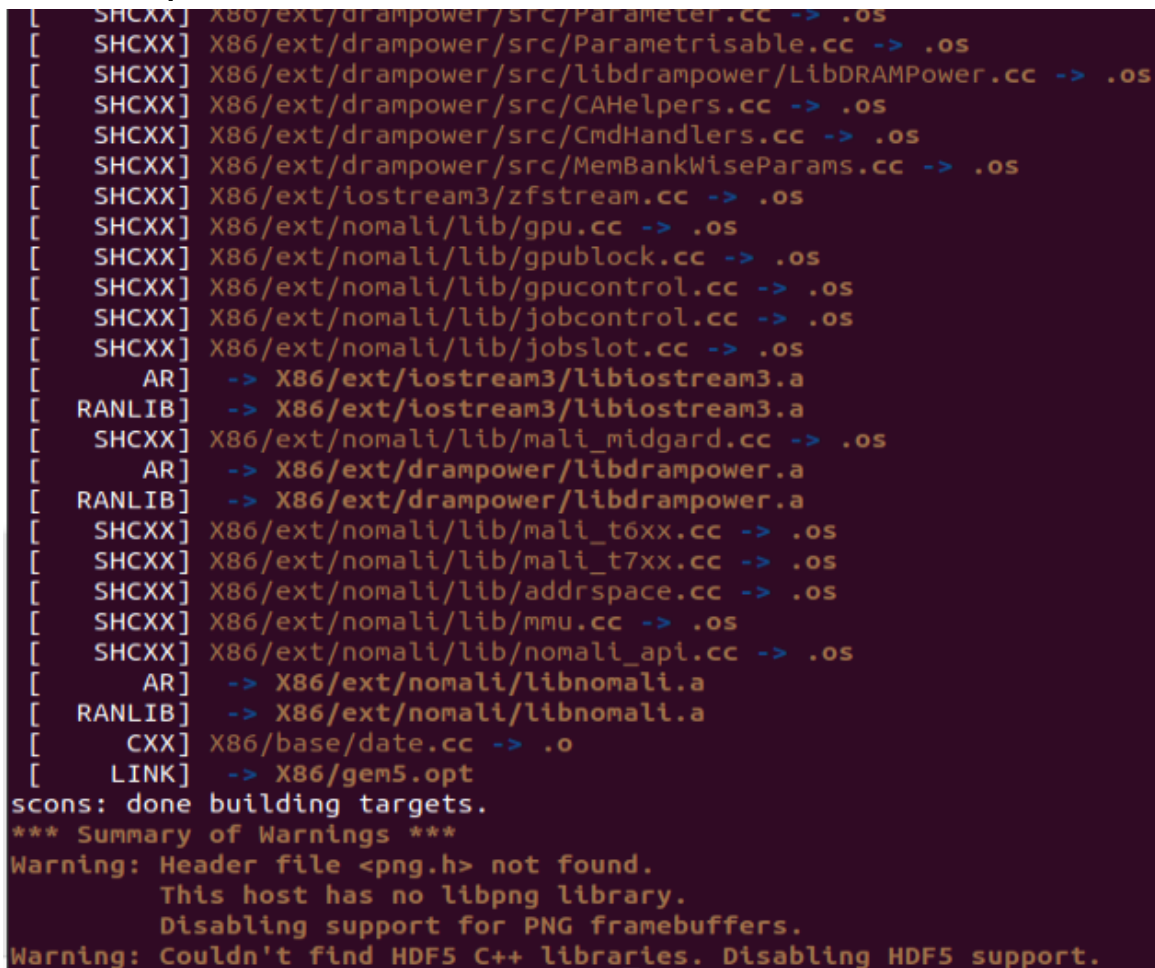


Laurence Kim
ELEN 511 - Advanced Computer Architecture
ASSIGNMENT #1 GEM 5
Prof. Hoesek Yang
Santa Clara University
Fall Quarter 2022

Homework #1

Part 0 - setup:



```
[ SHCXX] X86/ext/drapower/src/Parameter.cc -> .os
[ SHCXX] X86/ext/drapower/src/Parametrisable.cc -> .os
[ SHCXX] X86/ext/drapower/src/libdrampower/LibDRAMPower.cc -> .os
[ SHCXX] X86/ext/drapower/src/CAHelpers.cc -> .os
[ SHCXX] X86/ext/drapower/src/CmdHandlers.cc -> .os
[ SHCXX] X86/ext/drapower/src/MemBankWiseParams.cc -> .os
[ SHCXX] X86/ext/iostream3/zfstream.cc -> .os
[ SHCXX] X86/ext/nomali/lib/gpu.cc -> .os
[ SHCXX] X86/ext/nomali/lib/gpublock.cc -> .os
[ SHCXX] X86/ext/nomali/lib/gpucontrol.cc -> .os
[ SHCXX] X86/ext/nomali/lib/jobcontrol.cc -> .os
[ SHCXX] X86/ext/nomali/lib/jobslot.cc -> .os
[ AR] -> X86/ext/iostream3/libiostream3.a
[ RANLIB] -> X86/ext/iostream3/libiostream3.a
[ SHCXX] X86/ext/nomali/lib/mali_midgard.cc -> .os
[ AR] -> X86/ext/drapower/libdrampower.a
[ RANLIB] -> X86/ext/drapower/libdrampower.a
[ SHCXX] X86/ext/nomali/lib/mali_t6xx.cc -> .os
[ SHCXX] X86/ext/nomali/lib/mali_t7xx.cc -> .os
[ SHCXX] X86/ext/nomali/lib/addrspace.cc -> .os
[ SHCXX] X86/ext/nomali/lib/mmu.cc -> .os
[ SHCXX] X86/ext/nomali/lib/nomali_api.cc -> .os
[ AR] -> X86/ext/nomali/libnomali.a
[ RANLIB] -> X86/ext/nomali/libnomali.a
[ CXX] X86/base/date.cc -> .o
[ LINK] -> X86/gem5.opt
scons: done building targets.
*** Summary of Warnings ***
Warning: Header file <png.h> not found.
This host has no libpng library.
Disabling support for PNG framebuffers.
Warning: Couldn't find HDF5 C++ libraries. Disabling HDF5 support.
```

I first started off by downloading virtualbox and had to build an image twice because the first one did not have enough disk drive to properly run Ubuntu and gem5. Furthermore, everything was fairly seamless other than the actual build command which required me to think outside the box and experiment with how to make scons work for my system. Ultimately, I was able to build gem5 as seen in the screenshot above.

Part 1 - creating a simple configuration:

```

lkin@lkin-VirtualBox: ~/Desktop$ cd gems
lkin@lkin-VirtualBox: ~/Desktop/gem5$ build/X86/gem5.opt configs/tutorial/part1/simple.py
gem5 Simulator System.  https://www.gem5.org
gem5 is copyrighted software; use the --copyright option for details.

gem5 version 22.0.0.2
gem5 compiled Nov 10 2022 21:46:19
gem5 started Nov 11 2022 01:41:38
gem5 executing on lkin-VirtualBox, pid 3751
command line: build/X86/gem5.opt configs/tutorial/part1/simple.py

Global frequency set at 1000000000000 ticks per second
warn: No dot file generated. Please install pydot to generate the dot file and pdf.
build/X86/mem/dram_interface.cc:690: warn: DRAM device capacity (8192 Mbytes) does not match the address range assigned (512 Mbytes)
0: system.remote_gdb: listening for remote gdb on port 7000
Beginning simulation!
build/X86/sim/simulate.cc:194: info: Entering event queue @ 0. Starting simulation...
Hello world!
Exiting @ tick 454646000 because exiting with last active thread context
lkin@lkin-VirtualBox: ~/Desktop/gem5$ 

```

This portion was fairly simple as the documentation was very procedural and was informative because it explained the purpose of each parameter that composed of our simple configuration.

Part 2 - Write and run your own test application:

Configuration 3:

```

system.clk_domain.clock = '1GHz'
system.cpu = TimingSimpleCPU()
system.mem_ctrl.dram = DDR3_1600_8x8()

```

```

Returning '/home/lkin/Desktop/gem5/configs/tutorial/part1/sieveofe.o'
build/X86/sim/syscall_emul.cc:74: warn: ignoring syscall mprotect(...)
78498
Exiting @ tick 2904978744369 because exiting with last active thread context
lkin@lkin-VirtualBox: ~/Desktop/gem5$ build/X86/gem5.opt configs/tutorial/part1/simple.py
gem5 Simulator System.  https://www.gem5.org
gem5 is copyrighted software; use the --copyright option for details.

gem5 version 22.0.0.2
gem5 compiled Nov 11 2022 14:52:49
gem5 started Nov 11 2022 15:53:00
gem5 executing on lkin-VirtualBox, pid 10514
command line: build/X86/gem5.opt configs/tutorial/part1/simple.py

Global frequency set at 1000000000000 ticks per second
warn: No dot file generated. Please install pydot to generate the dot file and pdf.
build/X86/mem/dram_interface.cc:690: warn: DRAM device capacity (8192 Mbytes) does not match the address range assigned (512 Mbytes)
0: system.remote_gdb: listening for remote gdb on port 7002
Beginning simulation!
build/X86/sim/simulate.cc:194: info: Entering event queue @ 0. Starting simulation...
build/X86/sim/syscall_emul.cc:74: warn: ignoring syscall set_robust_list(...)
build/X86/sim/syscall_emul.cc:74: warn: ignoring syscall rseq(...)
build/X86/sim/mem_state.cc:443: info: Increasing stack size by one page.
build/X86/sim/syscall_emul.hh:1015: warn: readlink() called on '/proc/self/exe' may yield unexpected results in various settings.
Returning '/home/lkin/Desktop/gem5/configs/tutorial/part1/sieveofe.o'
build/X86/sim/syscall_emul.cc:74: warn: ignoring syscall mprotect(...)
78498
Exiting @ tick 3397563657000 because exiting with last active thread context
lkin@lkin-VirtualBox: ~/Desktop/gem5$ 

```

This portion of the assignment required me to understand how the algorithm which is called Shiva veritas the knees Works. After having done so I created a C program that takes a integer and I'll puts the number of prime numbers from zero up to that and put it in a jar, implementing

this portion of my own test application required me to understand the compilation of test applications, and end where it applies in comparison to the program in build.

Part 3 - Analyze the statistics:

The statistics show a plethora of relevant CPU statistics. And the statistics range from a number of arithmetic logic. Unit axis is whether those are for integers, floats, vectors. I was looking for relevant cash information, but was not able to find any. The closest thing to some resemblance of a cash was a TLB. there were statistics referring to the translation lookaside buffer, those being accesses/ misses on read/write requests.

Part 4 - Alternative Configurations:

Configuration 4.1:

system.clk_domain.clock = '1GHz'

system.cpu = X86O3CPU()

system.mem_ctrl.dram = DDR3_1600_8x8()

```
build/X86/python/m5/main.py(434): main
lkin@lkin-VirtualBox:~/Desktop/gem5$ build/X86/gem5.opt configs/tutorial/part1/simple.py
gem5 Simulator System.  https://www.gem5.org
gem5 is copyrighted software; use the --copyright option for details.

gem5 version 22.0.0.2
gem5 compiled Nov 11 2022 14:52:49
gem5 started Nov 11 2022 16:42:56
gem5 executing on lkin-VirtualBox, pid 11209
command line: build/X86/gem5.opt configs/tutorial/part1/simple.py

Global frequency set at 1000000000000 ticks per second
warn: No dot file generated. Please install pydot to generate the dot file and pdf.
build/X86/mem/dram_interface.cc:690: warn: DRAM device capacity (8192 Mbytes) does not match the address range assigned (512 Mbytes)
0: system.remote_gdb: listening for remote gdb on port 7002
Beginning simulation!
build/X86/sim/simulate.cc:194: info: Entering event queue @ 0. Starting simulation...
build/X86/arch/x86/cpuid.cc:180: warn: x86 cpuid family 0x0000: unimplemented function 13
build/X86/arch/x86/cpuid.cc:180: warn: x86 cpuid family 0x0000: unimplemented function 20
build/X86/arch/x86/cpuid.cc:180: warn: x86 cpuid family 0x0000: unimplemented function 25
build/X86/sim/syscall_emul.cc:74: warn: ignoring syscall set_robust_list(...)
build/X86/sim/syscall_emul.cc:74: warn: ignoring syscall rseq(...)
build/X86/sim/mem_state.cc:443: info: Increasing stack size by one page.
build/X86/sim/syscall_emul.hh:1015: warn: readlink() called on '/proc/self/exe' may yield unexpected results in various settings.
Returning '/home/lkin/Desktop/gem5/configs/tutorial/part1/sieveofe.o'
build/X86/sim/syscall_emul.cc:74: warn: ignoring syscall mprotect(...)
78498
Exiting @ tick 495887903000 because exiting with last active thread context
lkin@lkin-VirtualBox:~/Desktop/gem5$
```

We can expect a lot of changes and we did see many changes as the actual cpu was interchanged with a different processor. We can see that for this configuration the simulation time was MUCH faster. With a time of 0.49 from the last 3.39 seconds. This makes sense as when we pull up the tlb accesses, we can read,

```
system.cpu.mmu.itb.rdAccesses          0
# TLB accesses on read requests (Count)
system.cpu.mmu.itb.wrAccesses          6497328
# TLB accesses on write requests (Count)
system.cpu.mmu.itb.rdMisses            0
# TLB misses on read requests (Count)
```

```
system.cpu.mmu.itb.wrMisses 93
# TLB misses on write requests (Count)
```

Versus the original

```
system.cpu.mmu.itb.rdAccesses 0
# TLB accesses on read requests (Count)
system.cpu.mmu.itb.wrAccesses 47529643
# TLB accesses on write requests (Count)
system.cpu.mmu.itb.rdMisses 0
# TLB misses on read requests (Count)
system.cpu.mmu.itb.wrMisses 56
# TLB misses on write requests (Count)
```

We observe that there is a huge difference in the number of accesses in the itb by almost a magnitude as there were 47.5 million accesses versus the new 6 million access reads. This could result in how the simulation time was also drastically reduced.

Configuration 4.2:

```
system.clk_domain.clock = '3GHz'
system.cpu = TimingSimpleCPU()
system.mem_ctrl.dram = DDR3_1600_8x8()
```

```
build/X86/sim/syscall_emul.cc:74: warn: ignoring syscall mprotect(...)
78498
Exiting @ tick 3397563657000 because exiting with last active thread context
lkim@lkim-VirtualBox:~/Desktop/gem5$ build/X86/gem5.opt configs/tutorial/part1/simple.py
gem5 Simulator System. https://www.gem5.org
gem5 is copyrighted software; use the --copyright option for details.

gem5 version 22.0.0.2
gem5 compiled Nov 11 2022 14:52:49
gem5 started Nov 11 2022 15:57:49
gem5 executing on lkim-VirtualBox, pid 10596
command line: build/X86/gem5.opt configs/tutorial/part1/simple.py

Global frequency set at 1000000000000 ticks per second
warn: No dot file generated. Please install pydot to generate the dot file and pdf.
build/X86/mem/dram_interface.cc:690: warn: DRAM device capacity (8192 Mbytes) does not match the address range assigned (512 Mbytes)
0: system.remote_gdb: listening for remote gdb on port 7002
Beginning simulation!
build/X86/sim/simulate.cc:194: info: Entering event queue @ 0. Starting simulation...
build/X86/sim/syscall_emul.cc:74: warn: ignoring syscall set_robust_list(...)
build/X86/sim/syscall_emul.cc:74: warn: ignoring syscall rseq(...)
build/X86/sim/mem_state.cc:443: info: Increasing stack size by one page.
build/X86/sim/syscall_emul.hh:1015: warn: readlink() called on '/proc/self/exe' may yield unexpected results in various settings.
Returning '/home/lkim/Desktop/gem5/configs/tutorial/part1/sieveofe.o'
build/X86/sim/syscall_emul.cc:74: warn: ignoring syscall mprotect(...)
78498
Exiting @ tick 2904978744369 because exiting with last active thread context
lkim@lkim-VirtualBox:~/Desktop/gem5$
```

For this configuration, we have a difference in the clock speed that we are using. We were using 1GHz, but now we are using 3GHz.

The change in clock is confirmed in our statistics line that says

```
system.clk_domain.clock 333
# Clock period in ticks (Tick)
```

And it is shown as the frequency increased by threefold and the period was decreased by threefold by comparison.

The number of tlb accesses/misses on read/write requests stayed the same which is to be expected as there is no change in the processing other than the speed. Intuitively, we can see that the simulation time is faster from 3.39 to 2.90.

Configuration 4.3:

system.clk_domain.clock = '1GHz'

system.cpu = TimingSimpleCPU()

system.mem_ctrl.dram = DDR3_2133_8x8()

```
build/X86/python/m5/main.py(434): main
lkin@lkin-VirtualBox:~/Desktop/gem5$ build/X86/gem5.opt configs/tutorial/part1/simple.py
gem5 Simulator System.  https://www.gem5.org
gem5 is copyrighted software; use the --copyright option for details.

gem5 version 22.0.0.2
gem5 compiled Nov 11 2022 14:52:49
gem5 started Nov 11 2022 16:33:33
gem5 executing on lkin-VirtualBox, pid 10978
command line: build/X86/gem5.opt configs/tutorial/part1/simple.py

Global frequency set at 1000000000000 ticks per second
warn: No dot file generated. Please install pydot to generate the dot file and pdf.
build/X86/mem/dram_interface.cc:690: warn: DRAM device capacity (8192 Mbytes) does not match the address range assigned (512 Mbytes)
0: system.remote_gdb: listening for remote gdb on port 7002
Beginning simulation!
build/X86/sim/simulate.cc:194: info: Entering event queue @ 0. Starting simulation...
build/X86/sim/syscall_emul.cc:74: warn: ignoring syscall set_robust_list(...)
build/X86/sim/syscall_emul.cc:74: warn: ignoring syscall rseq(...)
build/X86/sim/mem_state.cc:443: info: Increasing stack size by one page.
build/X86/sim/syscall_emul.hh:1015: warn: readlink() called on '/proc/self/exe' may yield unexpected results in various settings.
Returning '/home/lkin/Desktop/gem5/configs/tutorial/part1/sieveofe.o'
build/X86/sim/syscall_emul.cc:74: warn: ignoring syscall mprotect(...)
78498
Exiting @ tick 3271748533000 because exiting with last active thread context
lkin@lkin-VirtualBox:~/Desktop/gem5$
```

For this configuration, we have a difference in the memory that we are using. We were using DDR3_1600_8x8, but now we are using DDR3_2133_8x8.

Configuration 4.4:

system.clk_domain.clock = '1GHz'

system.cpu = TimingSimpleCPU()

system.mem_ctrl.dram = LPDDR2_S4_1066_1x32()

For this configuration, we have a difference in the memory that we are using. We were using DDR3_1600_8x8, but now we are using LPDDR2_S4_1066_1x32(). I had to experiment a little bit with the sizing of the memory, but it does make sense that it turned out to be 1x32 as it is a low power memory which means that the bandwidth is likely to be much smaller.


```

configs/tutorial/part1/simple.py(23): <module>
build/X86/python/m5/main.py(434): main
lkim@lkim-VirtualBox:~/Desktop/gem5$ build/X86/gem5.opt configs/tutorial/part1/simple.py
gem5 Simulator System.  https://www.gem5.org
gem5 is copyrighted software; use the --copyright option for details.

gem5 version 22.0.0.2
gem5 compiled Nov 11 2022 14:52:49
gem5 started Nov 11 2022 16:55:02
gem5 executing on lkim-VirtualBox, pid 11378
command line: build/X86/gem5.opt configs/tutorial/part1/simple.py

Global frequency set at 1000000000000 ticks per second
warn: No dot file generated. Please install pydot to generate the dot file and pdf.
0: system.remote_gdb: listening for remote gdb on port 7002
Beginning simulation!
build/X86/sim/simulate.cc:194: info: Entering event queue @ 0. Starting simulation...
build/X86/sim/syscall_emul.cc:74: warn: ignoring syscall set_robust_list(...)
build/X86/sim/syscall_emul.cc:74: warn: ignoring syscall rseq(...)
build/X86/sim/mem_state.cc:443: info: Increasing stack size by one page.
build/X86/sim/syscall_emul.hh:1015: warn: readlink() called on '/proc/self/exe' may yield unexpected
results in various settings.
Returning '/home/lkim/Desktop/gem5/configs/tutorial/part1/sieveofe.o'
build/X86/sim/syscall_emul.cc:74: warn: ignoring syscall mprotect(...)
78498
Exiting @ tick 3387931467000 because exiting with last active thread context
lkim@lkim-VirtualBox:~/Desktop/gem5$ 

```

sieveofe.c

```
#include <stdio.h>
```

```
#include <math.h>
```

```
#define MAX 1000000 //1 mil
```

```
//#define MAX 100000000 //100 mil
```

```
char primes[MAX];
```

```
int main(int argc, char *argv[]){
```

```
    /* Create an array of values, where '1' indicates that a number is prime.
```

```
    * Start by assuming all numbers are prime by setting them to 1.
```

```
    */
```

```
    for (int i=0; i<MAX; i++) {
```

```
        primes[i] = 1;
```

```
    }
```

```
    /* Loop through a portion of the array (up to the square root of MAX). If
```

```
    * it's a prime, ensure all multiples of it are set to zero (false), as they
```

```
    * clearly cannot be prime.
```

```
    */
```

```
    int limit = sqrt(MAX) + 1;
```

```
    for (int i=2; i<limit; i++) {
```

```
        if (primes[i-1]) {
```

```
            for (int j=i*i; j<=MAX; j+=i) {
```

```

        primes[j-1] = 0;
    }
}

/* Output the results */
int count = 0;
for (int i=2; i<=MAX; i++) {
    if (primes[i-1]) {
//        printf("%d\n", i);
        count++;
    }
}
printf("%i\n",count);

return 0;
}

```

Simple.py # this version is for configuration 4.4, but we can assume the parameters are changed for the appropriate configuration

```

import m5
from m5.objects import *
system = System()
system.clk_domain = SrcClockDomain()
system.clk_domain.clock = '1GHz'
system.clk_domain.voltage_domain = VoltageDomain()
system.mem_mode = 'timing'
system.mem_ranges = [AddrRange('512MB')]
system.cpu = TimingSimpleCPU()
system.membus = SystemXBar()

system.cpu.icache_port = system.membus.cpu_side_ports
system.cpu.dcache_port = system.membus.cpu_side_ports

system.cpu.createInterruptController()
system.cpu.interrupts[0].pio = system.membus.mem_side_ports
system.cpu.interrupts[0].int_requestor = system.membus.cpu_side_ports
system.cpu.interrupts[0].int_responder = system.membus.mem_side_ports

system.system_port = system.membus.cpu_side_ports

system.mem_ctrl = MemCtrl()
system.mem_ctrl.dram = LPDDR2_S4_1066_1x32()

```

```
system.mem_ctrl.dram.range = system.mem_ranges[0]
system.mem_ctrl.port = system.membus.mem_side_ports
```

```
#
```

```
binary = 'configs/tutorial/part1/sieveofe.o'
```

```
# for gem5 V21 and beyond
system.workload = SEWorkload.init_compatible(binary)
```

```
process = Process()
process.cmd = [binary]
system.cpu.workload = process
system.cpu.createThreads()
```

```
root = Root(full_system = False, system = system)
m5.instantiate()
```

```
print("Beginning simulation!")
exit_event = m5.simulate()
```

```
print('Exiting @ tick {} because {}'.format(m5.curTick(), exit_event.getCause()))
```

Stats 3

```
----- Begin Simulation Statistics -----
simSeconds                      3.397564
# Number of seconds simulated (Second)
simTicks                        3397563657000
# Number of ticks simulated (Tick)
finalTick                      3397563657000
# Number of ticks from beginning of simulation (restored from checkpoints
and never reset) (Tick)
simFreq                         1000000000000
# The number of ticks per simulated second ((Tick/Second))
hostSeconds                     173.61
# Real time elapsed on the host (Second)
hostTickRate                    19570292456
# The number of ticks simulated per host second (ticks/s) ((Tick/Second))
hostMemory                      655500
# Number of bytes of host memory used (Byte)
simInsts                       36199500
# Number of instructions simulated (Count)
```



```

simOps                                76555494
# Number of ops (including micro ops) simulated (Count)
hostInstRate                          208512
# Simulator instruction rate (inst/s) ((Count/Second))
hostOpRate                            440967
# Simulator op (including micro ops) rate (op/s) ((Count/Second))
system.clk_domain.clock               1000
# Clock period in ticks (Tick)
system.clk_domain.voltage_domain.voltage 1
# Voltage in Volts (Volt)
system.cpu.numCycles                  3397563657
# Number of cpu cycles simulated (Cycle)
system.cpu.numWorkItemsStarted        0
# Number of work items this cpu started (Count)
system.cpu.numWorkItemsCompleted      0
# Number of work items this cpu completed (Count)
system.cpu.exec_context.thread_0.numInsts 36199500
# Number of instructions committed (Count)
system.cpu.exec_context.thread_0.numOps 76555494
# Number of ops (including micro ops) committed (Count)
system.cpu.exec_context.thread_0.numIntAluAccesses 76554574
# Number of integer alu accesses (Count)
system.cpu.exec_context.thread_0.numFpAluAccesses 1471
# Number of float alu accesses (Count)
system.cpu.exec_context.thread_0.numVecAluAccesses 0
# Number of vector alu accesses (Count)
system.cpu.exec_context.thread_0.numCallsReturns 373
# Number of times a function call or return occurred (Count)
system.cpu.exec_context.thread_0.numCondCtrlInsts 5125826
# Number of instructions that are conditional controls (Count)
system.cpu.exec_context.thread_0.numIntInsts 76554574
# Number of integer instructions (Count)
system.cpu.exec_context.thread_0.numFpInsts 1471
# Number of float instructions (Count)
system.cpu.exec_context.thread_0.numVecInsts 0
# Number of vector instructions (Count)
system.cpu.exec_context.thread_0.numIntRegReads 87007781
# Number of times the integer registers were read (Count)
system.cpu.exec_context.thread_0.numIntRegWrites 58976338
# Number of times the integer registers were written (Count)
system.cpu.exec_context.thread_0.numFpRegReads 1590
# Number of times the floating registers were read (Count)
system.cpu.exec_context.thread_0.numFpRegWrites 859
# Number of times the floating registers were written (Count)
system.cpu.exec_context.thread_0.numVecRegReads 0
# Number of times the vector registers were read (Count)

```

```

system.cpu.exec_context.thread_0.numVecRegWrites          0
# Number of times the vector registers were written (Count)
system.cpu.exec_context.thread_0.numVecPredRegReads       0
# Number of times the predicate registers were read (Count)
system.cpu.exec_context.thread_0.numVecPredRegWrites      0
# Number of times the predicate registers were written (Count)
system.cpu.exec_context.thread_0.numCCRegReads            26632889
# Number of times the CC registers were read (Count)
system.cpu.exec_context.thread_0.numCCRegWrites           24904504
# Number of times the CC registers were written (Count)
system.cpu.exec_context.thread_0.numMiscRegReads          37276209
# Number of times the Misc registers were read (Count)
system.cpu.exec_context.thread_0.numMiscRegWrites         0
# Number of times the Misc registers were written (Count)
system.cpu.exec_context.thread_0.numMemRefs               22899889
# Number of memory refs (Count)
system.cpu.exec_context.thread_0.numLoadInsts             15574080
# Number of load instructions (Count)
system.cpu.exec_context.thread_0.numStoreInsts            7325809
# Number of store instructions (Count)
system.cpu.exec_context.thread_0.numIdleCycles            0.001000
# Number of idle cycles (Cycle)
system.cpu.exec_context.thread_0.numBusyCycles            3397563656.999000
# Number of busy cycles (Cycle)
system.cpu.exec_context.thread_0.notIdleFraction          1.000000
# Percentage of non-idle cycles (Ratio)
system.cpu.exec_context.thread_0.idleFraction             0.000000
# Percentage of idle cycles (Ratio)
system.cpu.exec_context.thread_0.numBranches              5126544
# Number of branches fetched (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::No_OpClass
236      0.00%      0.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::IntAlu      53654589
70.09%    70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::IntMult
177      0.00%    70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::IntDiv      28
0.00%    70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatAdd
184      0.00%    70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatCmp
0        0.00%    70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatCvt
0        0.00%    70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMult
0        0.00%    70.09% # Class of executed instruction. (Count)

```

```

system.cpu.exec_context.thread_0.statExecutedInstType::FloatMultAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatDiv
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMisc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatSqrt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAdd
8      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAddAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAlu
98     0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdCvt
54     0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdMisc
252    0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdMult
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdMultAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdShift
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdShiftAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdDiv
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSqrt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatAdd
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatAlu
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatCvt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatDiv
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatMisc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatMult
0      0.00%      70.09% # Class of executed instruction. (Count)

```

```

system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatMultAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatSqrt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdReduceAdd
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdReduceAlu
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdReduceCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatReduceAdd
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatReduceCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAes
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAesMix
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSha1Hash
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSha1Hash2
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSha256Hash
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSha256Hash2
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdShaSigma2
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdShaSigma3
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdPredAlu
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::MemRead
15573939    20.34%    90.43% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::MemWrite
7325245     9.57%    100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMemRead
141         0.00%    100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMemWrite
564         0.00%    100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::IprAccess
0          0.00%    100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::InstPrefetch
0          0.00%    100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::total      76555515
# Class of executed instruction. (Count)

```

```

system.cpu.interrupts.clk_domain.clock          16000
# Clock period in ticks (Tick)
system.cpu.mmu.dtb.rdAccesses                   15574084
# TLB accesses on read requests (Count)
system.cpu.mmu.dtb.wrAccesses                   7325810
# TLB accesses on write requests (Count)
system.cpu.mmu.dtb.rdMisses                     421
# TLB misses on read requests (Count)
system.cpu.mmu.dtb.wrMisses                     28844
# TLB misses on write requests (Count)
system.cpu.mmu.dtb.walker.power_state.pwrStateResidencyTicks::UNDEFINED
3397563657000                                # Cumulative time (in ticks) in
various power states (Tick)
system.cpu.mmu.itb.rdAccesses                    0
# TLB accesses on read requests (Count)
system.cpu.mmu.itb.wrAccesses                   47529643
# TLB accesses on write requests (Count)
system.cpu.mmu.itb.rdMisses                    0
# TLB misses on read requests (Count)
system.cpu.mmu.itb.wrMisses                    56
# TLB misses on write requests (Count)
system.cpu.mmu.itb.walker.power_state.pwrStateResidencyTicks::UNDEFINED
3397563657000                                # Cumulative time (in ticks) in
various power states (Tick)
system.cpu.power_state.pwrStateResidencyTicks::ON 3397563657000
# Cumulative time (in ticks) in various power states (Tick)
system.cpu.thread_0.numInsts                    0
# Number of Instructions committed (Count)
system.cpu.thread_0.numOps                      0
# Number of Ops committed (Count)
system.cpu.thread_0.numMemRefs                 0
# Number of Memory References (Count)
system.cpu.workload.numSyscalls                17
# Number of system calls (Count)
system.mem_ctrl.avgPriority_cpu.inst::samples  47529643.00
# Average QoS priority value for accepted requests (Count)
system.mem_ctrl.avgPriority_cpu.data::samples  6934363.00
# Average QoS priority value for accepted requests (Count)
system.mem_ctrl.priorityMinLatency             0.000000018750
# per QoS priority minimum request to response latency (Second)
system.mem_ctrl.priorityMaxLatency             2.262941650750
# per QoS priority maximum request to response latency (Second)
system.mem_ctrl.numReadWriteTurnArounds        44356
# Number of turnarounds from READ to WRITE (Count)
system.mem_ctrl.numWriteReadTurnArounds        44356
# Number of turnarounds from WRITE to READ (Count)

```

```

system.mem_ctrl.numStayReadState          115662297
# Number of times bus staying in READ state (Count)
system.mem_ctrl.numStayWriteState          665707
# Number of times bus staying in WRITE state (Count)
system.mem_ctrl.readReqs                   63103726
# Number of read requests accepted (Count)
system.mem_ctrl.writeReqs                   7325807
# Number of write requests accepted (Count)
system.mem_ctrl.readBursts                 63103726
# Number of controller read bursts, including those serviced by the write
queue (Count)
system.mem_ctrl.writeBursts                 7325807
# Number of controller write bursts, including those merged in the write
queue (Count)
system.mem_ctrl.servicedByWrQ              9349484
# Number of controller read bursts serviced by the write queue (Count)
system.mem_ctrl.mergedWrBursts             6616043
# Number of controller write bursts merged with an existing one (Count)
system.mem_ctrl.neitherReadNorWriteReqs     0
# Number of requests that are neither read nor write (Count)
system.mem_ctrl.avgRdQLen                  1.00
# Average read queue length when enqueueing ((Count/Tick))
system.mem_ctrl.avgWrQLen                  24.98
# Average write queue length when enqueueing ((Count/Tick))
system.mem_ctrl.numRdRetry                  0
# Number of times read queue was full causing retry (Count)
system.mem_ctrl.numWrRetry                  0
# Number of times write queue was full causing retry (Count)
system.mem_ctrl.readPktSize::0             1001231
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::1             19
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::2             14571441
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::3             47531035
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::4             0
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::5             0
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::6             0
# Read request sizes (log2) (Count)
system.mem_ctrl.writePktSize::0            3122099
# Write request sizes (log2) (Count)
system.mem_ctrl.writePktSize::1            3
# Write request sizes (log2) (Count)

```


system.mem_ctrl.writePktSize::2	4201939
# Write request sizes (log2) (Count)	
system.mem_ctrl.writePktSize::3	1766
# Write request sizes (log2) (Count)	
system.mem_ctrl.writePktSize::4	0
# Write request sizes (log2) (Count)	
system.mem_ctrl.writePktSize::5	0
# Write request sizes (log2) (Count)	
system.mem_ctrl.writePktSize::6	0
# Write request sizes (log2) (Count)	
system.mem_ctrl.rdQLenPdf::0	53754238
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::1	4
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::2	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::3	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::4	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::5	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::6	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::7	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::8	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::9	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::10	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::11	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::12	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::13	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::14	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::15	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::16	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::17	0
# What read queue length does an incoming req see (Count)	

```

system.mem_ctrl.rdQLenPdf::18      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::19      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::20      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::21      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::22      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::23      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::24      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::25      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::26      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::27      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::28      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::29      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::30      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::31      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::0       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::1       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::2       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::3       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::4       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::5       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::6       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::7       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::8       1
# What write queue length does an incoming req see (Count)

```

```

system.mem_ctrl.wrQLenPdf::9          1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::10         1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::11         1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::12         1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::13         1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::14         1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::15        24
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::16        24
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::17       44356
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::18       44357
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::19       44357
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::20       44357
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::21       44357
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::22       44356
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::23       44357
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::24       44356
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::25       44356
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::26       44356
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::27       44356
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::28       44356
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::29       44356
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::30       44356
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::31       44356
# What write queue length does an incoming req see (Count)

```

```
system.mem_ctrl.wrQLenPdf::32          44356
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::33          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::34          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::35          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::36          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::37          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::38          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::39          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::40          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::41          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::42          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::43          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::44          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::45          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::46          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::47          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::48          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::49          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::50          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::51          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::52          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::53          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::54          0
# What write queue length does an incoming req see (Count)
```

```

system.mem_ctrl.wrQLenPdf::55          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::56          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::57          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::58          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::59          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::60          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::61          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::62          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::63          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.rdPerTurnAround::samples  44356
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::mean    1211.878664
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::gmean   338.313167
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::stdev   86600.937407
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::0-1.04858e+06  44355  100.00%
100.00% # Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::1.78258e+07-1.88744e+07  1
0.00%  100.00% # Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::total    44356
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.wrPerTurnAround::samples  44356
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::mean    16.001037
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::gmean   16.000977
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::stdev    0.045531
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::16      44333  99.95%
99.95% # Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::18      23  0.05%
100.00% # Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::total    44356
# Writes before turning the bus around for reads (Count)

```

```
system.mem_ctrl.bytesReadWrQ          598366976
# Total number of bytes read from write queue (Byte)
system.mem_ctrl.bytesReadSys           439535306
# Total read bytes from the system interface side (Byte)
system.mem_ctrl.bytesWrittenSys        19943987
# Total written bytes from the system interface side (Byte)
system.mem_ctrl.avgRdBWSys             129367791.26843597
# Average system read bandwidth in Byte/s ((Byte/Second))
system.mem_ctrl.avgWrBWSys             5870084.86475578
# Average system write bandwidth in Byte/s ((Byte/Second))
system.mem_ctrl.totGap                  3397563531000
# Total gap between requests (Tick)
system.mem_ctrl.avgGap                  48240.61
# Average gap between requests ((Tick/Count))
system.mem_ctrl.requestorReadBytes::cpu.inst  380237144
# Per-requestor bytes read from memory (Byte)
system.mem_ctrl.requestorReadBytes::cpu.data  21899389
# Per-requestor bytes read from memory (Byte)
system.mem_ctrl.requestorWriteBytes::cpu.data  720805
# Per-requestor bytes write to memory (Byte)
system.mem_ctrl.requestorReadRate::cpu.inst 111914648.962234288454
# Per-requestor bytes read from memory rate ((Byte/Second))
system.mem_ctrl.requestorReadRate::cpu.data 6445615.508889934048
# Per-requestor bytes read from memory rate ((Byte/Second))
system.mem_ctrl.requestorWriteRate::cpu.data 212153.493729227281
# Per-requestor bytes write to memory rate ((Byte/Second))
system.mem_ctrl.requestorReadAccesses::cpu.inst 47529643
# Per-requestor read serviced memory accesses (Count)
system.mem_ctrl.requestorReadAccesses::cpu.data 15574083
# Per-requestor read serviced memory accesses (Count)
system.mem_ctrl.requestorWriteAccesses::cpu.data 7325807
# Per-requestor write serviced memory accesses (Count)
system.mem_ctrl.requestorReadTotalLat::cpu.inst 1154721525250
# Per-requestor read total memory access latency (Tick)
system.mem_ctrl.requestorReadTotalLat::cpu.data 270488760000
# Per-requestor read total memory access latency (Tick)
system.mem_ctrl.requestorWriteTotalLat::cpu.data 78277683342750
# Per-requestor write total memory access latency (Tick)
system.mem_ctrl.requestorReadAvgLat::cpu.inst 24294.77
# Per-requestor read average memory access latency ((Tick/Count))
system.mem_ctrl.requestorReadAvgLat::cpu.data 17367.88
# Per-requestor read average memory access latency ((Tick/Count))
system.mem_ctrl.requestorWriteAvgLat::cpu.data 10685195.96
# Per-requestor write average memory access latency ((Tick/Count))
system.mem_ctrl.dram.bytesRead::cpu.inst 380237144
# Number of bytes read from this memory (Byte)
```



```
system.mem_ctrl.dram.bytesRead::cpu.data      59298162
# Number of bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesRead::total         439535306
# Number of bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesInstRead::cpu.inst   380237144
# Number of instructions bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesInstRead::total      380237144
# Number of instructions bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesWritten::cpu.data    19943987
# Number of bytes written to this memory (Byte)
system.mem_ctrl.dram.bytesWritten::total       19943987
# Number of bytes written to this memory (Byte)
system.mem_ctrl.dram.numReads::cpu.inst        47529643
# Number of read requests responded to by this memory (Count)
system.mem_ctrl.dram.numReads::cpu.data        15574083
# Number of read requests responded to by this memory (Count)
system.mem_ctrl.dram.numReads::total           63103726
# Number of read requests responded to by this memory (Count)
system.mem_ctrl.dram.numWrites::cpu.data       7325807
# Number of write requests responded to by this memory (Count)
system.mem_ctrl.dram.numWrites::total          7325807
# Number of write requests responded to by this memory (Count)
system.mem_ctrl.dram.bwRead::cpu.inst          111914649
# Total read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwRead::cpu.data          17453142
# Total read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwRead::total             129367791
# Total read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwInstRead::cpu.inst      111914649
# Instruction read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwInstRead::total         111914649
# Instruction read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwWrite::cpu.data         5870085
# Write bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwWrite::total            5870085
# Write bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwTotal::cpu.inst         111914649
# Total bandwidth to/from this memory ((Byte/Second))
system.mem_ctrl.dram.bwTotal::cpu.data         23323227
# Total bandwidth to/from this memory ((Byte/Second))
system.mem_ctrl.dram.bwTotal::total            135237876
# Total bandwidth to/from this memory ((Byte/Second))
system.mem_ctrl.dram.readBursts                53754242
# Number of DRAM read bursts (Count)
system.mem_ctrl.dram.writeBursts              709742
# Number of DRAM write bursts (Count)
```

system.mem_ctrl.dram.perBankRdBursts::0	52796429
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::1	58693
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::2	58164
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::3	61969
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::4	66160
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::5	66349
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::6	65557
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::7	66179
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::8	65688
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::9	67381
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::10	66785
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::11	65843
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::12	66137
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::13	62864
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::14	58980
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::15	61064
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::0	44249
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::1	41967
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::2	41529
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::3	42110
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::4	44344
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::5	45114
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::6	45485
# Per bank write bursts (Count)	

system.mem_ctrl.dram.perBankWrBursts::7	45865
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::8	46100
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::9	46302
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::10	46512
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::11	46705
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::12	46857
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::13	44923
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::14	40793
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::15	40887
# Per bank write bursts (Count)	
system.mem_ctrl.dram.totQLat	417318247750
# Total ticks spent queuing (Tick)	
system.mem_ctrl.dram.totBusLat	268771210000
# Total ticks spent in databus transfers (Tick)	
system.mem_ctrl.dram.totMemAccLat	1425210285250
# Total ticks spent from burst creation until serviced by the DRAM (Tick)	
system.mem_ctrl.dram.avgQLat	7763.45
# Average queueing delay per DRAM burst ((Tick/Count))	
system.mem_ctrl.dram.avgBusLat	5000.00
# Average bus latency per DRAM burst ((Tick/Count))	
system.mem_ctrl.dram.avgMemAccLat	26513.45
# Average memory access latency per DRAM burst ((Tick/Count))	
system.mem_ctrl.dram.readRowHits	42118516
# Number of row buffer hits during reads (Count)	
system.mem_ctrl.dram.writeRowHits	648898
# Number of row buffer hits during writes (Count)	
system.mem_ctrl.dram.readRowHitRate	78.35
# Row buffer hit rate for reads (Ratio)	
system.mem_ctrl.dram.writeRowHitRate	91.43
# Row buffer hit rate for writes (Ratio)	
system.mem_ctrl.dram.bytesPerActivate::samples	11696565
# Bytes accessed per row activation (Byte)	
system.mem_ctrl.dram.bytesPerActivate::mean	298.009921
# Bytes accessed per row activation (Byte)	
system.mem_ctrl.dram.bytesPerActivate::gmean	169.664060
# Bytes accessed per row activation (Byte)	
system.mem_ctrl.dram.bytesPerActivate::stdev	304.957490
# Bytes accessed per row activation (Byte)	

system.mem_ctrl.dram.bytesPerActivate::0-127	5505879	47.07%
47.07% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::128-255	2141340	18.31%
65.38% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::256-383	125989	1.08%
66.46% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::384-511	285359	2.44%
68.90% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::512-639	922086	7.88%
76.78% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::640-767	2040896	17.45%
94.23% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::768-895	38479	0.33%
94.56% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::896-1023	47645	0.41%
94.97% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::1024-1151	588892	5.03%
100.00% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::total	11696565	
# Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesRead	3440271488	
# Total bytes read (Byte)		
system.mem_ctrl.dram.bytesWritten	45423488	
# Total bytes written (Byte)		
system.mem_ctrl.dram.avgRdBW	1012.570134	
# Average DRAM read bandwidth in MiBytes/s ((Byte/Second))		
system.mem_ctrl.dram.avgWrBW	13.369430	
# Average DRAM write bandwidth in MiBytes/s ((Byte/Second))		
system.mem_ctrl.dram.peakBW	12800.00	
# Theoretical peak bandwidth in MiByte/s ((Byte/Second))		
system.mem_ctrl.dram.busUtil	8.02	
# Data bus utilization in percentage (Ratio)		
system.mem_ctrl.dram.busUtilRead	7.91	
# Data bus utilization in percentage for reads (Ratio)		
system.mem_ctrl.dram.busUtilWrite	0.10	
# Data bus utilization in percentage for writes (Ratio)		
system.mem_ctrl.dram.pageHitRate	78.52	
# Row buffer hit rate, read and write combined (Ratio)		
system.mem_ctrl.dram.power_state.pwrStateResidencyTicks::UNDEFINED		
3397563657000		# Cumulative time (in ticks) in various power states (Tick)
system.mem_ctrl.dram.rank0.actEnergy	82778475360	
# Energy for activate commands per rank (pJ) (Joule)		
system.mem_ctrl.dram.rank0.preEnergy	43997787900	
# Energy for precharge commands per rank (pJ) (Joule)		
system.mem_ctrl.dram.rank0.readEnergy	380130030000	
# Energy for read commands per rank (pJ) (Joule)		

```
system.mem_ctrl.dram.rank0.writeEnergy      1830460860
# Energy for write commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.refreshEnergy 268200622560.000031
# Energy for refresh commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.actBackEnergy 1480927690350
# Energy for active background per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.preBackEnergy 57567442080
# Energy for precharge background per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.actPowerDownEnergy      0
# Energy for active power-down per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.prePowerDownEnergy      0
# Energy for precharge power-down per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.selfRefreshEnergy      0
# Energy for self refresh per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.totalEnergy 2315432509110
# Total energy per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.averagePower 681.497903
# Core power per rank (mW) (Watt)
system.mem_ctrl.dram.rank0.totalIdleTime      0
# Total Idle time Per DRAM Rank (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::IDLE 21716258750
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::REF 113452040000
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::SREF      0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::PRE_PDN      0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::ACT 3262395358250
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::ACT_PDN      0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.actEnergy 735034440
# Energy for activate commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.preEnergy 390676275
# Energy for precharge commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.readEnergy 3675257880
# Energy for read commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.writeEnergy 1874392380
# Energy for write commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.refreshEnergy 268200622560.000031
# Energy for refresh commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.actBackEnergy 295943547990
# Energy for active background per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.preBackEnergy 1055448825120
# Energy for precharge background per rank (pJ) (Joule)
```

```

system.mem_ctrl.dram.rank1.actPowerDownEnergy      0
# Energy for active power-down per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.prePowerDownEnergy      0
# Energy for precharge power-down per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.selfRefreshEnergy      0
# Energy for self refresh per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.totalEnergy    1626268356645
# Total energy per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.averagePower    478.657215
# Core power per rank (mW) (Watt)
system.mem_ctrl.dram.rank1.totalIdleTime      0
# Total Idle time Per DRAM Rank (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::IDLE 2741190158500
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::REF 113452040000
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::SREF      0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::PRE_PDN      0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::ACT 542921458500
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::ACT_PDN      0
# Time in different power states (Tick)
system.mem_ctrl.power_state.pwrStateResidencyTicks::UNDEFINED
3397563657000      # Cumulative time (in ticks) in
various power states (Tick)
system.membus.transDist::ReadReq      63103710
# Transaction distribution (Count)
system.membus.transDist::ReadResp      63103710
# Transaction distribution (Count)
system.membus.transDist::WriteReq      7325791
# Transaction distribution (Count)
system.membus.transDist::WriteResp      7325791
# Transaction distribution (Count)
system.membus.transDist::LockedRMWReadReq      16
# Transaction distribution (Count)
system.membus.transDist::LockedRMWReadResp      16
# Transaction distribution (Count)
system.membus.transDist::LockedRMWWriteReq      16
# Transaction distribution (Count)
system.membus.transDist::LockedRMWWriteResp      16
# Transaction distribution (Count)
system.membus.pktCount_system.cpu.icache_port::system.mem_ctrl.port
95059286      # Packet count per connected requestor and
responder (Count)

```



```

system.membus.pktCount_system.cpu.icache_port::total      95059286
# Packet count per connected requestor and responder (Count)
system.membus.pktCount_system.cpu.dcache_port::system.mem_ctrl.port
45799780           # Packet count per connected requestor and
responder (Count)
system.membus.pktCount_system.cpu.dcache_port::total      45799780
# Packet count per connected requestor and responder (Count)
system.membus.pktCount::total      140859066
# Packet count per connected requestor and responder (Count)
system.membus.pktSize_system.cpu.icache_port::system.mem_ctrl.port
380237144           # Cumulative packet size per connected
requestor and responder (Byte)
system.membus.pktSize_system.cpu.icache_port::total      380237144
# Cumulative packet size per connected requestor and responder (Byte)
system.membus.pktSize_system.cpu.dcache_port::system.mem_ctrl.port
79242149           # Cumulative packet size per connected
requestor and responder (Byte)
system.membus.pktSize_system.cpu.dcache_port::total      79242149
# Cumulative packet size per connected requestor and responder (Byte)
system.membus.pktSize::total      459479293
# Cumulative packet size per connected requestor and responder (Byte)
system.membus.snoops      0
# Total snoops (Count)
system.membus.snoopTraffic      0
# Total snoop traffic (Byte)
system.membus.snoopFanout::samples      70429533
# Request fanout histogram (Count)
system.membus.snoopFanout::mean      0
# Request fanout histogram (Count)
system.membus.snoopFanout::stdev      0
# Request fanout histogram (Count)
system.membus.snoopFanout::underflows      0      0.00%
0.00% # Request fanout histogram (Count)
system.membus.snoopFanout::0      70429533      100.00%
100.00% # Request fanout histogram (Count)
system.membus.snoopFanout::1      0      0.00%
100.00% # Request fanout histogram (Count)
system.membus.snoopFanout::overflows      0      0.00%
100.00% # Request fanout histogram (Count)
system.membus.snoopFanout::min_value      0
# Request fanout histogram (Count)
system.membus.snoopFanout::max_value      0
# Request fanout histogram (Count)
system.membus.snoopFanout::total      70429533
# Request fanout histogram (Count)
system.membus.power_state.pwrStateResidencyTicks::UNDEFINED 3397563657000
# Cumulative time (in ticks) in various power states (Tick)

```

```

system.membus.reqLayer2.occupancy          77755340000
# Layer occupancy (ticks) (Tick)
system.membus.reqLayer2.utilization         0.0
# Layer utilization (Ratio)
system.membus.respLayer0.occupancy          109734297750
# Layer occupancy (ticks) (Tick)
system.membus.respLayer0.utilization         0.0
# Layer utilization (Ratio)
system.membus.respLayer1.occupancy          42693685000
# Layer occupancy (ticks) (Tick)
system.membus.respLayer1.utilization         0.0
# Layer utilization (Ratio)
system.membus.snoop_filter.totRequests       0
# Total number of requests made to the snoop filter. (Count)
system.membus.snoop_filter.hitSingleRequests 0
# Number of requests hitting in the snoop filter with a single holder of
the requested data. (Count)
system.membus.snoop_filter.hitMultiRequests 0
# Number of requests hitting in the snoop filter with multiple (>1)
holders of the requested data. (Count)
system.membus.snoop_filter.totSnoops         0
# Total number of snoops made to the snoop filter. (Count)
system.membus.snoop_filter.hitSingleSnoops   0
# Number of snoops hitting in the snoop filter with a single holder of the
requested data. (Count)
system.membus.snoop_filter.hitMultiSnoops    0
# Number of snoops hitting in the snoop filter with multiple (>1) holders
of the requested data. (Count)
system.workload.inst.arm                     0
# number of arm instructions executed (Count)
system.workload.inst.quiesce                 0
# number of quiesce instructions executed (Count)

```

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

Stats 4.1

----- Begin Simulation Statistics -----

```

simSeconds          0.495888
# Number of seconds simulated (Second)
simTicks            495887903000
# Number of ticks simulated (Tick)
finalTick           495887903000
# Number of ticks from beginning of simulation (restored from checkpoints
and never reset) (Tick)
simFreq             1000000000000
# The number of ticks per simulated second ((Tick/Second))
hostSeconds         410.22
# Real time elapsed on the host (Second)

```

```

hostTickRate                      1208826443
# The number of ticks simulated per host second (ticks/s) ((Tick/Second))
hostMemory                        658572
# Number of bytes of host memory used (Byte)
simInsts                          36199500
# Number of instructions simulated (Count)
simOps                            76555494
# Number of ops (including micro ops) simulated (Count)
hostInstRate                      88244
# Simulator instruction rate (inst/s) ((Count/Second))
hostOpRate                        186619
# Simulator op (including micro ops) rate (op/s) ((Count/Second))
system.clk_domain.clock           1000
# Clock period in ticks (Tick)
system.clk_domain.voltage_domain.voltage 1
# Voltage in Volts (Volt)
system.cpu.numCycles              495887904
# Number of cpu cycles simulated (Cycle)
system.cpu.numWorkItemsStarted    0
# Number of work items this cpu started (Count)
system.cpu.numWorkItemsCompleted 0
# Number of work items this cpu completed (Count)
system.cpu.instsAdded             77908802
# Number of instructions added to the IQ (excludes non-spec) (Count)
system.cpu.nonSpecInstsAdded      100
# Number of non-speculative instructions added to the IQ (Count)
system.cpu.instsIssued            79441802
# Number of instructions issued (Count)
system.cpu.squashedInstsIssued    60
# Number of squashed instructions issued (Count)
system.cpu.squashedInstsExamined  1353402
# Number of squashed instructions iterated over during squash; mainly for
profiling (Count)
system.cpu.squashedOperandsExamined 3637174
# Number of squashed operands that are examined and possibly removed from
graph (Count)
system.cpu.squashedNonSpecRemoved 52
# Number of squashed non-spec instructions that were removed (Count)
system.cpu.numIssuedDist::samples 302528199
# Number of insts issued each cycle (Count)
system.cpu.numIssuedDist::mean    0.262593
# Number of insts issued each cycle (Count)
system.cpu.numIssuedDist::stdev   0.775607
# Number of insts issued each cycle (Count)
system.cpu.numIssuedDist::underflows 0      0.00%
0.00% # Number of insts issued each cycle (Count)

```

system.cpu.numIssuedDist::0	261961260	86.59%
86.59% # Number of insts issued each cycle (Count)		
system.cpu.numIssuedDist::1	17194560	5.68%
92.27% # Number of insts issued each cycle (Count)		
system.cpu.numIssuedDist::2	13725745	4.54%
96.81% # Number of insts issued each cycle (Count)		
system.cpu.numIssuedDist::3	4968416	1.64%
98.45% # Number of insts issued each cycle (Count)		
system.cpu.numIssuedDist::4	3794029	1.25%
99.71% # Number of insts issued each cycle (Count)		
system.cpu.numIssuedDist::5	591194	0.20%
99.90% # Number of insts issued each cycle (Count)		
system.cpu.numIssuedDist::6	292661	0.10%
100.00% # Number of insts issued each cycle (Count)		
system.cpu.numIssuedDist::7	220	0.00%
100.00% # Number of insts issued each cycle (Count)		
system.cpu.numIssuedDist::8	114	0.00%
100.00% # Number of insts issued each cycle (Count)		
system.cpu.numIssuedDist::overflows	0	0.00%
100.00% # Number of insts issued each cycle (Count)		
system.cpu.numIssuedDist::min_value	0	
# Number of insts issued each cycle (Count)		
system.cpu.numIssuedDist::max_value	8	
# Number of insts issued each cycle (Count)		
system.cpu.numIssuedDist::total	302528199	
# Number of insts issued each cycle (Count)		
system.cpu.statFuBusy::No_OpClass	0	0.00%
0.00% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::IntAlu	103	51.50%
51.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::IntMult	0	0.00%
51.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::IntDiv	0	0.00%
51.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::FloatAdd	0	0.00%
51.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::FloatCmp	0	0.00%
51.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::FloatCvt	0	0.00%
51.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::FloatMult	0	0.00%
51.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::FloatMultAcc	0	0.00%
51.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::FloatDiv	0	0.00%
51.50% # attempts to use FU when none available (Count)		

system.cpu.statFuBusy::FloatMisc	0	0.00%
51.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::FloatSqrt	0	0.00%
51.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdAdd	0	0.00%
51.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdAddAcc	0	0.00%
51.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdAlu	8	4.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdCmp	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdCvt	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdMisc	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdMult	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdMultAcc	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdShift	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdShiftAcc	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdDiv	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdSqrt	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdFloatAdd	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdFloatAlu	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdFloatCmp	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdFloatCvt	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdFloatDiv	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdFloatMisc	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdFloatMult	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdFloatMultAcc	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdFloatSqrt	0	0.00%
55.50% # attempts to use FU when none available (Count)		

system.cpu.statFuBusy::SimdReduceAdd	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdReduceAlu	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdReduceCmp	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdFloatReduceAdd	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdFloatReduceCmp	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdAes	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdAesMix	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdShalHash	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdShalHash2	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdSha256Hash	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdSha256Hash2	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdShaSigma2	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdShaSigma3	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::SimdPredAlu	0	0.00%
55.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::MemRead	36	18.00%
73.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::MemWrite	12	6.00%
79.50% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::FloatMemRead	27	13.50%
93.00% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::FloatMemWrite	14	7.00%
100.00% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::IprAccess	0	0.00%
100.00% # attempts to use FU when none available (Count)		
system.cpu.statFuBusy::InstPrefetch	0	0.00%
100.00% # attempts to use FU when none available (Count)		
system.cpu.statIssuedInstType_0::No_OpClass	486	0.00%
0.00% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::IntAlu	54244857	68.28%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::IntMult	203	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		

system.cpu.statIssuedInstType_0::IntDiv	28	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::FloatAdd	211	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::FloatCmp	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::FloatCvt	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::FloatMult	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::FloatMultAcc	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::FloatDiv	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::FloatMisc	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::FloatSqrt	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdAdd	8	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdAddAcc	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdAlu	142	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdCmp	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdCvt	54	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdMisc	256	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdMult	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdMultAcc	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdShift	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdShiftAcc	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdDiv	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdSqrt	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdFloatAdd	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdFloatAlu	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		

system.cpu.statIssuedInstType_0::SimdFloatCmp	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdFloatCvt	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdFloatDiv	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdFloatMisc	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdFloatMult	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdFloatMultAcc	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdFloatSqrt	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdReduceAdd	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdReduceAlu	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdReduceCmp	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdFloatReduceAdd	0	
0.00% 68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdFloatReduceCmp	0	
0.00% 68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdAes	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdAesMix	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdShalHash	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdShalHash2	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdSha256Hash	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdSha256Hash2	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdShaSigma2	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdShaSigma3	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::SimdPredAlu	0	0.00%
68.28% # Number of instructions issued per FU type, per thread (Count)		
system.cpu.statIssuedInstType_0::MemRead	17868533	22.49%
90.78% # Number of instructions issued per FU type, per thread (Count)		

```

system.cpu.statIssuedInstType_0::MemWrite      7325835      9.22%
100.00% # Number of instructions issued per FU type, per thread (Count)
system.cpu.statIssuedInstType_0::FloatMemRead    531      0.00%
100.00% # Number of instructions issued per FU type, per thread (Count)
system.cpu.statIssuedInstType_0::FloatMemWrite    658      0.00%
100.00% # Number of instructions issued per FU type, per thread (Count)
system.cpu.statIssuedInstType_0::IprAccess        0      0.00%
100.00% # Number of instructions issued per FU type, per thread (Count)
system.cpu.statIssuedInstType_0::InstPrefetch     0      0.00%
100.00% # Number of instructions issued per FU type, per thread (Count)
system.cpu.statIssuedInstType_0::total      79441802
# Number of instructions issued per FU type, per thread (Count)
system.cpu.issueRate      0.160201
# Inst issue rate ((Count/Cycle))
system.cpu.fuBusy      200
# FU busy when requested (Count)
system.cpu.fuBusyRate      0.000003
# FU busy rate (busy events/executed inst) ((Count/Count))
system.cpu.intInstQueueReads      461407937
# Number of integer instruction queue reads (Count)
system.cpu.intInstQueueWrites      79260198
# Number of integer instruction queue writes (Count)
system.cpu.intInstQueueWakeupAccesses      77145937
# Number of integer instruction queue wakeup accesses (Count)
system.cpu.fpInstQueueReads      4126
# Number of floating instruction queue reads (Count)
system.cpu.fpInstQueueWrites      2208
# Number of floating instruction queue writes (Count)
system.cpu.fpInstQueueWakeupAccesses      1635
# Number of floating instruction queue wakeup accesses (Count)
system.cpu.vecInstQueueReads      0
# Number of vector instruction queue reads (Count)
system.cpu.vecInstQueueWrites      0
# Number of vector instruction queue writes (Count)
system.cpu.vecInstQueueWakeupAccesses      0
# Number of vector instruction queue wakeup accesses (Count)
system.cpu.intAluAccesses      79439434
# Number of integer alu accesses (Count)
system.cpu.fpAluAccesses      2082
# Number of floating point alu accesses (Count)
system.cpu.vecAluAccesses      0
# Number of vector alu accesses (Count)
system.cpu.numInsts      79441607
# Number of executed instructions (Count)
system.cpu.numLoadInsts      17868994
# Number of load instructions executed (Count)

```

system.cpu.numSquashedInsts	195
# Number of squashed instructions skipped in execute (Count)	
system.cpu.numSwp	0
# Number of swp insts executed (Count)	
system.cpu.numNop	0
# Number of nop insts executed (Count)	
system.cpu.numRefs	25195469
# Number of memory reference insts executed (Count)	
system.cpu.numBranches	5127301
# Number of branches executed (Count)	
system.cpu.numStoreInsts	7326475
# Number of stores executed (Count)	
system.cpu.numRate	0.160201
# Inst execution rate ((Count/Cycle))	
system.cpu.timesIdled	14975769
# Number of times that the entire CPU went into an idle state and unscheduled itself (Count)	
system.cpu.idleCycles	193359705
# Total number of cycles that the CPU has spent unscheduled due to idling (Cycle)	
system.cpu.committedInsts	36199500
# Number of Instructions Simulated (Count)	
system.cpu.committedOps	76555494
# Number of Ops (including micro ops) Simulated (Count)	
system.cpu.cpi	13.698750
# CPI: Cycles Per Instruction ((Cycle/Count))	
system.cpu.totalCpi	13.698750
# CPI: Total CPI of All Threads ((Cycle/Count))	
system.cpu.ipc	0.072999
# IPC: Instructions Per Cycle ((Count/Cycle))	
system.cpu.totalIpc	0.072999
# IPC: Total IPC of All Threads ((Count/Cycle))	
system.cpu.intRegfileReads	89555031
# Number of integer regfile reads (Count)	
system.cpu.intRegfileWrites	59566193
# Number of integer regfile writes (Count)	
system.cpu.fpRegfileReads	1776
# Number of floating regfile reads (Count)	
system.cpu.fpRegfileWrites	940
# Number of floating regfile writes (Count)	
system.cpu.ccRegfileReads	26635654
# number of cc regfile reads (Count)	
system.cpu.ccRegfileWrites	24907543
# number of cc regfile writes (Count)	
system.cpu.miscRegfileReads	39739173
# number of misc regfile reads (Count)	

```

system.cpu.MemDepUnit__0.insertedLoads      15828722
# Number of loads inserted to the mem dependence unit. (Count)
system.cpu.MemDepUnit__0.insertedStores      7414545
# Number of stores inserted to the mem dependence unit. (Count)
system.cpu.MemDepUnit__0.conflictingLoads     6659652
# Number of conflicting loads. (Count)
system.cpu.MemDepUnit__0.conflictingStores    162186
# Number of conflicting stores. (Count)
system.cpu.MemDepUnit__1.insertedLoads        0
# Number of loads inserted to the mem dependence unit. (Count)
system.cpu.MemDepUnit__1.insertedStores        0
# Number of stores inserted to the mem dependence unit. (Count)
system.cpu.MemDepUnit__1.conflictingLoads        0
# Number of conflicting loads. (Count)
system.cpu.MemDepUnit__1.conflictingStores        0
# Number of conflicting stores. (Count)
system.cpu.MemDepUnit__2.insertedLoads        0
# Number of loads inserted to the mem dependence unit. (Count)
system.cpu.MemDepUnit__2.insertedStores        0
# Number of stores inserted to the mem dependence unit. (Count)
system.cpu.MemDepUnit__2.conflictingLoads        0
# Number of conflicting loads. (Count)
system.cpu.MemDepUnit__2.conflictingStores        0
# Number of conflicting stores. (Count)
system.cpu.MemDepUnit__3.insertedLoads        0
# Number of loads inserted to the mem dependence unit. (Count)
system.cpu.MemDepUnit__3.insertedStores        0
# Number of stores inserted to the mem dependence unit. (Count)
system.cpu.MemDepUnit__3.conflictingLoads        0
# Number of conflicting loads. (Count)
system.cpu.MemDepUnit__3.conflictingStores        0
# Number of conflicting stores. (Count)
system.cpu.branchPred.lookups                 5210998
# Number of BP lookups (Count)
system.cpu.branchPred.condPredicted           5209752
# Number of conditional branches predicted (Count)
system.cpu.branchPred.condIncorrect           83692
# Number of conditional branches incorrect (Count)
system.cpu.branchPred.BTBLookups              5202788
# Number of BTB lookups (Count)
system.cpu.branchPred.BTBHits                 5201923
# Number of BTB hits (Count)
system.cpu.branchPred.BTBHitRatio             0.999834
# BTB Hit Ratio (Ratio)
system.cpu.branchPred.RASUsed                  304
# Number of times the RAS was used to get a target. (Count)

```

system.cpu.branchPred.RASIncorrect	0		
# Number of incorrect RAS predictions. (Count)			
system.cpu.branchPred.indirectLookups	201		
# Number of indirect predictor lookups. (Count)			
system.cpu.branchPred.indirectHits	20		
# Number of indirect target hits. (Count)			
system.cpu.branchPred.indirectMisses	181		
# Number of indirect misses. (Count)			
system.cpu.branchPred.indirectMispredicted	96		
# Number of mispredicted indirect branches. (Count)			
system.cpu.commit.commitSquashedInsts	1353384		
# The number of squashed insts skipped by commit (Count)			
system.cpu.commit.commitNonSpecStalls	48		
# The number of times commit has been forced to stall to communicate backwards (Count)			
system.cpu.commit.branchMispredicts	83424		
# The number of times a branch was mispredicted (Count)			
system.cpu.commit.numCommittedDist::samples	302355604		
# Number of insts committed each cycle (Count)			
system.cpu.commit.numCommittedDist::mean	0.253197		
# Number of insts committed each cycle (Count)			
system.cpu.commit.numCommittedDist::stdev	0.930143		
# Number of insts committed each cycle (Count)			
system.cpu.commit.numCommittedDist::underflows	0	0.00%	
0.00% # Number of insts committed each cycle (Count)			
system.cpu.commit.numCommittedDist::0	267859630	88.59%	
88.59% # Number of insts committed each cycle (Count)			
system.cpu.commit.numCommittedDist::1	16579102	5.48%	
94.07% # Number of insts committed each cycle (Count)			
system.cpu.commit.numCommittedDist::2	8666013	2.87%	
96.94% # Number of insts committed each cycle (Count)			
system.cpu.commit.numCommittedDist::3	4963209	1.64%	
98.58% # Number of insts committed each cycle (Count)			
system.cpu.commit.numCommittedDist::4	667693	0.22%	
98.80% # Number of insts committed each cycle (Count)			
system.cpu.commit.numCommittedDist::5	360	0.00%	
98.80% # Number of insts committed each cycle (Count)			
system.cpu.commit.numCommittedDist::6	416008	0.14%	
98.94% # Number of insts committed each cycle (Count)			
system.cpu.commit.numCommittedDist::7	3042593	1.01%	
99.95% # Number of insts committed each cycle (Count)			
system.cpu.commit.numCommittedDist::8	160996	0.05%	
100.00% # Number of insts committed each cycle (Count)			
system.cpu.commit.numCommittedDist::overflows	0	0.00%	
100.00% # Number of insts committed each cycle (Count)			
system.cpu.commit.numCommittedDist::min_value	0		
# Number of insts committed each cycle (Count)			

system.cpu.commit.numCommittedDist::max_value	8	
# Number of insts committed each cycle (Count)		
system.cpu.commit.numCommittedDist::total	302355604	
# Number of insts committed each cycle (Count)		
system.cpu.commit.instsCommitted	36199500	
# Number of instructions committed (Count)		
system.cpu.commit.opsCommitted	76555494	
# Number of ops (including micro ops) committed (Count)		
system.cpu.commit.memRefs	22899885	
# Number of memory references committed (Count)		
system.cpu.commit.loads	15574079	
# Number of loads committed (Count)		
system.cpu.commit.amos	0	
# Number of atomic instructions committed (Count)		
system.cpu.commit.membars	32	
# Number of memory barriers committed (Count)		
system.cpu.commit.branches	5126544	
# Number of branches committed (Count)		
system.cpu.commit.vectorInstructions	0	
# Number of committed Vector instructions. (Count)		
system.cpu.commit.floating	1470	
# Number of committed floating point instructions. (Count)		
system.cpu.commit.integer	76554570	
# Number of committed integer instructions. (Count)		
system.cpu.commit.functionCalls	189	
# Number of function calls committed. (Count)		
system.cpu.commit.committedInstType_0::No_OpClass	236	0.00%
0.00% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::IntAlu	53654572	70.09%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::IntMult	177	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::IntDiv	28	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::FloatAdd	184	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::FloatCmp	0	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::FloatCvt	0	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::FloatMult	0	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::FloatMultAcc	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::FloatDiv	0	0.00%
70.09% # Class of committed instruction (Count)		

system.cpu.commit.committedInstType_0::FloatMisc	0	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::FloatSqrt	0	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdAdd	8	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdAddAcc	0	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdAlu	98	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdCmp	0	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdCvt	54	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdMisc	252	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdMult	0	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdMultAcc	0	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdShift	0	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdShiftAcc	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdDiv	0	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdSqrt	0	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdFloatAdd	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdFloatAlu	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdFloatCmp	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdFloatCvt	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdFloatDiv	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdFloatMisc	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdFloatMult	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdFloatMultAcc	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdFloatSqrt	0	
0.00% 70.09% # Class of committed instruction (Count)		

system.cpu.commit.committedInstType_0::SimdReduceAdd	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdReduceAlu	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdReduceCmp	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdFloatReduceAdd	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdFloatReduceCmp	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdAes	0	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdAesMix	0	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdShalHash	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdShalHash2	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdSha256Hash	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdSha256Hash2	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdShaSigma2	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdShaSigma3	0	
0.00% 70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::SimdPredAlu	0	0.00%
70.09% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::MemRead	15573938	20.34%
90.43% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::MemWrite	7325243	9.57%
100.00% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::FloatMemRead	141	
0.00% 100.00% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::FloatMemWrite	563	
0.00% 100.00% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::IprAccess	0	0.00%
100.00% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::InstPrefetch	0	
0.00% 100.00% # Class of committed instruction (Count)		
system.cpu.commit.committedInstType_0::total	76555494	
# Class of committed instruction (Count)		
system.cpu.commit.commitEligibleSamples	160996	
# number cycles where commit BW limit reached (Cycle)		
system.cpu.decode.idleCycles	250395229	
# Number of cycles decode is idle (Cycle)		

```

system.cpu.decode.blockedCycles          39425743
# Number of cycles decode is blocked (Cycle)
system.cpu.decode.runCycles              10623535
# Number of cycles decode is running (Cycle)
system.cpu.decode.unblockCycles          2000145
# Number of cycles decode is unblocking (Cycle)
system.cpu.decode.squashCycles            83547
# Number of cycles decode is squashing (Cycle)
system.cpu.decode.branchResolved         5202158
# Number of times decode resolved a branch (Count)
system.cpu.decode.branchMispred          288
# Number of times decode detected a branch misprediction (Count)
system.cpu.decode.decodedInsts           77909374
# Number of instructions handled by decode (Count)
system.cpu.decode.squashedInsts          1460
# Number of squashed instructions handled by decode (Count)
system.cpu.fetch.icacheStallCycles        249817678
# Number of cycles fetch is stalled on an Icache miss (Cycle)
system.cpu.fetch.insts                   36790390
# Number of instructions fetch has processed (Count)
system.cpu.fetch.branches                 5210998
# Number of branches that fetch encountered (Count)
system.cpu.fetch.predictedBranches        5202247
# Number of branches that fetch has predicted taken (Count)
system.cpu.fetch.cycles                   52626470
# Number of cycles fetch has run and was not squashing or blocked (Cycle)
system.cpu.fetch.squashCycles             167670
# Number of cycles fetch has spent squashing (Cycle)
system.cpu.fetch.miscStallCycles           48
# Number of cycles fetch has spent waiting on interrupts, or bad
addresses, or out of MSHRs (Cycle)
system.cpu.fetch.pendingTrapStallCycles    166
# Number of stall cycles due to pending traps (Cycle)
system.cpu.fetch.icacheWaitRetryStallCycles 2
# Number of stall cycles due to full MSHR (Cycle)
system.cpu.fetch.cacheLines               6497296
# Number of cache lines fetched (Count)
system.cpu.fetch.icacheSquashes            83630
# Number of outstanding Icache misses that were squashed (Count)
system.cpu.fetch.nisnDist::samples         302528199
# Number of instructions fetched each cycle (Total) (Count)
system.cpu.fetch.nisnDist::mean            0.257537
# Number of instructions fetched each cycle (Total) (Count)
system.cpu.fetch.nisnDist::stdev           1.293057
# Number of instructions fetched each cycle (Total) (Count)
system.cpu.fetch.nisnDist::underflows      0      0.00%
0.00% # Number of instructions fetched each cycle (Total) (Count)

```

system.cpu.fetch.nisnDist::0	289904405	95.83%
95.83% # Number of instructions fetched each cycle (Total)	(Count)	
system.cpu.fetch.nisnDist::1	265	0.00%
95.83% # Number of instructions fetched each cycle (Total)	(Count)	
system.cpu.fetch.nisnDist::2	1000352	0.33%
96.16% # Number of instructions fetched each cycle (Total)	(Count)	
system.cpu.fetch.nisnDist::3	308	0.00%
96.16% # Number of instructions fetched each cycle (Total)	(Count)	
system.cpu.fetch.nisnDist::4	2129756	0.70%
96.86% # Number of instructions fetched each cycle (Total)	(Count)	
system.cpu.fetch.nisnDist::5	304	0.00%
96.86% # Number of instructions fetched each cycle (Total)	(Count)	
system.cpu.fetch.nisnDist::6	4276129	1.41%
98.28% # Number of instructions fetched each cycle (Total)	(Count)	
system.cpu.fetch.nisnDist::7	329	0.00%
98.28% # Number of instructions fetched each cycle (Total)	(Count)	
system.cpu.fetch.nisnDist::8	5216351	1.72%
100.00% # Number of instructions fetched each cycle (Total)	(Count)	
system.cpu.fetch.nisnDist::overflows	0	0.00%
100.00% # Number of instructions fetched each cycle (Total)	(Count)	
system.cpu.fetch.nisnDist::min_value	0	
# Number of instructions fetched each cycle (Total)	(Count)	
system.cpu.fetch.nisnDist::max_value	8	
# Number of instructions fetched each cycle (Total)	(Count)	
system.cpu.fetch.nisnDist::total	302528199	
# Number of instructions fetched each cycle (Total)	(Count)	
system.cpu.fetch.branchRate	0.010508	
# Number of branch fetches per cycle (Ratio)		
system.cpu.fetch.rate	0.074191	
# Number of inst fetches per cycle ((Count/Cycle))		
system.cpu.iew.idleCycles	0	
# Number of cycles IEW is idle (Cycle)		
system.cpu.iew.squashCycles	83547	
# Number of cycles IEW is squashing (Cycle)		
system.cpu.iew.blockCycles	89475	
# Number of cycles IEW is blocking (Cycle)		
system.cpu.iew.unblockCycles	15000856	
# Number of cycles IEW is unblocking (Cycle)		
system.cpu.iew.dispatchedInsts	77908902	
# Number of instructions dispatched to IQ (Count)		
system.cpu.iew.dispSquashedInsts	1	
# Number of squashed instructions skipped by dispatch (Count)		
system.cpu.iew.dispLoadInsts	15828722	
# Number of dispatched load instructions (Count)		
system.cpu.iew.dispStoreInsts	7414545	
# Number of dispatched store instructions (Count)		

```

system.cpu.iew.dispNonSpecInsts          34
# Number of dispatched non-speculative instructions (Count)
system.cpu.iew.iqFullEvents              7
# Number of times the IQ has become full, causing a stall (Count)
system.cpu.iew.lsqFullEvents            15000838
# Number of times the LSQ has become full, causing a stall (Count)
system.cpu.iew.memOrderViolationEvents   103
# Number of memory order violations (Count)
system.cpu.iew.predictedTakenIncorrect   77796
# Number of branches that were predicted taken incorrectly (Count)
system.cpu.iew.predictedNotTakenIncorrect 5677
# Number of branches that were predicted not taken incorrectly (Count)
system.cpu.iew.branchMispredicts         83473
# Number of branch mispredicts detected at execute (Count)
system.cpu.iew.instsToCommit             77147723
# Cumulative count of insts sent to commit (Count)
system.cpu.iew.writebackCount            77147572
# Cumulative count of insts written-back (Count)
system.cpu.iew.producerInst              54442198
# Number of instructions producing a value (Count)
system.cpu.iew.consumerInst              60991982
# Number of instructions consuming a value (Count)
system.cpu.iew.wbRate                    0.155575
# Insts written-back per cycle ((Count/Cycle))
system.cpu.iew.wbFanout                  0.892612
# Average fanout of values written-back ((Count/Count))
system.cpu.interrupts.clk_domain.clock   16000
# Clock period in ticks (Tick)
system.cpu.lsq0.forwLoads                9324850
# Number of loads that had data forwarded from stores (Count)
system.cpu.lsq0.squashedLoads            254643
# Number of loads squashed (Count)
system.cpu.lsq0.ignoredResponses          0
# Number of memory responses ignored because the instruction is squashed
# (Count)
system.cpu.lsq0.memOrderViolation        103
# Number of memory ordering violations (Count)
system.cpu.lsq0.squashedStores            88739
# Number of stores squashed (Count)
system.cpu.lsq0.rescheduledLoads         0
# Number of loads that were rescheduled (Count)
system.cpu.lsq0.blockedByCache           2209889
# Number of times an access to memory failed due to the cache being
# blocked (Count)
system.cpu.lsq0.loadToUse::samples       15574079
# Distribution of cycle latency between the first time a load is issued
# and its completion (Unspecified)

```

```

system.cpu.lsqa0.loadToUse::mean                25.365366
# Distribution of cycle latency between the first time a load is issued
and its completion (Unspecified)
system.cpu.lsqa0.loadToUse::stdev                37.482952
# Distribution of cycle latency between the first time a load is issued
and its completion (Unspecified)
system.cpu.lsqa0.loadToUse::0-9                  9324215      59.87%
59.87% # Distribution of cycle latency between the first time a load is
issued and its completion (Unspecified)
system.cpu.lsqa0.loadToUse::20-29                2122035      13.63%
73.50% # Distribution of cycle latency between the first time a load is
issued and its completion (Unspecified)
system.cpu.lsqa0.loadToUse::50-59                871472       5.60%
79.09% # Distribution of cycle latency between the first time a load is
issued and its completion (Unspecified)
system.cpu.lsqa0.loadToUse::60-69                60999       0.39%
79.48% # Distribution of cycle latency between the first time a load is
issued and its completion (Unspecified)
system.cpu.lsqa0.loadToUse::70-79                225         0.00%
79.48% # Distribution of cycle latency between the first time a load is
issued and its completion (Unspecified)
system.cpu.lsqa0.loadToUse::80-89                3010038     19.33%
98.81% # Distribution of cycle latency between the first time a load is
issued and its completion (Unspecified)
system.cpu.lsqa0.loadToUse::90-99                82165       0.53%
99.34% # Distribution of cycle latency between the first time a load is
issued and its completion (Unspecified)
system.cpu.lsqa0.loadToUse::100-109              390         0.00%
99.34% # Distribution of cycle latency between the first time a load is
issued and its completion (Unspecified)
system.cpu.lsqa0.loadToUse::110-119              8           0.00%
99.34% # Distribution of cycle latency between the first time a load is
issued and its completion (Unspecified)
system.cpu.lsqa0.loadToUse::120-129              345         0.00%
99.34% # Distribution of cycle latency between the first time a load is
issued and its completion (Unspecified)
system.cpu.lsqa0.loadToUse::130-139              47522       0.31%
99.65% # Distribution of cycle latency between the first time a load is
issued and its completion (Unspecified)
system.cpu.lsqa0.loadToUse::140-149              36          0.00%
99.65% # Distribution of cycle latency between the first time a load is
issued and its completion (Unspecified)
system.cpu.lsqa0.loadToUse::150-159              1           0.00%
99.65% # Distribution of cycle latency between the first time a load is
issued and its completion (Unspecified)

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system.cpu.lsq0.loadToUse::170-179	1	0.00%
99.65% # Distribution of cycle latency between the first time a load is issued and its completion (Unspecified)		
system.cpu.lsq0.loadToUse::180-189	6	0.00%
99.65% # Distribution of cycle latency between the first time a load is issued and its completion (Unspecified)		
system.cpu.lsq0.loadToUse::190-199	1	0.00%
99.65% # Distribution of cycle latency between the first time a load is issued and its completion (Unspecified)		
system.cpu.lsq0.loadToUse::220-229	6	0.00%
99.65% # Distribution of cycle latency between the first time a load is issued and its completion (Unspecified)		
system.cpu.lsq0.loadToUse::230-239	34	0.00%
99.65% # Distribution of cycle latency between the first time a load is issued and its completion (Unspecified)		
system.cpu.lsq0.loadToUse::240-249	106	0.00%
99.65% # Distribution of cycle latency between the first time a load is issued and its completion (Unspecified)		
system.cpu.lsq0.loadToUse::250-259	528	0.00%
99.65% # Distribution of cycle latency between the first time a load is issued and its completion (Unspecified)		
system.cpu.lsq0.loadToUse::260-269	458	0.00%
99.66% # Distribution of cycle latency between the first time a load is issued and its completion (Unspecified)		
system.cpu.lsq0.loadToUse::270-279	656	0.00%
99.66% # Distribution of cycle latency between the first time a load is issued and its completion (Unspecified)		
system.cpu.lsq0.loadToUse::280-289	805	0.01%
99.67% # Distribution of cycle latency between the first time a load is issued and its completion (Unspecified)		
system.cpu.lsq0.loadToUse::290-299	657	0.00%
99.67% # Distribution of cycle latency between the first time a load is issued and its completion (Unspecified)		
system.cpu.lsq0.loadToUse::overflows	51370	0.33%
100.00% # Distribution of cycle latency between the first time a load is issued and its completion (Unspecified)		
system.cpu.lsq0.loadToUse::min_value	2	
# Distribution of cycle latency between the first time a load is issued and its completion (Unspecified)		
system.cpu.lsq0.loadToUse::max_value	451	
# Distribution of cycle latency between the first time a load is issued and its completion (Unspecified)		
system.cpu.lsq0.loadToUse::total	15574079	
# Distribution of cycle latency between the first time a load is issued and its completion (Unspecified)		
system.cpu.mmu.dtb.rdAccesses	15658795	
# TLB accesses on read requests (Count)		

```

system.cpu.mmu.dtb.wrAccesses                7326476
# TLB accesses on write requests (Count)
system.cpu.mmu.dtb.rdMisses                  470
# TLB misses on read requests (Count)
system.cpu.mmu.dtb.wrMisses                  28850
# TLB misses on write requests (Count)
system.cpu.mmu.dtb.walker.power_state.pwrStateResidencyTicks::UNDEFINED
495887903000                                # Cumulative time (in ticks) in various
power states (Tick)
system.cpu.mmu.itb.rdAccesses                 0
# TLB accesses on read requests (Count)
system.cpu.mmu.itb.wrAccesses                 6497328
# TLB accesses on write requests (Count)
system.cpu.mmu.itb.rdMisses                  0
# TLB misses on read requests (Count)
system.cpu.mmu.itb.wrMisses                  93
# TLB misses on write requests (Count)
system.cpu.mmu.itb.walker.power_state.pwrStateResidencyTicks::UNDEFINED
495887903000                                # Cumulative time (in ticks) in various
power states (Tick)
system.cpu.power_state.pwrStateResidencyTicks::ON 495887903000
# Cumulative time (in ticks) in various power states (Tick)
system.cpu.rename.squashCycles                83547
# Number of cycles rename is squashing (Cycle)
system.cpu.rename.idleCycles                  251062187
# Number of cycles rename is idle (Cycle)
system.cpu.rename.blockCycles                 15090358
# Number of cycles rename is blocking (Cycle)
system.cpu.rename.serializeStallCycles        246
# count of cycles rename stalled for serializing inst (Cycle)
system.cpu.rename.runCycles                   11956695
# Number of cycles rename is running (Cycle)
system.cpu.rename.unblockCycles               24335166
# Number of cycles rename is unblocking (Cycle)
system.cpu.rename.renamedInsts                77909147
# Number of instructions processed by rename (Count)
system.cpu.rename.ROBFullEvents               2
# Number of times rename has blocked due to ROB full (Count)
system.cpu.rename.IQFullEvents               236
# Number of times rename has blocked due to IQ full (Count)
system.cpu.rename.SQFullEvents               23668230
# Number of times rename has blocked due to SQ full (Count)
system.cpu.rename.renamedOperands             128819633
# Number of destination operands rename has renamed (Count)
system.cpu.rename.lookups                     240155080
# Number of register rename lookups that rename has made (Count)

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```

system.cpu.rename.intLookups          88369006
# Number of integer rename lookups (Count)
system.cpu.rename.fpLookups           1933
# Number of floating rename lookups (Count)
system.cpu.rename.committedMaps       126364676
# Number of HB maps that are committed (Count)
system.cpu.rename.undoneMaps           2454948
# Number of HB maps that are undone due to squashing (Count)
system.cpu.rename.serializing          8
# count of serializing insts renamed (Count)
system.cpu.rename.tempSerializing      8
# count of temporary serializing insts renamed (Count)
system.cpu.rename.skidInsts           12000898
# count of insts added to the skid buffer (Count)
system.cpu.rob.reads                   380103226
# The number of ROB reads (Count)
system.cpu.rob.writes                   155990359
# The number of ROB writes (Count)
system.cpu.thread_0.numInsts           36199500
# Number of Instructions committed (Count)
system.cpu.thread_0.numOps              76555494
# Number of Ops committed (Count)
system.cpu.thread_0.numMemRefs          0
# Number of Memory References (Count)
system.cpu.workload.numSyscalls         17
# Number of system calls (Count)
system.mem_ctrl.avgPriority_cpu.inst::samples  6497296.00
# Average QoS priority value for accepted requests (Count)
system.mem_ctrl.avgPriority_cpu.data::samples  4961408.00
# Average QoS priority value for accepted requests (Count)
system.mem_ctrl.priorityMinLatency       0.000000018750
# per QoS priority minimum request to response latency (Second)
system.mem_ctrl.priorityMaxLatency       0.311197507750
# per QoS priority maximum request to response latency (Second)
system.mem_ctrl.numReadWriteTurnArounds  46736
# Number of turnarounds from READ to WRITE (Count)
system.mem_ctrl.numWriteReadTurnArounds  46736
# Number of turnarounds from WRITE to READ (Count)
system.mem_ctrl.numStayReadState         26451082
# Number of times bus staying in READ state (Count)
system.mem_ctrl.numStayWriteState        704929
# Number of times bus staying in WRITE state (Count)
system.mem_ctrl.readReqs                 12831113
# Number of read requests accepted (Count)
system.mem_ctrl.writeReqs                 7325807
# Number of write requests accepted (Count)

```



```

system.mem_ctrl.readBursts                12831113
# Number of controller read bursts, including those serviced by the write
queue (Count)
system.mem_ctrl.writeBursts                7325807
# Number of controller write bursts, including those merged in the write
queue (Count)
system.mem_ctrl.servicedByWrQ              2122189
# Number of controller read bursts serviced by the write queue (Count)
system.mem_ctrl.mergedWrBursts             6576027
# Number of controller write bursts merged with an existing one (Count)
system.mem_ctrl.neitherReadNorWriteReqs    0
# Number of requests that are neither read nor write (Count)
system.mem_ctrl.avgRdQLen                  2.07
# Average read queue length when enqueueing ((Count/Tick))
system.mem_ctrl.avgWrQLen                  23.24
# Average write queue length when enqueueing ((Count/Tick))
system.mem_ctrl.numRdRetry                  0
# Number of times read queue was full causing retry (Count)
system.mem_ctrl.numWrRetry                  0
# Number of times write queue was full causing retry (Count)
system.mem_ctrl.readPktSize::0             1001314
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::1             24
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::2             5330404
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::3             2075
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::4             0
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::5             0
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::6             6497296
# Read request sizes (log2) (Count)
system.mem_ctrl.writePktSize::0            3122099
# Write request sizes (log2) (Count)
system.mem_ctrl.writePktSize::1            3
# Write request sizes (log2) (Count)
system.mem_ctrl.writePktSize::2            4201939
# Write request sizes (log2) (Count)
system.mem_ctrl.writePktSize::3            1766
# Write request sizes (log2) (Count)
system.mem_ctrl.writePktSize::4            0
# Write request sizes (log2) (Count)
system.mem_ctrl.writePktSize::5            0
# Write request sizes (log2) (Count)

```

```

system.mem_ctrl.writePktSize::6                                0
# Write request sizes (log2) (Count)
system.mem_ctrl.rdQLenPdf::0                                  3203060
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::1                                  6518010
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::2                                  986402
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::3                                  734
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::4                                  278
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::5                                  155
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::6                                  98
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::7                                  67
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::8                                  33
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::9                                  25
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::10                                 24
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::11                                 20
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::12                                 6
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::13                                 4
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::14                                 3
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::15                                 2
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::16                                 1
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::17                                 1
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::18                                 1
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::19                                 0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::20                                 0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::21                                 0
# What read queue length does an incoming req see (Count)

```

```
system.mem_ctrl.rdQLenPdf::22      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::23      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::24      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::25      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::26      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::27      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::28      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::29      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::30      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::31      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::0       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::1       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::2       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::3       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::4       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::5       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::6       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::7       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::8       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::9       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::10      1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::11      1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::12      1
# What write queue length does an incoming req see (Count)
```

system.mem_ctrl.wrQLenPdf::13	1
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::14	1
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::15	909
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::16	944
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::17	20035
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::18	60717
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::19	47383
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::20	47351
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::21	47357
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::22	47372
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::23	47369
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::24	47293
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::25	47301
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::26	47364
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::27	47387
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::28	52355
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::29	48323
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::30	46785
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::31	46771
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::32	46749
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::33	0
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::34	0
# What write queue length does an incoming req see (Count)	
system.mem_ctrl.wrQLenPdf::35	0
# What write queue length does an incoming req see (Count)	

[illegible]

```

system.mem_ctrl.wrQLenPdf::59          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::60          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::61          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::62          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::63          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.rdPerTurnAround::samples 46736
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::mean    229.130863
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::stdev   20030.720262
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::0-262143 46735    100.00%
100.00% # Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::4.1943e+06-4.45645e+06 1
0.00%    100.00% # Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::total    46736
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.wrPerTurnAround::samples 46736
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::mean    16.042237
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::gmean   16.039588
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::stdev    0.304617
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::16      45827    98.06%
98.06% # Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::17      1         0.00%
98.06% # Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::18      752     1.61%
99.67% # Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::19      155     0.33%
100.00% # Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::20      1         0.00%
100.00% # Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::total    46736
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.bytesReadWrQ             135820096
# Total number of bytes read from write queue (Byte)
system.mem_ctrl.bytesReadSys              438166513
# Total read bytes from the system interface side (Byte)

```

```
system.mem_ctrl.bytesWrittenSys          19943987
# Total written bytes from the system interface side (Byte)
system.mem_ctrl.avgRdBWSys              883599923.18667221
# Average system read bandwidth in Byte/s ((Byte/Second))
system.mem_ctrl.avgWrBWSys              40218740.72616770
# Average system write bandwidth in Byte/s ((Byte/Second))
system.mem_ctrl.totGap                  495887893000
# Total gap between requests (Tick)
system.mem_ctrl.avgGap                  24601.37
# Average gap between requests ((Tick/Count))
system.mem_ctrl.requestorReadBytes::cpu.inst  415826944
# Per-requestor bytes read from memory (Byte)
system.mem_ctrl.requestorReadBytes::cpu.data  13849638
# Per-requestor bytes read from memory (Byte)
system.mem_ctrl.requestorWriteBytes::cpu.data  878614
# Per-requestor bytes write to memory (Byte)
system.mem_ctrl.requestorReadRate::cpu.inst 838550288.249318242073
# Per-requestor bytes read from memory rate ((Byte/Second))
system.mem_ctrl.requestorReadRate::cpu.data 27928969.261426001787
# Per-requestor bytes read from memory rate ((Byte/Second))
system.mem_ctrl.requestorWriteRate::cpu.data 1771799.623835550621
# Per-requestor bytes write to memory rate ((Byte/Second))
system.mem_ctrl.requestorReadAccesses::cpu.inst  6497296
# Per-requestor read serviced memory accesses (Count)
system.mem_ctrl.requestorReadAccesses::cpu.data  6333817
# Per-requestor read serviced memory accesses (Count)
system.mem_ctrl.requestorWriteAccesses::cpu.data  7325807
# Per-requestor write serviced memory accesses (Count)
system.mem_ctrl.requestorReadTotalLat::cpu.inst 258411205000
# Per-requestor read total memory access latency (Tick)
system.mem_ctrl.requestorReadTotalLat::cpu.data 202843452750
# Per-requestor read total memory access latency (Tick)
system.mem_ctrl.requestorWriteTotalLat::cpu.data 11017646788500
# Per-requestor write total memory access latency (Tick)
system.mem_ctrl.requestorReadAvgLat::cpu.inst  39772.12
# Per-requestor read average memory access latency ((Tick/Count))
system.mem_ctrl.requestorReadAvgLat::cpu.data  32025.47
# Per-requestor read average memory access latency ((Tick/Count))
system.mem_ctrl.requestorWriteAvgLat::cpu.data  1503949.91
# Per-requestor write average memory access latency ((Tick/Count))
system.mem_ctrl.dram.bytesRead::cpu.inst  415826880
# Number of bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesRead::cpu.data  22339569
# Number of bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesRead::total  438166449
# Number of bytes read from this memory (Byte)
```

```

system.mem_ctrl.dram.bytesInstRead::cpu.inst      415826880
# Number of instructions bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesInstRead::total        415826880
# Number of instructions bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesWritten::cpu.data       19943987
# Number of bytes written to this memory (Byte)
system.mem_ctrl.dram.bytesWritten::total          19943987
# Number of bytes written to this memory (Byte)
system.mem_ctrl.dram.numReads::cpu.inst           6497295
# Number of read requests responded to by this memory (Count)
system.mem_ctrl.dram.numReads::cpu.data           6333817
# Number of read requests responded to by this memory (Count)
system.mem_ctrl.dram.numReads::total              12831112
# Number of read requests responded to by this memory (Count)
system.mem_ctrl.dram.numWrites::cpu.data          7325807
# Number of write requests responded to by this memory (Count)
system.mem_ctrl.dram.numWrites::total             7325807
# Number of write requests responded to by this memory (Count)
system.mem_ctrl.dram.bwRead::cpu.inst             838550159
# Total read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwRead::cpu.data             45049635
# Total read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwRead::total                883599794
# Total read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwInstRead::cpu.inst         838550159
# Instruction read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwInstRead::total            838550159
# Instruction read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwWrite::cpu.data            40218741
# Write bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwWrite::total               40218741
# Write bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwTotal::cpu.inst            838550159
# Total bandwidth to/from this memory ((Byte/Second))
system.mem_ctrl.dram.bwTotal::cpu.data            85268376
# Total bandwidth to/from this memory ((Byte/Second))
system.mem_ctrl.dram.bwTotal::total              923818535
# Total bandwidth to/from this memory ((Byte/Second))
system.mem_ctrl.dram.readBursts                  10708924
# Number of DRAM read bursts (Count)
system.mem_ctrl.dram.writeBursts                 749750
# Number of DRAM write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::0          9761533
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::1          57754
# Per bank write bursts (Count)

```


system.mem_ctrl.dram.perBankRdBursts::2	58016
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::3	61829
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::4	65663
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::5	65660
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::6	65545
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::7	65696
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::8	65575
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::9	65929
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::10	65884
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::11	65592
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::12	65674
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::13	62819
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::14	57931
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::15	57824
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::0	83509
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::1	41674
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::2	41603
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::3	42298
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::4	44550
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::5	45300
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::6	45623
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::7	45935
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::8	46117
# Per bank write bursts (Count)	

system.mem_ctrl.dram.perBankWrBursts::9	46320	
# Per bank write bursts (Count)		
system.mem_ctrl.dram.perBankWrBursts::10	46537	
# Per bank write bursts (Count)		
system.mem_ctrl.dram.perBankWrBursts::11	46733	
# Per bank write bursts (Count)		
system.mem_ctrl.dram.perBankWrBursts::12	46879	
# Per bank write bursts (Count)		
system.mem_ctrl.dram.perBankWrBursts::13	44948	
# Per bank write bursts (Count)		
system.mem_ctrl.dram.perBankWrBursts::14	40816	
# Per bank write bursts (Count)		
system.mem_ctrl.dram.perBankWrBursts::15	40908	
# Per bank write bursts (Count)		
system.mem_ctrl.dram.totQLat	260462332750	
# Total ticks spent queuing (Tick)		
system.mem_ctrl.dram.totBusLat	53544620000	
# Total ticks spent in databus transfers (Tick)		
system.mem_ctrl.dram.totMemAccLat	461254657750	
# Total ticks spent from burst creation until serviced by the DRAM (Tick)		
system.mem_ctrl.dram.avgQLat	24321.99	
# Average queueing delay per DRAM burst ((Tick/Count))		
system.mem_ctrl.dram.avgBusLat	5000.00	
# Average bus latency per DRAM burst ((Tick/Count))		
system.mem_ctrl.dram.avgMemAccLat	43071.99	
# Average memory access latency per DRAM burst ((Tick/Count))		
system.mem_ctrl.dram.readRowHits	4119584	
# Number of row buffer hits during reads (Count)		
system.mem_ctrl.dram.writeRowHits	688318	
# Number of row buffer hits during writes (Count)		
system.mem_ctrl.dram.readRowHitRate	38.47	
# Row buffer hit rate for reads (Ratio)		
system.mem_ctrl.dram.writeRowHitRate	91.81	
# Row buffer hit rate for writes (Ratio)		
system.mem_ctrl.dram.bytesPerActivate::samples	6650760	
# Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::mean	110.265683	
# Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::gmean	93.794039	
# Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::stdev	114.591988	
# Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::0-127	3391789	51.00%
51.00% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::128-255	3143785	47.27%
98.27% # Bytes accessed per row activation (Byte)		

system.mem_ctrl.dram.bytesPerActivate::256-383	8903	0.13%
98.40% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::384-511	4696	0.07%
98.47% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::512-639	3004	0.05%
98.52% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::640-767	3487	0.05%
98.57% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::768-895	5010	0.08%
98.65% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::896-1023	14191	0.21%
98.86% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::1024-1151	75895	1.14%
100.00% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::total	6650760	
# Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesRead	685371136	
# Total bytes read (Byte)		
system.mem_ctrl.dram.bytesWritten	47984000	
# Total bytes written (Byte)		
system.mem_ctrl.dram.avgRdBW	1382.109005	
# Average DRAM read bandwidth in MiBytes/s ((Byte/Second))		
system.mem_ctrl.dram.avgWrBW	96.763804	
# Average DRAM write bandwidth in MiBytes/s ((Byte/Second))		
system.mem_ctrl.dram.peakBW	12800.00	
# Theoretical peak bandwidth in MiByte/s ((Byte/Second))		
system.mem_ctrl.dram.busUtil	11.55	
# Data bus utilization in percentage (Ratio)		
system.mem_ctrl.dram.busUtilRead	10.80	
# Data bus utilization in percentage for reads (Ratio)		
system.mem_ctrl.dram.busUtilWrite	0.76	
# Data bus utilization in percentage for writes (Ratio)		
system.mem_ctrl.dram.pageHitRate	41.96	
# Row buffer hit rate, read and write combined (Ratio)		
system.mem_ctrl.dram.power_state.pwrStateResidencyTicks::UNDEFINED		
495887903000	# Cumulative time (in ticks) in various power states (Tick)	
system.mem_ctrl.dram.rank0.actEnergy	46995401460	
# Energy for activate commands per rank (pJ) (Joule)		
system.mem_ctrl.dram.rank0.preEnergy	24978625485	
# Energy for precharge commands per rank (pJ) (Joule)		
system.mem_ctrl.dram.rank0.readEnergy	72840109440	
# Energy for read commands per rank (pJ) (Joule)		
system.mem_ctrl.dram.rank0.writeEnergy	2038368240	
# Energy for write commands per rank (pJ) (Joule)		
system.mem_ctrl.dram.rank0.refreshEnergy	39144577680.000008	
# Energy for refresh commands per rank (pJ) (Joule)		

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system.mem_ctrl.dram.rank0.actBackEnergy 178168711590
# Energy for active background per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.preBackEnergy 40384145280
# Energy for precharge background per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.actPowerDownEnergy 0
# Energy for active power-down per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.prePowerDownEnergy 0
# Energy for precharge power-down per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.selfRefreshEnergy 0
# Energy for self refresh per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.totalEnergy 404549939175
# Total energy per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.averagePower 815.809252
# Core power per rank (mW) (Watt)
system.mem_ctrl.dram.rank0.totalIdleTime 0
# Total Idle time Per DRAM Rank (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::IDLE 37382178500
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::REF 16558620000
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::SREF 0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::PRE_PDN 0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::ACT 441947104500
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::ACT_PDN 0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.actEnergy 491110620
# Energy for activate commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.preEnergy 261008715
# Energy for precharge commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.readEnergy 3621607920
# Energy for read commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.writeEnergy 1875326760
# Energy for write commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.refreshEnergy 39144577680.000008
# Energy for refresh commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.actBackEnergy 66463813740
# Energy for active background per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.preBackEnergy 134451427680
# Energy for precharge background per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.actPowerDownEnergy 0
# Energy for active power-down per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.prePowerDownEnergy 0
# Energy for precharge power-down per rank (pJ) (Joule)

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system.mem_ctrl.dram.rank1.selfRefreshEnergy          0
# Energy for self refresh per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.totalEnergy      246308873115
# Total energy per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.averagePower      496.702726
# Core power per rank (mW) (Watt)
system.mem_ctrl.dram.rank1.totalIdleTime        0
# Total Idle time Per DRAM Rank (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::IDLE 348505776500
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::REF  16558620000
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::SREF          0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::PRE_PDN        0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::ACT 130823506500
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::ACT_PDN        0
# Time in different power states (Tick)
system.mem_ctrl.power_state.pwrStateResidencyTicks::UNDEFINED 495887903000
# Cumulative time (in ticks) in various power states (Tick)
system.membus.transDist::ReadReq              12831097
# Transaction distribution (Count)
system.membus.transDist::ReadResp             12831096
# Transaction distribution (Count)
system.membus.transDist::WriteReq             7325791
# Transaction distribution (Count)
system.membus.transDist::WriteResp            7325791
# Transaction distribution (Count)
system.membus.transDist::LockedRMWReadReq      16
# Transaction distribution (Count)
system.membus.transDist::LockedRMWReadResp     16
# Transaction distribution (Count)
system.membus.transDist::LockedRMWWriteReq     16
# Transaction distribution (Count)
system.membus.transDist::LockedRMWWriteResp    16
# Transaction distribution (Count)
system.membus.pktCount_system.cpu.icache_port::system.mem_ctrl.port
12994591          # Packet count per connected requestor and
responder (Count)
system.membus.pktCount_system.cpu.icache_port::total      12994591
# Packet count per connected requestor and responder (Count)
system.membus.pktCount_system.cpu.dcache_port::system.mem_ctrl.port
27319248          # Packet count per connected requestor and
responder (Count)

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system.membus.pktCount_system.cpu.dcache_port::total      27319248
# Packet count per connected requestor and responder (Count)
system.membus.pktCount::total                             40313839
# Packet count per connected requestor and responder (Count)
system.membus.pktSize_system.cpu.icache_port::system.mem_ctrl.port
415826880          # Cumulative packet size per connected
requestor and responder (Byte)
system.membus.pktSize_system.cpu.icache_port::total      415826880
# Cumulative packet size per connected requestor and responder (Byte)
system.membus.pktSize_system.cpu.dcache_port::system.mem_ctrl.port
42283556          # Cumulative packet size per connected
requestor and responder (Byte)
system.membus.pktSize_system.cpu.dcache_port::total      42283556
# Cumulative packet size per connected requestor and responder (Byte)
system.membus.pktSize::total                             458110436
# Cumulative packet size per connected requestor and responder (Byte)
system.membus.snoops                                     0
# Total snoops (Count)
system.membus.snoopTraffic                               0
# Total snoop traffic (Byte)
system.membus.snoopFanout::samples                       20156920
# Request fanout histogram (Count)
system.membus.snoopFanout::mean                           0
# Request fanout histogram (Count)
system.membus.snoopFanout::stdev                           0
# Request fanout histogram (Count)
system.membus.snoopFanout::underflows                     0          0.00%
0.00% # Request fanout histogram (Count)
system.membus.snoopFanout::0                             20156920      100.00%
100.00% # Request fanout histogram (Count)
system.membus.snoopFanout::1                              0          0.00%
100.00% # Request fanout histogram (Count)
system.membus.snoopFanout::overflows                     0          0.00%
100.00% # Request fanout histogram (Count)
system.membus.snoopFanout::min_value                     0
# Request fanout histogram (Count)
system.membus.snoopFanout::max_value                     0
# Request fanout histogram (Count)
system.membus.snoopFanout::total                         20156920
# Request fanout histogram (Count)
system.membus.power_state.pwrStateResidencyTicks::UNDEFINED 495887903000
# Cumulative time (in ticks) in various power states (Tick)
system.membus.reqLayer2.occupancy                       27482727000
# Layer occupancy (ticks) (Tick)
system.membus.reqLayer2.utilization                     0.1
# Layer utilization (Ratio)

```

```

system.membus.respLayer0.occupancy          34870803250
# Layer occupancy (ticks) (Tick)
system.membus.respLayer0.utilization        0.1
# Layer utilization (Ratio)
system.membus.respLayer1.occupancy          21328052248
# Layer occupancy (ticks) (Tick)
system.membus.respLayer1.utilization        0.0
# Layer utilization (Ratio)
system.membus.snoop_filter.totRequests      0
# Total number of requests made to the snoop filter. (Count)
system.membus.snoop_filter.hitSingleRequests 0
# Number of requests hitting in the snoop filter with a single holder of
the requested data. (Count)
system.membus.snoop_filter.hitMultiRequests 0
# Number of requests hitting in the snoop filter with multiple (>1)
holders of the requested data. (Count)
system.membus.snoop_filter.totSnoops        0
# Total number of snoops made to the snoop filter. (Count)
system.membus.snoop_filter.hitSingleSnoops  0
# Number of snoops hitting in the snoop filter with a single holder of the
requested data. (Count)
system.membus.snoop_filter.hitMultiSnoops    0
# Number of snoops hitting in the snoop filter with multiple (>1) holders
of the requested data. (Count)
system.workload.inst.arm                    0
# number of arm instructions executed (Count)
system.workload.inst.quiesce                0
# number of quiesce instructions executed (Count)

```

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

Stats 4.2

```

----- Begin Simulation Statistics -----
simSeconds          2.904979
# Number of seconds simulated (Second)
simTicks            2904978744369
# Number of ticks simulated (Tick)
finalTick           2904978744369
# Number of ticks from beginning of simulation (restored from checkpoints
and never reset) (Tick)
simFreq             1000000000000
# The number of ticks per simulated second ((Tick/Second))
hostSeconds         151.65
# Real time elapsed on the host (Second)
hostTickRate        19155619113
# The number of ticks simulated per host second (ticks/s) ((Tick/Second))

```

hostMemory	655496
# Number of bytes of host memory used (Byte)	
simInsts	36199500
# Number of instructions simulated (Count)	
simOps	76555494
# Number of ops (including micro ops) simulated (Count)	
hostInstRate	238702
# Simulator instruction rate (inst/s) ((Count/Second))	
hostOpRate	504812
# Simulator op (including micro ops) rate (op/s) ((Count/Second))	
system.clk_domain.clock	333
# Clock period in ticks (Tick)	
system.clk_domain.voltage_domain.voltage	1
# Voltage in Volts (Volt)	
system.cpu.numCycles	8723659893
# Number of cpu cycles simulated (Cycle)	
system.cpu.numWorkItemsStarted	0
# Number of work items this cpu started (Count)	
system.cpu.numWorkItemsCompleted	0
# Number of work items this cpu completed (Count)	
system.cpu.exec_context.thread_0.numInsts	36199500
# Number of instructions committed (Count)	
system.cpu.exec_context.thread_0.numOps	76555494
# Number of ops (including micro ops) committed (Count)	
system.cpu.exec_context.thread_0.numIntAluAccesses	76554574
# Number of integer alu accesses (Count)	
system.cpu.exec_context.thread_0.numFpAluAccesses	1471
# Number of float alu accesses (Count)	
system.cpu.exec_context.thread_0.numVecAluAccesses	0
# Number of vector alu accesses (Count)	
system.cpu.exec_context.thread_0.numCallsReturns	373
# Number of times a function call or return occurred (Count)	
system.cpu.exec_context.thread_0.numCondCtrlInsts	5125826
# Number of instructions that are conditional controls (Count)	
system.cpu.exec_context.thread_0.numIntInsts	76554574
# Number of integer instructions (Count)	
system.cpu.exec_context.thread_0.numFpInsts	1471
# Number of float instructions (Count)	
system.cpu.exec_context.thread_0.numVecInsts	0
# Number of vector instructions (Count)	
system.cpu.exec_context.thread_0.numIntRegReads	87007781
# Number of times the integer registers were read (Count)	
system.cpu.exec_context.thread_0.numIntRegWrites	58976338
# Number of times the integer registers were written (Count)	
system.cpu.exec_context.thread_0.numFpRegReads	1590
# Number of times the floating registers were read (Count)	


```

system.cpu.exec_context.thread_0.numFpRegWrites      859
# Number of times the floating registers were written (Count)
system.cpu.exec_context.thread_0.numVecRegReads      0
# Number of times the vector registers were read (Count)
system.cpu.exec_context.thread_0.numVecRegWrites     0
# Number of times the vector registers were written (Count)
system.cpu.exec_context.thread_0.numVecPredRegReads  0
# Number of times the predicate registers were read (Count)
system.cpu.exec_context.thread_0.numVecPredRegWrites 0
# Number of times the predicate registers were written (Count)
system.cpu.exec_context.thread_0.numCCRegReads      26632889
# Number of times the CC registers were read (Count)
system.cpu.exec_context.thread_0.numCCRegWrites     24904504
# Number of times the CC registers were written (Count)
system.cpu.exec_context.thread_0.numMiscRegReads     37276209
# Number of times the Misc registers were read (Count)
system.cpu.exec_context.thread_0.numMiscRegWrites    0
# Number of times the Misc registers were written (Count)
system.cpu.exec_context.thread_0.numMemRefs         22899889
# Number of memory refs (Count)
system.cpu.exec_context.thread_0.numLoadInsts       15574080
# Number of load instructions (Count)
system.cpu.exec_context.thread_0.numStoreInsts      7325809
# Number of store instructions (Count)
system.cpu.exec_context.thread_0.numIdleCycles      0.003003
# Number of idle cycles (Cycle)
system.cpu.exec_context.thread_0.numBusyCycles 8723659892.996996
# Number of busy cycles (Cycle)
system.cpu.exec_context.thread_0.notIdleFraction    1.000000
# Percentage of non-idle cycles (Ratio)
system.cpu.exec_context.thread_0.idleFraction      0.000000
# Percentage of idle cycles (Ratio)
system.cpu.exec_context.thread_0.numBranches       5126544
# Number of branches fetched (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::No_OpClass
236      0.00%      0.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::IntAlu      53654589
70.09%    70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::IntMult
177      0.00%    70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::IntDiv      28
0.00%    70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatAdd
184      0.00%    70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatCmp
0        0.00%    70.09% # Class of executed instruction. (Count)

```

```

system.cpu.exec_context.thread_0.statExecutedInstType::FloatCvt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMult
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMultAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatDiv
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMisc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatSqrt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAdd
8      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAddAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAlu
98     0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdCvt
54     0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdMisc
252    0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdMult
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdMultAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdShift
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdShiftAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdDiv
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSqrt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatAdd
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatAlu
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatCvt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatDiv
0      0.00%      70.09% # Class of executed instruction. (Count)

```

```

system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatMisc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatMult
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatMultAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatSqrt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdReduceAdd
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdReduceAlu
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdReduceCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatReduceAdd
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatReduceCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAes
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAesMix
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSha1Hash
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSha1Hash2
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSha256Hash
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSha256Hash2
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdShaSigma2
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdShaSigma3
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdPredAlu
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::MemRead
15573939    20.34%    90.43% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::MemWrite
7325245     9.57%   100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMemRead
141      0.00%   100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMemWrite
564      0.00%   100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::IprAccess
0      0.00%   100.00% # Class of executed instruction. (Count)

```

```

system.cpu.exec_context.thread_0.statExecutedInstType::InstPrefetch
0      0.00%      100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::total      76555515
# Class of executed instruction. (Count)
system.cpu.interrupts.clk_domain.clock      5328
# Clock period in ticks (Tick)
system.cpu.mmu.dtb.rdAccesses      15574084
# TLB accesses on read requests (Count)
system.cpu.mmu.dtb.wrAccesses      7325810
# TLB accesses on write requests (Count)
system.cpu.mmu.dtb.rdMisses      421
# TLB misses on read requests (Count)
system.cpu.mmu.dtb.wrMisses      28844
# TLB misses on write requests (Count)
system.cpu.mmu.dtb.walker.power_state.pwrStateResidencyTicks::UNDEFINED
2904978744369      # Cumulative time (in ticks) in
various power states (Tick)
system.cpu.mmu.itb.rdAccesses      0
# TLB accesses on read requests (Count)
system.cpu.mmu.itb.wrAccesses      47529643
# TLB accesses on write requests (Count)
system.cpu.mmu.itb.rdMisses      0
# TLB misses on read requests (Count)
system.cpu.mmu.itb.wrMisses      56
# TLB misses on write requests (Count)
system.cpu.mmu.itb.walker.power_state.pwrStateResidencyTicks::UNDEFINED
2904978744369      # Cumulative time (in ticks) in
various power states (Tick)
system.cpu.power_state.pwrStateResidencyTicks::ON 2904978744369
# Cumulative time (in ticks) in various power states (Tick)
system.cpu.thread_0.numInsts      0
# Number of Instructions committed (Count)
system.cpu.thread_0.numOps      0
# Number of Ops committed (Count)
system.cpu.thread_0.numMemRefs      0
# Number of Memory References (Count)
system.cpu.workload.numSyscalls      17
# Number of system calls (Count)
system.mem_ctrl.avgPriority_cpu.inst::samples 47529643.00
# Average QoS priority value for accepted requests (Count)
system.mem_ctrl.avgPriority_cpu.data::samples 6943403.00
# Average QoS priority value for accepted requests (Count)
system.mem_ctrl.priorityMinLatency      0.000000018750
# per QoS priority minimum request to response latency (Second)
system.mem_ctrl.priorityMaxLatency      1.983623239254
# per QoS priority maximum request to response latency (Second)

```

```

system.mem_ctrl.numReadWriteTurnArounds      44371
# Number of turnarounds from READ to WRITE (Count)
system.mem_ctrl.numWriteReadTurnArounds      44371
# Number of turnarounds from WRITE to READ (Count)
system.mem_ctrl.numStayReadState             115552918
# Number of times bus staying in READ state (Count)
system.mem_ctrl.numStayWriteState            666701
# Number of times bus staying in WRITE state (Count)
system.mem_ctrl.readReqs                     63103726
# Number of read requests accepted (Count)
system.mem_ctrl.writeReqs                    7325807
# Number of write requests accepted (Count)
system.mem_ctrl.readBursts                   63103726
# Number of controller read bursts, including those serviced by the write
queue (Count)
system.mem_ctrl.writeBursts                  7325807
# Number of controller write bursts, including those merged in the write
queue (Count)
system.mem_ctrl.servicedByWrQ                9340636
# Number of controller read bursts serviced by the write queue (Count)
system.mem_ctrl.mergedWrBursts               6615851
# Number of controller write bursts merged with an existing one (Count)
system.mem_ctrl.neitherReadNorWriteReqs      0
# Number of requests that are neither read nor write (Count)
system.mem_ctrl.avgRdQLen                    1.00
# Average read queue length when enqueueing ((Count/Tick))
system.mem_ctrl.avgWrQLen                    24.97
# Average write queue length when enqueueing ((Count/Tick))
system.mem_ctrl.numRdRetry                   0
# Number of times read queue was full causing retry (Count)
system.mem_ctrl.numWrRetry                   0
# Number of times write queue was full causing retry (Count)
system.mem_ctrl.readPktSize::0               1001231
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::1               19
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::2               14571441
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::3               47531035
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::4               0
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::5               0
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::6               0
# Read request sizes (log2) (Count)

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system.mem_ctrl.writePktSize::0	3122099
# Write request sizes (log2) (Count)	
system.mem_ctrl.writePktSize::1	3
# Write request sizes (log2) (Count)	
system.mem_ctrl.writePktSize::2	4201939
# Write request sizes (log2) (Count)	
system.mem_ctrl.writePktSize::3	1766
# Write request sizes (log2) (Count)	
system.mem_ctrl.writePktSize::4	0
# Write request sizes (log2) (Count)	
system.mem_ctrl.writePktSize::5	0
# Write request sizes (log2) (Count)	
system.mem_ctrl.writePktSize::6	0
# Write request sizes (log2) (Count)	
system.mem_ctrl.rdQLenPdf::0	53763086
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::1	4
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::2	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::3	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::4	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::5	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::6	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::7	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::8	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::9	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::10	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::11	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::12	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::13	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::14	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::15	0
# What read queue length does an incoming req see (Count)	

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system.mem_ctrl.rdQLenPdf::16      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::17      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::18      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::19      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::20      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::21      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::22      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::23      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::24      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::25      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::26      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::27      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::28      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::29      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::30      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::31      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::0       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::1       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::2       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::3       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::4       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::5       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::6       1
# What write queue length does an incoming req see (Count)

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```

system.mem_ctrl.wrQLenPdf::7          1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::8          1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::9          1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::10         1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::11         1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::12         1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::13         1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::14         1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::15         2
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::16         2
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::17        44371
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::18        44371
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::19        44371
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::20        44371
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::21        44371
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::22        44371
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::23        44371
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::24        44372
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::25        44371
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::26        44371
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::27        44371
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::28        44371
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::29        44371
# What write queue length does an incoming req see (Count)

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```
system.mem_ctrl.wrQLenPdf::30          44371
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::31          44371
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::32          44371
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::33          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::34          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::35          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::36          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::37          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::38          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::39          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::40          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::41          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::42          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::43          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::44          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::45          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::46          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::47          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::48          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::49          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::50          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::51          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::52          0
# What write queue length does an incoming req see (Count)
```

```

system.mem_ctrl.wrQLenPdf::53          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::54          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::55          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::56          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::57          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::58          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::59          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::60          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::61          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::62          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::63          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.rdPerTurnAround::samples  44371
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::mean    1211.670122
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::gmean   338.242484
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::stdev   86586.289948
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::0-1.04858e+06    44370    100.00%
100.00% # Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::1.78258e+07-1.88744e+07    1
0.00%    100.00% # Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::total    44371
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.wrPerTurnAround::samples  44371
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::mean    16.000045
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::gmean   16.000042
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::stdev    0.009495
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::16    44370    100.00%
100.00% # Writes before turning the bus around for reads (Count)

```

```

system.mem_ctrl.wrPerTurnAround::18          1      0.00%
100.00% # Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::total      44371
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.bytesReadWrQ                597800704
# Total number of bytes read from write queue (Byte)
system.mem_ctrl.bytesReadSys                439535306
# Total read bytes from the system interface side (Byte)
system.mem_ctrl.bytesWrittenSys             19943987
# Total written bytes from the system interface side (Byte)
system.mem_ctrl.avgRdBWSys                  151304138.40445256
# Average system read bandwidth in Byte/s ((Byte/Second))
system.mem_ctrl.avgWrBWSys                  6865450.23389908
# Average system write bandwidth in Byte/s ((Byte/Second))
system.mem_ctrl.totGap                      2904978632481
# Total gap between requests (Tick)
system.mem_ctrl.avgGap                      41246.60
# Average gap between requests ((Tick/Count))
system.mem_ctrl.requestorReadBytes::cpu.inst 380237144
# Per-requestor bytes read from memory (Byte)
system.mem_ctrl.requestorReadBytes::cpu.data 21934765
# Per-requestor bytes read from memory (Byte)
system.mem_ctrl.requestorWriteBytes::cpu.data 721850
# Per-requestor bytes write to memory (Byte)
system.mem_ctrl.requestorReadRate::cpu.inst 130891540.854489982128
# Per-requestor bytes read from memory rate ((Byte/Second))
system.mem_ctrl.requestorReadRate::cpu.data 7550748.879838885739
# Per-requestor bytes read from memory rate ((Byte/Second))
system.mem_ctrl.requestorWriteRate::cpu.data 248487.188210664666
# Per-requestor bytes write to memory rate ((Byte/Second))
system.mem_ctrl.requestorReadAccesses::cpu.inst 47529643
# Per-requestor read serviced memory accesses (Count)
system.mem_ctrl.requestorReadAccesses::cpu.data 15574083
# Per-requestor read serviced memory accesses (Count)
system.mem_ctrl.requestorWriteAccesses::cpu.data 7325807
# Per-requestor write serviced memory accesses (Count)
system.mem_ctrl.requestorReadTotalLat::cpu.inst 1143607376552
# Per-requestor read total memory access latency (Tick)
system.mem_ctrl.requestorReadTotalLat::cpu.data 267861554323
# Per-requestor read total memory access latency (Tick)
system.mem_ctrl.requestorWriteTotalLat::cpu.data 70795069287956
# Per-requestor write total memory access latency (Tick)
system.mem_ctrl.requestorReadAvgLat::cpu.inst 24060.93
# Per-requestor read average memory access latency ((Tick/Count))
system.mem_ctrl.requestorReadAvgLat::cpu.data 17199.19
# Per-requestor read average memory access latency ((Tick/Count))

```

```
system.mem_ctrl.requestorWriteAvgLat::cpu.data    9663791.21
# Per-requestor write average memory access latency ((Tick/Count))
system.mem_ctrl.dram.bytesRead::cpu.inst         380237144
# Number of bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesRead::cpu.data         59298162
# Number of bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesRead::total            439535306
# Number of bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesInstRead::cpu.inst      380237144
# Number of instructions bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesInstRead::total         380237144
# Number of instructions bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesWritten::cpu.data       19943987
# Number of bytes written to this memory (Byte)
system.mem_ctrl.dram.bytesWritten::total          19943987
# Number of bytes written to this memory (Byte)
system.mem_ctrl.dram.numReads::cpu.inst           47529643
# Number of read requests responded to by this memory (Count)
system.mem_ctrl.dram.numReads::cpu.data           15574083
# Number of read requests responded to by this memory (Count)
system.mem_ctrl.dram.numReads::total              63103726
# Number of read requests responded to by this memory (Count)
system.mem_ctrl.dram.numWrites::cpu.data           7325807
# Number of write requests responded to by this memory (Count)
system.mem_ctrl.dram.numWrites::total              7325807
# Number of write requests responded to by this memory (Count)
system.mem_ctrl.dram.bwRead::cpu.inst             130891541
# Total read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwRead::cpu.data             20412598
# Total read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwRead::total                151304138
# Total read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwInstRead::cpu.inst          130891541
# Instruction read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwInstRead::total            130891541
# Instruction read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwWrite::cpu.data             6865450
# Write bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwWrite::total                6865450
# Write bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwTotal::cpu.inst             130891541
# Total bandwidth to/from this memory ((Byte/Second))
system.mem_ctrl.dram.bwTotal::cpu.data            27278048
# Total bandwidth to/from this memory ((Byte/Second))
system.mem_ctrl.dram.bwTotal::total               158169589
# Total bandwidth to/from this memory ((Byte/Second))
```

system.mem_ctrl.dram.readBursts	53763090
# Number of DRAM read bursts (Count)	
system.mem_ctrl.dram.writeBursts	709938
# Number of DRAM write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::0	52805285
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::1	58690
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::2	58157
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::3	61971
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::4	66160
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::5	66349
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::6	65557
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::7	66179
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::8	65688
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::9	67381
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::10	66785
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::11	65843
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::12	66137
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::13	62865
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::14	58979
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankRdBursts::15	61064
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::0	44533
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::1	41907
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::2	41515
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::3	42093
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::4	44340
# Per bank write bursts (Count)	

system.mem_ctrl.dram.perBankWrBursts::5	45115
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::6	45484
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::7	45866
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::8	46100
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::9	46302
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::10	46512
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::11	46708
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::12	46858
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::13	44924
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::14	40794
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::15	40887
# Per bank write bursts (Count)	
system.mem_ctrl.dram.totQLat	403410993375
# Total ticks spent queuing (Tick)	
system.mem_ctrl.dram.totBusLat	268815450000
# Total ticks spent in databus transfers (Tick)	
system.mem_ctrl.dram.totMemAccLat	1411468930875
# Total ticks spent from burst creation until serviced by the DRAM (Tick)	
system.mem_ctrl.dram.avgQLat	7503.49
# Average queueing delay per DRAM burst ((Tick/Count))	
system.mem_ctrl.dram.avgBusLat	5000.00
# Average bus latency per DRAM burst ((Tick/Count))	
system.mem_ctrl.dram.avgMemAccLat	26253.49
# Average memory access latency per DRAM burst ((Tick/Count))	
system.mem_ctrl.dram.readRowHits	42188256
# Number of row buffer hits during reads (Count)	
system.mem_ctrl.dram.writeRowHits	648271
# Number of row buffer hits during writes (Count)	
system.mem_ctrl.dram.readRowHitRate	78.47
# Row buffer hit rate for reads (Ratio)	
system.mem_ctrl.dram.writeRowHitRate	91.31
# Row buffer hit rate for writes (Ratio)	
system.mem_ctrl.dram.bytesPerActivate::samples	11636492
# Bytes accessed per row activation (Byte)	
system.mem_ctrl.dram.bytesPerActivate::mean	299.597937
# Bytes accessed per row activation (Byte)	

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system.mem_ctrl.dram.bytesPerActivate::gmean    170.594697
# Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::stdev    305.879668
# Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::0-127    5442191    46.77%
46.77% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::128-255    2170999    18.66%
65.43% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::256-383    68240    0.59%
66.01% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::384-511    243053    2.09%
68.10% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::512-639    993233    8.54%
76.64% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::640-767    2082764    17.90%
94.53% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::768-895    3089    0.03%
94.56% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::896-1023    3745    0.03%
94.59% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::1024-1151    629178    5.41%
100.00% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::total    11636492
# Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesRead    3440837760
# Total bytes read (Byte)
system.mem_ctrl.dram.bytesWritten    45436032
# Total bytes written (Byte)
system.mem_ctrl.dram.avgRdBW    1184.462285
# Average DRAM read bandwidth in MiBytes/s ((Byte/Second))
system.mem_ctrl.dram.avgWrBW    15.640745
# Average DRAM write bandwidth in MiBytes/s ((Byte/Second))
system.mem_ctrl.dram.peakBW    12800.00
# Theoretical peak bandwidth in MiByte/s ((Byte/Second))
system.mem_ctrl.dram.busUtil    9.38
# Data bus utilization in percentage (Ratio)
system.mem_ctrl.dram.busUtilRead    9.25
# Data bus utilization in percentage for reads (Ratio)
system.mem_ctrl.dram.busUtilWrite    0.12
# Data bus utilization in percentage for writes (Ratio)
system.mem_ctrl.dram.pageHitRate    78.64
# Row buffer hit rate, read and write combined (Ratio)
system.mem_ctrl.dram.power_state.pwrStateResidencyTicks::UNDEFINED
2904978744369    # Cumulative time (in ticks) in
various power states (Tick)
system.mem_ctrl.dram.rank0.actEnergy    82411657860
# Energy for activate commands per rank (pJ) (Joule)

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```

system.mem_ctrl.dram.rank0.preEnergy      43802815980
# Energy for precharge commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.readEnergy     380193204720
# Energy for read commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.writeEnergy     1831452660
# Energy for write commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.refreshEnergy 229316037600.000031
# Energy for refresh commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.actBackEnergy 1259461453290
# Energy for active background per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.preBackEnergy  54912719520
# Energy for precharge background per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.actPowerDownEnergy 0
# Energy for active power-down per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.prePowerDownEnergy 0
# Energy for precharge power-down per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.selfRefreshEnergy 0
# Energy for self refresh per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.totalEnergy    2051929341630
# Total energy per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.averagePower   706.349176
# Core power per rank (mW) (Watt)
system.mem_ctrl.dram.rank0.totalIdleTime  0
# Total Idle time Per DRAM Rank (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::IDLE 16427461440
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::REF 97003400000
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::SREF 0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::PRE_PDN 0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::ACT 2791547882929
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::ACT_PDN 0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.actEnergy      672959280
# Energy for activate commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.preEnergy      357671160
# Energy for precharge commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.readEnergy     3675257880
# Energy for read commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.writeEnergy    1874423700
# Energy for write commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.refreshEnergy 229316037600.000031
# Energy for refresh commands per rank (pJ) (Joule)

```



```

system.mem_ctrl.dram.rank1.actBackEnergy 261012021960
# Energy for active background per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.preBackEnergy 895712240640
# Energy for precharge background per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.actPowerDownEnergy 0
# Energy for active power-down per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.prePowerDownEnergy 0
# Energy for precharge power-down per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.selfRefreshEnergy 0
# Energy for self refresh per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.totalEnergy 1392620612220
# Total energy per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.averagePower 479.390982
# Core power per rank (mW) (Watt)
system.mem_ctrl.dram.rank1.totalIdleTime 0
# Total Idle time Per DRAM Rank (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::IDLE 2326194428411
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::REF 97003400000
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::SREF 0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::PRE_PDN 0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::ACT 481780915958
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::ACT_PDN 0
# Time in different power states (Tick)
system.mem_ctrl.power_state.pwrStateResidencyTicks::UNDEFINED
2904978744369 # Cumulative time (in ticks) in
various power states (Tick)
system.membus.transDist::ReadReq 63103710
# Transaction distribution (Count)
system.membus.transDist::ReadResp 63103710
# Transaction distribution (Count)
system.membus.transDist::WriteReq 7325791
# Transaction distribution (Count)
system.membus.transDist::WriteResp 7325791
# Transaction distribution (Count)
system.membus.transDist::LockedRMWReadReq 16
# Transaction distribution (Count)
system.membus.transDist::LockedRMWReadResp 16
# Transaction distribution (Count)
system.membus.transDist::LockedRMWWriteReq 16
# Transaction distribution (Count)
system.membus.transDist::LockedRMWWriteResp 16
# Transaction distribution (Count)

```

```

system.membus.pktCount_system.cpu.icache_port::system.mem_ctrl.port
95059286          # Packet count per connected requestor and
responder (Count)
system.membus.pktCount_system.cpu.icache_port::total      95059286
# Packet count per connected requestor and responder (Count)
system.membus.pktCount_system.cpu.dcache_port::system.mem_ctrl.port
45799780          # Packet count per connected requestor and
responder (Count)
system.membus.pktCount_system.cpu.dcache_port::total      45799780
# Packet count per connected requestor and responder (Count)
system.membus.pktCount::total      140859066
# Packet count per connected requestor and responder (Count)
system.membus.pktSize_system.cpu.icache_port::system.mem_ctrl.port
380237144          # Cumulative packet size per connected
requestor and responder (Byte)
system.membus.pktSize_system.cpu.icache_port::total      380237144
# Cumulative packet size per connected requestor and responder (Byte)
system.membus.pktSize_system.cpu.dcache_port::system.mem_ctrl.port
79242149          # Cumulative packet size per connected
requestor and responder (Byte)
system.membus.pktSize_system.cpu.dcache_port::total      79242149
# Cumulative packet size per connected requestor and responder (Byte)
system.membus.pktSize::total      459479293
# Cumulative packet size per connected requestor and responder (Byte)
system.membus.snoops      0
# Total snoops (Count)
system.membus.snoopTraffic      0
# Total snoop traffic (Byte)
system.membus.snoopFanout::samples      70429533
# Request fanout histogram (Count)
system.membus.snoopFanout::mean      0
# Request fanout histogram (Count)
system.membus.snoopFanout::stdev      0
# Request fanout histogram (Count)
system.membus.snoopFanout::underflows      0      0.00%
0.00% # Request fanout histogram (Count)
system.membus.snoopFanout::0      70429533      100.00%
100.00% # Request fanout histogram (Count)
system.membus.snoopFanout::1      0      0.00%
100.00% # Request fanout histogram (Count)
system.membus.snoopFanout::overflows      0      0.00%
100.00% # Request fanout histogram (Count)
system.membus.snoopFanout::min_value      0
# Request fanout histogram (Count)
system.membus.snoopFanout::max_value      0
# Request fanout histogram (Count)

```

```

system.membus.snoopFanout::total          70429533
# Request fanout histogram (Count)
system.membus.power_state.pwrStateResidencyTicks::UNDEFINED 2904978744369
# Cumulative time (in ticks) in various power states (Tick)
system.membus.reqLayer2.occupancy          25892528220
# Layer occupancy (ticks) (Tick)
system.membus.reqLayer2.utilization         0.0
# Layer utilization (Ratio)
system.membus.respLayer0.occupancy          40605288314
# Layer occupancy (ticks) (Tick)
system.membus.respLayer0.utilization         0.0
# Layer utilization (Ratio)
system.membus.respLayer1.occupancy          18475240264
# Layer occupancy (ticks) (Tick)
system.membus.respLayer1.utilization         0.0
# Layer utilization (Ratio)
system.membus.snoop_filter.totRequests       0
# Total number of requests made to the snoop filter. (Count)
system.membus.snoop_filter.hitSingleRequests 0
# Number of requests hitting in the snoop filter with a single holder of
the requested data. (Count)
system.membus.snoop_filter.hitMultiRequests 0
# Number of requests hitting in the snoop filter with multiple (>1)
holders of the requested data. (Count)
system.membus.snoop_filter.totSnoops         0
# Total number of snoops made to the snoop filter. (Count)
system.membus.snoop_filter.hitSingleSnoops   0
# Number of snoops hitting in the snoop filter with a single holder of the
requested data. (Count)
system.membus.snoop_filter.hitMultiSnoops    0
# Number of snoops hitting in the snoop filter with multiple (>1) holders
of the requested data. (Count)
system.workload.inst.arm                     0
# number of arm instructions executed (Count)
system.workload.inst.quiesce                 0
# number of quiesce instructions executed (Count)

```

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

Stats 4.3

```

----- Begin Simulation Statistics -----
simSeconds          3.271749
# Number of seconds simulated (Second)
simTicks            3271748533000
# Number of ticks simulated (Tick)

```

```

finalTick                                3271748533000
# Number of ticks from beginning of simulation (restored from checkpoints
and never reset) (Tick)
simFreq                                  1000000000000
# The number of ticks per simulated second ((Tick/Second))
hostSeconds                              152.52
# Real time elapsed on the host (Second)
hostTickRate                             21450822174
# The number of ticks simulated per host second (ticks/s) ((Tick/Second))
hostMemory                               655496
# Number of bytes of host memory used (Byte)
simInsts                                 36199500
# Number of instructions simulated (Count)
simOps                                   76555494
# Number of ops (including micro ops) simulated (Count)
hostInstRate                             237337
# Simulator instruction rate (inst/s) ((Count/Second))
hostOpRate                               501926
# Simulator op (including micro ops) rate (op/s) ((Count/Second))
system.clk_domain.clock                   1000
# Clock period in ticks (Tick)
system.clk_domain.voltage_domain.voltage 1
# Voltage in Volts (Volt)
system.cpu.numCycles                      3271748533
# Number of cpu cycles simulated (Cycle)
system.cpu.numWorkItemsStarted             0
# Number of work items this cpu started (Count)
system.cpu.numWorkItemsCompleted           0
# Number of work items this cpu completed (Count)
system.cpu.exec_context.thread_0.numInsts  36199500
# Number of instructions committed (Count)
system.cpu.exec_context.thread_0.numOps     76555494
# Number of ops (including micro ops) committed (Count)
system.cpu.exec_context.thread_0.numIntAluAccesses 76554574
# Number of integer alu accesses (Count)
system.cpu.exec_context.thread_0.numFpAluAccesses 1471
# Number of float alu accesses (Count)
system.cpu.exec_context.thread_0.numVecAluAccesses 0
# Number of vector alu accesses (Count)
system.cpu.exec_context.thread_0.numCallsReturns 373
# Number of times a function call or return occurred (Count)
system.cpu.exec_context.thread_0.numCondCtrlInsts 5125826
# Number of instructions that are conditional controls (Count)
system.cpu.exec_context.thread_0.numIntInsts 76554574
# Number of integer instructions (Count)
system.cpu.exec_context.thread_0.numFpInsts 1471
# Number of float instructions (Count)

```

```

system.cpu.exec_context.thread_0.numVecInsts          0
# Number of vector instructions (Count)
system.cpu.exec_context.thread_0.numIntRegReads      87007781
# Number of times the integer registers were read (Count)
system.cpu.exec_context.thread_0.numIntRegWrites     58976338
# Number of times the integer registers were written (Count)
system.cpu.exec_context.thread_0.numFpRegReads       1590
# Number of times the floating registers were read (Count)
system.cpu.exec_context.thread_0.numFpRegWrites      859
# Number of times the floating registers were written (Count)
system.cpu.exec_context.thread_0.numVecRegReads      0
# Number of times the vector registers were read (Count)
system.cpu.exec_context.thread_0.numVecRegWrites     0
# Number of times the vector registers were written (Count)
system.cpu.exec_context.thread_0.numVecPredRegReads  0
# Number of times the predicate registers were read (Count)
system.cpu.exec_context.thread_0.numVecPredRegWrites 0
# Number of times the predicate registers were written (Count)
system.cpu.exec_context.thread_0.numCCRegReads       26632889
# Number of times the CC registers were read (Count)
system.cpu.exec_context.thread_0.numCCRegWrites      24904504
# Number of times the CC registers were written (Count)
system.cpu.exec_context.thread_0.numMiscRegReads     37276209
# Number of times the Misc registers were read (Count)
system.cpu.exec_context.thread_0.numMiscRegWrites    0
# Number of times the Misc registers were written (Count)
system.cpu.exec_context.thread_0.numMemRefs          22899889
# Number of memory refs (Count)
system.cpu.exec_context.thread_0.numLoadInsts        15574080
# Number of load instructions (Count)
system.cpu.exec_context.thread_0.numStoreInsts       7325809
# Number of store instructions (Count)
system.cpu.exec_context.thread_0.numIdleCycles       0.001000
# Number of idle cycles (Cycle)
system.cpu.exec_context.thread_0.numBusyCycles 3271748532.999000
# Number of busy cycles (Cycle)
system.cpu.exec_context.thread_0.notIdleFraction     1.000000
# Percentage of non-idle cycles (Ratio)
system.cpu.exec_context.thread_0.idleFraction        0.000000
# Percentage of idle cycles (Ratio)
system.cpu.exec_context.thread_0.numBranches         5126544
# Number of branches fetched (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::No_OpClass
236          0.00%          0.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::IntAlu      53654589
70.09%       70.09% # Class of executed instruction. (Count)

```

```

system.cpu.exec_context.thread_0.statExecutedInstType::IntMult
177      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::IntDiv
0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatAdd
184      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatCvt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMult
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMultAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatDiv
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMisc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatSqrt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAdd
8      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAddAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAlu
98      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdCvt
54      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdMisc
252      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdMult
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdMultAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdShift
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdShiftAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdDiv
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSqrt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatAdd
0      0.00%      70.09% # Class of executed instruction. (Count)

```

```

system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatAlu
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatCvt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatDiv
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatMisc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatMult
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatMultAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatSqrt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdReduceAdd
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdReduceAlu
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdReduceCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatReduceAdd
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatReduceCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAes
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAesMix
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdShalHash
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdShalHash2
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSha256Hash
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSha256Hash2
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdShaSigma2
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdShaSigma3
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdPredAlu
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::MemRead
15573939      20.34%      90.43% # Class of executed instruction. (Count)

```

```

system.cpu.exec_context.thread_0.statExecutedInstType::MemWrite
7325245      9.57%    100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMemRead
141         0.00%    100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMemWrite
564         0.00%    100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::IprAccess
0          0.00%    100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::InstPrefetch
0          0.00%    100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::total      76555515
# Class of executed instruction. (Count)
system.cpu.interrupts.clk_domain.clock      16000
# Clock period in ticks (Tick)
system.cpu.mmu.dtb.rdAccesses      15574084
# TLB accesses on read requests (Count)
system.cpu.mmu.dtb.wrAccesses      7325810
# TLB accesses on write requests (Count)
system.cpu.mmu.dtb.rdMisses      421
# TLB misses on read requests (Count)
system.cpu.mmu.dtb.wrMisses      28844
# TLB misses on write requests (Count)
system.cpu.mmu.dtb.walker.power_state.pwrStateResidencyTicks::UNDEFINED
3271748533000      # Cumulative time (in ticks) in
various power states (Tick)
system.cpu.mmu.itb.rdAccesses      0
# TLB accesses on read requests (Count)
system.cpu.mmu.itb.wrAccesses      47529643
# TLB accesses on write requests (Count)
system.cpu.mmu.itb.rdMisses      0
# TLB misses on read requests (Count)
system.cpu.mmu.itb.wrMisses      56
# TLB misses on write requests (Count)
system.cpu.mmu.itb.walker.power_state.pwrStateResidencyTicks::UNDEFINED
3271748533000      # Cumulative time (in ticks) in
various power states (Tick)
system.cpu.power_state.pwrStateResidencyTicks::ON 3271748533000
# Cumulative time (in ticks) in various power states (Tick)
system.cpu.thread_0.numInsts      0
# Number of Instructions committed (Count)
system.cpu.thread_0.numOps      0
# Number of Ops committed (Count)
system.cpu.thread_0.numMemRefs      0
# Number of Memory References (Count)
system.cpu.workload.numSyscalls      17
# Number of system calls (Count)

```



```

system.mem_ctrl.avgPriority_cpu.inst::samples 47529643.00
# Average QoS priority value for accepted requests (Count)
system.mem_ctrl.avgPriority_cpu.data::samples 6926926.00
# Average QoS priority value for accepted requests (Count)
system.mem_ctrl.priorityMinLatency 0.000000016842
# per QoS priority minimum request to response latency (Second)
system.mem_ctrl.priorityMaxLatency 2.172427269932
# per QoS priority maximum request to response latency (Second)
system.mem_ctrl.numReadWriteTurnArounds 44297
# Number of turnarounds from READ to WRITE (Count)
system.mem_ctrl.numWriteReadTurnArounds 44297
# Number of turnarounds from WRITE to READ (Count)
system.mem_ctrl.numStayReadState 115615734
# Number of times bus staying in READ state (Count)
system.mem_ctrl.numStayWriteState 665331
# Number of times bus staying in WRITE state (Count)
system.mem_ctrl.readReqs 63103726
# Number of read requests accepted (Count)
system.mem_ctrl.writeReqs 7325807
# Number of write requests accepted (Count)
system.mem_ctrl.readBursts 63103726
# Number of controller read bursts, including those serviced by the write
queue (Count)
system.mem_ctrl.writeBursts 7325807
# Number of controller write bursts, including those merged in the write
queue (Count)
system.mem_ctrl.servicedByWrQ 9356785
# Number of controller read bursts serviced by the write queue (Count)
system.mem_ctrl.mergedWrBursts 6616179
# Number of controller write bursts merged with an existing one (Count)
system.mem_ctrl.neitherReadNorWriteReqs 0
# Number of requests that are neither read nor write (Count)
system.mem_ctrl.avgRdQLen 1.00
# Average read queue length when enqueueing ((Count/Tick))
system.mem_ctrl.avgWrQLen 26.95
# Average write queue length when enqueueing ((Count/Tick))
system.mem_ctrl.numRdRetry 0
# Number of times read queue was full causing retry (Count)
system.mem_ctrl.numWrRetry 0
# Number of times write queue was full causing retry (Count)
system.mem_ctrl.readPktSize::0 1001231
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::1 19
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::2 14571441
# Read request sizes (log2) (Count)

```

system.mem_ctrl.readPktSize::3	47531035
# Read request sizes (log2) (Count)	
system.mem_ctrl.readPktSize::4	0
# Read request sizes (log2) (Count)	
system.mem_ctrl.readPktSize::5	0
# Read request sizes (log2) (Count)	
system.mem_ctrl.readPktSize::6	0
# Read request sizes (log2) (Count)	
system.mem_ctrl.writePktSize::0	3122099
# Write request sizes (log2) (Count)	
system.mem_ctrl.writePktSize::1	3
# Write request sizes (log2) (Count)	
system.mem_ctrl.writePktSize::2	4201939
# Write request sizes (log2) (Count)	
system.mem_ctrl.writePktSize::3	1766
# Write request sizes (log2) (Count)	
system.mem_ctrl.writePktSize::4	0
# Write request sizes (log2) (Count)	
system.mem_ctrl.writePktSize::5	0
# Write request sizes (log2) (Count)	
system.mem_ctrl.writePktSize::6	0
# Write request sizes (log2) (Count)	
system.mem_ctrl.rdQLenPdf::0	53746937
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::1	4
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::2	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::3	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::4	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::5	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::6	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::7	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::8	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::9	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::10	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::11	0
# What read queue length does an incoming req see (Count)	

```
system.mem_ctrl.rdQLenPdf::12      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::13      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::14      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::15      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::16      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::17      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::18      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::19      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::20      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::21      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::22      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::23      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::24      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::25      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::26      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::27      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::28      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::29      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::30      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::31      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::0        1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::1        1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::2        1
# What write queue length does an incoming req see (Count)
```

```

system.mem_ctrl.wrQLenPdf::3          1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::4          1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::5          1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::6          1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::7          1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::8          1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::9          1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::10         1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::11         1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::12         1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::13         1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::14         1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::15         428
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::16         428
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::17         44298
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::18         44298
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::19         44298
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::20         44298
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::21         44298
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::22         44297
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::23         44297
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::24         44297
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::25         44297
# What write queue length does an incoming req see (Count)

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```
system.mem_ctrl.wrQLenPdf::26          44297
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::27          44297
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::28          44297
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::29          44297
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::30          44297
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::31          44297
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::32          44297
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::33          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::34          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::35          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::36          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::37          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::38          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::39          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::40          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::41          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::42          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::43          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::44          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::45          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::46          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::47          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::48          0
# What write queue length does an incoming req see (Count)
```

```

system.mem_ctrl.wrQLenPdf::49      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::50      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::51      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::52      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::53      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::54      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::55      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::56      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::57      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::58      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::59      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::60      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::61      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::62      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::63      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.rdPerTurnAround::samples    44297
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::mean    1213.325440
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::gmean    338.733664
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::stdev    86658.496903
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::0-1.04858e+06    44296    100.00%
100.00% # Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::1.78258e+07-1.88744e+07    1
0.00%    100.00% # Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::total    44297
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.wrPerTurnAround::samples    44297
# Writes before turning the bus around for reads (Count)

```

```

system.mem_ctrl.wrPerTurnAround::mean      16.019279
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::gmean     16.018176
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::stdev     0.195415
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::16        43870      99.04%
99.04% # Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::18        427         0.96%
100.00% # Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::total     44297
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.bytesReadWrQ               598834240
# Total number of bytes read from write queue (Byte)
system.mem_ctrl.bytesReadSys               439535306
# Total read bytes from the system interface side (Byte)
system.mem_ctrl.bytesWrittenSys            19943987
# Total written bytes from the system interface side (Byte)
system.mem_ctrl.avgRdBWSys                 134342631.03251770
# Average system read bandwidth in Byte/s ((Byte/Second))
system.mem_ctrl.avgWrBWSys                 6095819.03952519
# Average system write bandwidth in Byte/s ((Byte/Second))
system.mem_ctrl.totGap                     3271748412000
# Total gap between requests (Tick)
system.mem_ctrl.avgGap                     46454.21
# Average gap between requests ((Tick/Count))
system.mem_ctrl.requestorReadBytes::cpu.inst 380237144
# Per-requestor bytes read from memory (Byte)
system.mem_ctrl.requestorReadBytes::cpu.data 21870171
# Per-requestor bytes read from memory (Byte)
system.mem_ctrl.requestorWriteBytes::cpu.data 719938
# Per-requestor bytes write to memory (Byte)
system.mem_ctrl.requestorReadRate::cpu.inst 116218327.956685915589
# Per-requestor bytes read from memory rate ((Byte/Second))
system.mem_ctrl.requestorReadRate::cpu.data 6684551.327649361454
# Per-requestor bytes read from memory rate ((Byte/Second))
system.mem_ctrl.requestorWriteRate::cpu.data 220046.862629708106
# Per-requestor bytes write to memory rate ((Byte/Second))
system.mem_ctrl.requestorReadAccesses::cpu.inst 47529643
# Per-requestor read serviced memory accesses (Count)
system.mem_ctrl.requestorReadAccesses::cpu.data 15574083
# Per-requestor read serviced memory accesses (Count)
system.mem_ctrl.requestorWriteAccesses::cpu.data 7325807
# Per-requestor write serviced memory accesses (Count)
system.mem_ctrl.requestorReadTotalLat::cpu.inst 1046412273808
# Per-requestor read total memory access latency (Tick)

```

```
system.mem_ctrl.requestorReadTotalLat::cpu.data 254768310736
# Per-requestor read total memory access latency (Tick)
system.mem_ctrl.requestorWriteTotalLat::cpu.data 85141809253008
# Per-requestor write total memory access latency (Tick)
system.mem_ctrl.requestorReadAvgLat::cpu.inst 22015.99
# Per-requestor read average memory access latency ((Tick/Count))
system.mem_ctrl.requestorReadAvgLat::cpu.data 16358.48
# Per-requestor read average memory access latency ((Tick/Count))
system.mem_ctrl.requestorWriteAvgLat::cpu.data 11622174.77
# Per-requestor write average memory access latency ((Tick/Count))
system.mem_ctrl.dram.bytesRead::cpu.inst 380237144
# Number of bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesRead::cpu.data 59298162
# Number of bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesRead::total 439535306
# Number of bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesInstRead::cpu.inst 380237144
# Number of instructions bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesInstRead::total 380237144
# Number of instructions bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesWritten::cpu.data 19943987
# Number of bytes written to this memory (Byte)
system.mem_ctrl.dram.bytesWritten::total 19943987
# Number of bytes written to this memory (Byte)
system.mem_ctrl.dram.numReads::cpu.inst 47529643
# Number of read requests responded to by this memory (Count)
system.mem_ctrl.dram.numReads::cpu.data 15574083
# Number of read requests responded to by this memory (Count)
system.mem_ctrl.dram.numReads::total 63103726
# Number of read requests responded to by this memory (Count)
system.mem_ctrl.dram.numWrites::cpu.data 7325807
# Number of write requests responded to by this memory (Count)
system.mem_ctrl.dram.numWrites::total 7325807
# Number of write requests responded to by this memory (Count)
system.mem_ctrl.dram.bwRead::cpu.inst 116218328
# Total read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwRead::cpu.data 18124303
# Total read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwRead::total 134342631
# Total read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwInstRead::cpu.inst 116218328
# Instruction read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwInstRead::total 116218328
# Instruction read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwWrite::cpu.data 6095819
# Write bandwidth from this memory ((Byte/Second))
```



```

system.mem_ctrl.dram.bwWrite::total          6095819
# Write bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwTotal::cpu.inst       116218328
# Total bandwidth to/from this memory ((Byte/Second))
system.mem_ctrl.dram.bwTotal::cpu.data       24220122
# Total bandwidth to/from this memory ((Byte/Second))
system.mem_ctrl.dram.bwTotal::total          140438450
# Total bandwidth to/from this memory ((Byte/Second))
system.mem_ctrl.dram.readBursts              53746941
# Number of DRAM read bursts (Count)
system.mem_ctrl.dram.writeBursts             709606
# Number of DRAM write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::0      52789130
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::1      58693
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::2      58167
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::3      61969
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::4      66160
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::5      66349
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::6      65557
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::7      66179
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::8      65688
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::9      67381
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::10     66785
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::11     65848
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::12     66124
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::13     62866
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::14     58981
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::15     61064
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankWrBursts::0      44015
# Per bank write bursts (Count)

```

system.mem_ctrl.dram.perBankWrBursts::1	41937
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::2	41594
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::3	42161
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::4	44341
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::5	45114
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::6	45486
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::7	45865
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::8	46102
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::9	46303
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::10	46513
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::11	46708
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::12	46857
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::13	44926
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::14	40796
# Per bank write bursts (Count)	
system.mem_ctrl.dram.perBankWrBursts::15	40888
# Per bank write bursts (Count)	
system.mem_ctrl.dram.totQLat	395974604222
# Total ticks spent queuing (Tick)	
system.mem_ctrl.dram.totBusLat	201658522632
# Total ticks spent in databus transfers (Tick)	
system.mem_ctrl.dram.totMemAccLat	1301180584544
# Total ticks spent from burst creation until serviced by the DRAM (Tick)	
system.mem_ctrl.dram.avgQLat	7367.39
# Average queueing delay per DRAM burst ((Tick/Count))	
system.mem_ctrl.dram.avgBusLat	3752.00
# Average bus latency per DRAM burst ((Tick/Count))	
system.mem_ctrl.dram.avgMemAccLat	24209.39
# Average memory access latency per DRAM burst ((Tick/Count))	
system.mem_ctrl.dram.readRowHits	42113187
# Number of row buffer hits during reads (Count)	
system.mem_ctrl.dram.writeRowHits	648956
# Number of row buffer hits during writes (Count)	

```

system.mem_ctrl.dram.readRowHitRate          78.35
# Row buffer hit rate for reads (Ratio)
system.mem_ctrl.dram.writeRowHitRate          91.45
# Row buffer hit rate for writes (Ratio)
system.mem_ctrl.dram.bytesPerActivate::samples 11694403
# Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::mean    298.024518
# Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::gmean   169.571890
# Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::stdev   306.218865
# Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::0-127   5464845      46.73%
46.73% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::128-255 2236969      19.13%
65.86% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::256-383 86170         0.74%
66.60% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::384-511 251437        2.15%
68.75% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::512-639 938593         8.03%
76.77% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::640-767 2061445       17.63%
94.40% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::768-895 3086           0.03%
94.43% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::896-1023 3723           0.03%
94.46% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::1024-1151 648135        5.54%
100.00% # Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesPerActivate::total    11694403
# Bytes accessed per row activation (Byte)
system.mem_ctrl.dram.bytesRead                 3439804224
# Total bytes read (Byte)
system.mem_ctrl.dram.bytesWritten              45414784
# Total bytes written (Byte)
system.mem_ctrl.dram.avgRdBW                   1051.365711
# Average DRAM read bandwidth in MiBytes/s ((Byte/Second))
system.mem_ctrl.dram.avgWrBW                   13.880891
# Average DRAM write bandwidth in MiBytes/s ((Byte/Second))
system.mem_ctrl.dram.peakBW                   17057.00
# Theoretical peak bandwidth in MiByte/s ((Byte/Second))
system.mem_ctrl.dram.busUtil                   6.25
# Data bus utilization in percentage (Ratio)
system.mem_ctrl.dram.busUtilRead               6.16
# Data bus utilization in percentage for reads (Ratio)

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```

system.mem_ctrl.dram.busUtilWrite          0.08
# Data bus utilization in percentage for writes (Ratio)
system.mem_ctrl.dram.pageHitRate           78.53
# Row buffer hit rate, read and write combined (Ratio)
system.mem_ctrl.dram.power_state.pwrStateResidencyTicks::UNDEFINED
3271748533000                             # Cumulative time (in ticks) in
various power states (Tick)
system.mem_ctrl.dram.rank0.actEnergy        122155663279.023529
# Energy for activate commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.preEnergy        60294777315.755035
# Energy for precharge commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.readEnergy       352318832675.713135
# Energy for read commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.writeEnergy      1783309196.255445
# Energy for write commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.refreshEnergy    270838752737.947968
# Energy for refresh commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.actBackEnergy    1651197300621.838623
# Energy for active background per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.preBackEnergy    64149527831.815384
# Energy for precharge background per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.actPowerDownEnergy 0
# Energy for active power-down per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.prePowerDownEnergy 0
# Energy for precharge power-down per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.selfRefreshEnergy 0
# Energy for self refresh per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.totalEnergy      2522738163657.621582
# Total energy per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.averagePower     771.067256
# Core power per rank (mW) (Watt)
system.mem_ctrl.dram.rank0.totalIdleTime    0
# Total Idle time Per DRAM Rank (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::IDLE 22855615048
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::REF 109241600000
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::SREF 0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::PRE_PDN 0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::ACT 3139651317952
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::ACT_PDN 0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.actEnergy        1052086613.762582
# Energy for activate commands per rank (pJ) (Joule)

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```

system.mem_ctrl.dram.rank1.preEnergy      519299161.921046
# Energy for precharge commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.readEnergy     3406801247.139291
# Energy for read commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.writeEnergy    1826961765.215440
# Energy for write commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.refreshEnergy  270838752737.947968
# Energy for refresh commands per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.actBackEnergy  329616363731.653137
# Energy for active background per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.preBackEnergy  1175478952037.081787
# Energy for precharge background per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.actPowerDownEnergy 0
# Energy for active power-down per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.prePowerDownEnergy 0
# Energy for precharge power-down per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.selfRefreshEnergy 0
# Energy for self refresh per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.totalEnergy    1782739217290.326904
# Total energy per rank (pJ) (Joule)
system.mem_ctrl.dram.rank1.averagePower   544.888826
# Core power per rank (mW) (Watt)
system.mem_ctrl.dram.rank1.totalIdleTime  0
# Total Idle time Per DRAM Rank (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::IDLE 2641049451722
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::REF 109241600000
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::SREF 0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::PRE_PDN 0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::ACT 521457481278
# Time in different power states (Tick)
system.mem_ctrl.dram.rank1.pwrStateTime::ACT_PDN 0
# Time in different power states (Tick)
system.mem_ctrl.power_state.pwrStateResidencyTicks::UNDEFINED
3271748533000 # Cumulative time (in ticks) in
various power states (Tick)
system.membus.transDist::ReadReq          63103710
# Transaction distribution (Count)
system.membus.transDist::ReadResp         63103710
# Transaction distribution (Count)
system.membus.transDist::WriteReq         7325791
# Transaction distribution (Count)
system.membus.transDist::WriteResp        7325791
# Transaction distribution (Count)

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```

system.membus.transDist::LockedRMWReadReq          16
# Transaction distribution (Count)
system.membus.transDist::LockedRMWReadResp        16
# Transaction distribution (Count)
system.membus.transDist::LockedRMWWriteReq         16
# Transaction distribution (Count)
system.membus.transDist::LockedRMWWriteResp        16
# Transaction distribution (Count)
system.membus.pktCount_system.cpu.icache_port::system.mem_ctrl.port
95059286      # Packet count per connected requestor and
responder (Count)
system.membus.pktCount_system.cpu.icache_port::total    95059286
# Packet count per connected requestor and responder (Count)
system.membus.pktCount_system.cpu.dcache_port::system.mem_ctrl.port
45799780      # Packet count per connected requestor and
responder (Count)
system.membus.pktCount_system.cpu.dcache_port::total    45799780
# Packet count per connected requestor and responder (Count)
system.membus.pktCount::total          140859066
# Packet count per connected requestor and responder (Count)
system.membus.pktSize_system.cpu.icache_port::system.mem_ctrl.port
380237144      # Cumulative packet size per connected
requestor and responder (Byte)
system.membus.pktSize_system.cpu.icache_port::total    380237144
# Cumulative packet size per connected requestor and responder (Byte)
system.membus.pktSize_system.cpu.dcache_port::system.mem_ctrl.port
79242149      # Cumulative packet size per connected
requestor and responder (Byte)
system.membus.pktSize_system.cpu.dcache_port::total    79242149
# Cumulative packet size per connected requestor and responder (Byte)
system.membus.pktSize::total          459479293
# Cumulative packet size per connected requestor and responder (Byte)
system.membus.snoops                          0
# Total snoops (Count)
system.membus.snoopTraffic                    0
# Total snoop traffic (Byte)
system.membus.snoopFanout::samples            70429533
# Request fanout histogram (Count)
system.membus.snoopFanout::mean                0
# Request fanout histogram (Count)
system.membus.snoopFanout::stdev               0
# Request fanout histogram (Count)
system.membus.snoopFanout::underflows          0      0.00%
0.00% # Request fanout histogram (Count)
system.membus.snoopFanout::0                   70429533    100.00%
100.00% # Request fanout histogram (Count)

```

system.membus.snoopFanout::1	0	0.00%
100.00% # Request fanout histogram (Count)		
system.membus.snoopFanout::overflows	0	0.00%
100.00% # Request fanout histogram (Count)		
system.membus.snoopFanout::min_value	0	
# Request fanout histogram (Count)		
system.membus.snoopFanout::max_value	0	
# Request fanout histogram (Count)		
system.membus.snoopFanout::total	70429533	
# Request fanout histogram (Count)		
system.membus.power_state.pwrStateResidencyTicks::UNDEFINED	3271748533000	
# Cumulative time (in ticks) in various power states (Tick)		
system.membus.reqLayer2.occupancy	77755340000	
# Layer occupancy (ticks) (Tick)		
system.membus.reqLayer2.utilization	0.0	
# Layer utilization (Ratio)		
system.membus.respLayer0.occupancy	106964241192	
# Layer occupancy (ticks) (Tick)		
system.membus.respLayer0.utilization	0.0	
# Layer utilization (Ratio)		
system.membus.respLayer1.occupancy	43751319264	
# Layer occupancy (ticks) (Tick)		
system.membus.respLayer1.utilization	0.0	
# Layer utilization (Ratio)		
system.membus.snoop_filter.totRequests	0	
# Total number of requests made to the snoop filter. (Count)		
system.membus.snoop_filter.hitSingleRequests	0	
# Number of requests hitting in the snoop filter with a single holder of the requested data. (Count)		
system.membus.snoop_filter.hitMultiRequests	0	
# Number of requests hitting in the snoop filter with multiple (>1) holders of the requested data. (Count)		
system.membus.snoop_filter.totSnoops	0	
# Total number of snoops made to the snoop filter. (Count)		
system.membus.snoop_filter.hitSingleSnoops	0	
# Number of snoops hitting in the snoop filter with a single holder of the requested data. (Count)		
system.membus.snoop_filter.hitMultiSnoops	0	
# Number of snoops hitting in the snoop filter with multiple (>1) holders of the requested data. (Count)		
system.workload.inst.arm	0	
# number of arm instructions executed (Count)		
system.workload.inst.quiesce	0	
# number of quiesce instructions executed (Count)		

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

Stats 4.4

```
----- Begin Simulation Statistics -----
simSeconds                      3.387931
# Number of seconds simulated (Second)
simTicks                       3387931467000
# Number of ticks simulated (Tick)
finalTick                     3387931467000
# Number of ticks from beginning of simulation (restored from checkpoints
and never reset) (Tick)
simFreq                       1000000000000
# The number of ticks per simulated second ((Tick/Second))
hostSeconds                   147.19
# Real time elapsed on the host (Second)
hostTickRate                   23017532962
# The number of ticks simulated per host second (ticks/s) ((Tick/Second))
hostMemory                     655500
# Number of bytes of host memory used (Byte)
simInsts                      36199500
# Number of instructions simulated (Count)
simOps                         76555494
# Number of ops (including micro ops) simulated (Count)
hostInstRate                   245938
# Simulator instruction rate (inst/s) ((Count/Second))
hostOpRate                     520116
# Simulator op (including micro ops) rate (op/s) ((Count/Second))
system.clk_domain.clock        1000
# Clock period in ticks (Tick)
system.clk_domain.voltage_domain.voltage 1
# Voltage in Volts (Volt)
system.cpu.numCycles           3387931467
# Number of cpu cycles simulated (Cycle)
system.cpu.numWorkItemsStarted 0
# Number of work items this cpu started (Count)
system.cpu.numWorkItemsCompleted 0
# Number of work items this cpu completed (Count)
system.cpu.exec_context.thread_0.numInsts 36199500
# Number of instructions committed (Count)
system.cpu.exec_context.thread_0.numOps 76555494
# Number of ops (including micro ops) committed (Count)
system.cpu.exec_context.thread_0.numIntAluAccesses 76554574
# Number of integer alu accesses (Count)
system.cpu.exec_context.thread_0.numFpAluAccesses 1471
# Number of float alu accesses (Count)
system.cpu.exec_context.thread_0.numVecAluAccesses 0
# Number of vector alu accesses (Count)
```



```

system.cpu.exec_context.thread_0.numCallsReturns          373
# Number of times a function call or return occurred (Count)
system.cpu.exec_context.thread_0.numCondCtrlInsts        5125826
# Number of instructions that are conditional controls (Count)
system.cpu.exec_context.thread_0.numIntInsts              76554574
# Number of integer instructions (Count)
system.cpu.exec_context.thread_0.numFpInsts               1471
# Number of float instructions (Count)
system.cpu.exec_context.thread_0.numVecInsts              0
# Number of vector instructions (Count)
system.cpu.exec_context.thread_0.numIntRegReads           87007781
# Number of times the integer registers were read (Count)
system.cpu.exec_context.thread_0.numIntRegWrites          58976338
# Number of times the integer registers were written (Count)
system.cpu.exec_context.thread_0.numFpRegReads            1590
# Number of times the floating registers were read (Count)
system.cpu.exec_context.thread_0.numFpRegWrites           859
# Number of times the floating registers were written (Count)
system.cpu.exec_context.thread_0.numVecRegReads           0
# Number of times the vector registers were read (Count)
system.cpu.exec_context.thread_0.numVecRegWrites          0
# Number of times the vector registers were written (Count)
system.cpu.exec_context.thread_0.numVecPredRegReads       0
# Number of times the predicate registers were read (Count)
system.cpu.exec_context.thread_0.numVecPredRegWrites      0
# Number of times the predicate registers were written (Count)
system.cpu.exec_context.thread_0.numCCRegReads            26632889
# Number of times the CC registers were read (Count)
system.cpu.exec_context.thread_0.numCCRegWrites           24904504
# Number of times the CC registers were written (Count)
system.cpu.exec_context.thread_0.numMiscRegReads          37276209
# Number of times the Misc registers were read (Count)
system.cpu.exec_context.thread_0.numMiscRegWrites         0
# Number of times the Misc registers were written (Count)
system.cpu.exec_context.thread_0.numMemRefs               22899889
# Number of memory refs (Count)
system.cpu.exec_context.thread_0.numLoadInsts             15574080
# Number of load instructions (Count)
system.cpu.exec_context.thread_0.numStoreInsts            7325809
# Number of store instructions (Count)
system.cpu.exec_context.thread_0.numIdleCycles            0.001000
# Number of idle cycles (Cycle)
system.cpu.exec_context.thread_0.numBusyCycles            3387931466.999000
# Number of busy cycles (Cycle)
system.cpu.exec_context.thread_0.notIdleFraction          1.000000
# Percentage of non-idle cycles (Ratio)

```

```

system.cpu.exec_context.thread_0.idleFraction      0.000000
# Percentage of idle cycles (Ratio)
system.cpu.exec_context.thread_0.numBranches      5126544
# Number of branches fetched (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::No_OpClass
236      0.00%      0.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::IntAlu      53654589
70.09%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::IntMult
177      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::IntDiv      28
0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatAdd
184      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatCvt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMult
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMultAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatDiv
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMisc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatSqrt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAdd
8      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAddAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAlu
98      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdCvt
54      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdMisc
252      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdMult
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdMultAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdShift
0      0.00%      70.09% # Class of executed instruction. (Count)

```

```
system.cpu.exec_context.thread_0.statExecutedInstType::SimdShiftAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdDiv
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSqrt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatAdd
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatAlu
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatCvt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatDiv
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatMisc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatMult
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatMultAcc
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatSqrt
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdReduceAdd
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdReduceAlu
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdReduceCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatReduceAdd
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdFloatReduceCmp
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAes
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdAesMix
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSha1Hash
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSha1Hash2
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSha256Hash
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdSha256Hash2
0      0.00%      70.09% # Class of executed instruction. (Count)
```

```

system.cpu.exec_context.thread_0.statExecutedInstType::SimdShaSigma2
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdShaSigma3
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::SimdPredAlu
0      0.00%      70.09% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::MemRead
15573939      20.34%      90.43% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::MemWrite
7325245       9.57%     100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMemRead
141      0.00%     100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::FloatMemWrite
564      0.00%     100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::IprAccess
0      0.00%     100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::InstPrefetch
0      0.00%     100.00% # Class of executed instruction. (Count)
system.cpu.exec_context.thread_0.statExecutedInstType::total      76555515
# Class of executed instruction. (Count)
system.cpu.interrupts.clk_domain.clock      16000
# Clock period in ticks (Tick)
system.cpu.mmu.dtb.rdAccesses      15574084
# TLB accesses on read requests (Count)
system.cpu.mmu.dtb.wrAccesses      7325810
# TLB accesses on write requests (Count)
system.cpu.mmu.dtb.rdMisses      421
# TLB misses on read requests (Count)
system.cpu.mmu.dtb.wrMisses      28844
# TLB misses on write requests (Count)
system.cpu.mmu.dtb.walker.power_state.pwrStateResidencyTicks::UNDEFINED
3387931467000      # Cumulative time (in ticks) in
various power states (Tick)
system.cpu.mmu.itb.rdAccesses      0
# TLB accesses on read requests (Count)
system.cpu.mmu.itb.wrAccesses      47529643
# TLB accesses on write requests (Count)
system.cpu.mmu.itb.rdMisses      0
# TLB misses on read requests (Count)
system.cpu.mmu.itb.wrMisses      56
# TLB misses on write requests (Count)
system.cpu.mmu.itb.walker.power_state.pwrStateResidencyTicks::UNDEFINED
3387931467000      # Cumulative time (in ticks) in
various power states (Tick)
system.cpu.power_state.pwrStateResidencyTicks::ON 3387931467000
# Cumulative time (in ticks) in various power states (Tick)

```

```

system.cpu.thread_0.numInsts                                0
# Number of Instructions committed (Count)
system.cpu.thread_0.numOps                                  0
# Number of Ops committed (Count)
system.cpu.thread_0.numMemRefs                              0
# Number of Memory References (Count)
system.cpu.workload.numSyscalls                             17
# Number of system calls (Count)
system.mem_ctrl.avgPriority_cpu.inst::samples 47529643.00
# Average QoS priority value for accepted requests (Count)
system.mem_ctrl.avgPriority_cpu.data::samples 7256330.00
# Average QoS priority value for accepted requests (Count)
system.mem_ctrl.priorityMinLatency 0.000000022500
# per QoS priority minimum request to response latency (Second)
system.mem_ctrl.priorityMaxLatency 2.128645477500
# per QoS priority maximum request to response latency (Second)
system.mem_ctrl.numReadWriteTurnArounds 62023
# Number of turnarounds from READ to WRITE (Count)
system.mem_ctrl.numWriteReadTurnArounds 62023
# Number of turnarounds from WRITE to READ (Count)
system.mem_ctrl.numStayReadState 115720873
# Number of times bus staying in READ state (Count)
system.mem_ctrl.numStayWriteState 932486
# Number of times bus staying in WRITE state (Count)
system.mem_ctrl.readReqs 63103726
# Number of read requests accepted (Count)
system.mem_ctrl.writeReqs 7325807
# Number of write requests accepted (Count)
system.mem_ctrl.readBursts 63103730
# Number of controller read bursts, including those serviced by the write
queue (Count)
system.mem_ctrl.writeBursts 7325807
# Number of controller write bursts, including those merged in the write
queue (Count)
system.mem_ctrl.servicedByWrQ 9310160
# Number of controller read bursts serviced by the write queue (Count)
system.mem_ctrl.mergedWrBursts 6333404
# Number of controller write bursts merged with an existing one (Count)
system.mem_ctrl.neitherReadNorWriteReqs 0
# Number of requests that are neither read nor write (Count)
system.mem_ctrl.avgRdQLen 1.00
# Average read queue length when enqueueing ((Count/Tick))
system.mem_ctrl.avgWrQLen 26.46
# Average write queue length when enqueueing ((Count/Tick))
system.mem_ctrl.numRdRetry 0
# Number of times read queue was full causing retry (Count)

```

```

system.mem_ctrl.numWrRetry                                0
# Number of times write queue was full causing retry (Count)
system.mem_ctrl.readPktSize::0                            1001233
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::1                            19
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::2                           14571444
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::3                           47531034
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::4                             0
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::5                             0
# Read request sizes (log2) (Count)
system.mem_ctrl.readPktSize::6                             0
# Read request sizes (log2) (Count)
system.mem_ctrl.writePktSize::0                           3122099
# Write request sizes (log2) (Count)
system.mem_ctrl.writePktSize::1                             3
# Write request sizes (log2) (Count)
system.mem_ctrl.writePktSize::2                           4201939
# Write request sizes (log2) (Count)
system.mem_ctrl.writePktSize::3                           1766
# Write request sizes (log2) (Count)
system.mem_ctrl.writePktSize::4                             0
# Write request sizes (log2) (Count)
system.mem_ctrl.writePktSize::5                             0
# Write request sizes (log2) (Count)
system.mem_ctrl.writePktSize::6                             0
# Write request sizes (log2) (Count)
system.mem_ctrl.rdQLenPdf::0                              53793562
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::1                               8
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::2                               0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::3                               0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::4                               0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::5                               0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::6                               0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.rdQLenPdf::7                               0
# What read queue length does an incoming req see (Count)

```

system.mem_ctrl.rdQLenPdf::8	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::9	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::10	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::11	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::12	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::13	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::14	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::15	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::16	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::17	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::18	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::19	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::20	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::21	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::22	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::23	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::24	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::25	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::26	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::27	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::28	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::29	0
# What read queue length does an incoming req see (Count)	
system.mem_ctrl.rdQLenPdf::30	0
# What read queue length does an incoming req see (Count)	

```

system.mem_ctrl.rdQLenPdf::31      0
# What read queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::0       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::1       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::2       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::3       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::4       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::5       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::6       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::7       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::8       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::9       1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::10      1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::11      1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::12      1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::13      1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::14      1
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::15      2
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::16      2
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::17      62024
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::18      62024
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::19      62025
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::20      62024
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::21      62024
# What write queue length does an incoming req see (Count)

```



```
system.mem_ctrl.wrQLenPdf::22          62024
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::23          62024
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::24          62024
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::25          62024
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::26          62024
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::27          62024
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::28          62024
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::29          62024
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::30          62024
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::31          62024
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::32          62023
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::33          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::34          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::35          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::36          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::37          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::38          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::39          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::40          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::41          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::42          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::43          0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::44          0
# What write queue length does an incoming req see (Count)
```

```

system.mem_ctrl.wrQLenPdf::45      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::46      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::47      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::48      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::49      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::50      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::51      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::52      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::53      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::54      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::55      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::56      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::57      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::58      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::59      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::60      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::61      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::62      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.wrQLenPdf::63      0
# What write queue length does an incoming req see (Count)
system.mem_ctrl.rdPerTurnAround::samples    62023
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::mean      867.307160
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::gmean     304.355664
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::stdev     73227.667422
# Reads before turning the bus around for writes (Count)

```

```

system.mem_ctrl.rdPerTurnAround::0-1.04858e+06      62022      100.00%
100.00% # Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::1.78258e+07-1.88744e+07      1
0.00%      100.00% # Reads before turning the bus around for writes (Count)
system.mem_ctrl.rdPerTurnAround::total      62023
# Reads before turning the bus around for writes (Count)
system.mem_ctrl.wrPerTurnAround::samples      62023
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::mean      16.000048
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::gmean      16.000044
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::stdev      0.012046
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::16      62022      100.00%
100.00% # Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::19      1      0.00%
100.00% # Writes before turning the bus around for reads (Count)
system.mem_ctrl.wrPerTurnAround::total      62023
# Writes before turning the bus around for reads (Count)
system.mem_ctrl.bytesReadWrQ      297925120
# Total number of bytes read from write queue (Byte)
system.mem_ctrl.bytesReadSys      439535306
# Total read bytes from the system interface side (Byte)
system.mem_ctrl.bytesWrittenSys      19943987
# Total written bytes from the system interface side (Byte)
system.mem_ctrl.avgRdBWSys      129735595.38652852
# Average system read bandwidth in Byte/s ((Byte/Second))
system.mem_ctrl.avgWrBWSys      5886774.03727423
# Average system write bandwidth in Byte/s ((Byte/Second))
system.mem_ctrl.totGap      3387931331000
# Total gap between requests (Tick)
system.mem_ctrl.avgGap      48103.84
# Average gap between requests ((Tick/Count))
system.mem_ctrl.requestorReadBytes::cpu.inst      380237144
# Per-requestor bytes read from memory (Byte)
system.mem_ctrl.requestorReadBytes::cpu.data      22056285
# Per-requestor bytes read from memory (Byte)
system.mem_ctrl.requestorWriteBytes::cpu.data      1163629
# Per-requestor bytes write to memory (Byte)
system.mem_ctrl.requestorReadRate::cpu.inst 112232832.246957615018
# Per-requestor bytes read from memory rate ((Byte/Second))
system.mem_ctrl.requestorReadRate::cpu.data 6510251.229943194427
# Per-requestor bytes read from memory rate ((Byte/Second))
system.mem_ctrl.requestorWriteRate::cpu.data 343462.968874747923
# Per-requestor bytes write to memory rate ((Byte/Second))

```

```
system.mem_ctrl.requestorReadAccesses::cpu.inst      47529643
# Per-requestor read serviced memory accesses (Count)
system.mem_ctrl.requestorReadAccesses::cpu.data      15574087
# Per-requestor read serviced memory accesses (Count)
system.mem_ctrl.requestorWriteAccesses::cpu.data     7325807
# Per-requestor write serviced memory accesses (Count)
system.mem_ctrl.requestorReadTotalLat::cpu.inst 1224887811000
# Per-requestor read total memory access latency (Tick)
system.mem_ctrl.requestorReadTotalLat::cpu.data 182313768000
# Per-requestor read total memory access latency (Tick)
system.mem_ctrl.requestorWriteTotalLat::cpu.data 88885120788000
# Per-requestor write total memory access latency (Tick)
system.mem_ctrl.requestorReadAvgLat::cpu.inst      25771.03
# Per-requestor read average memory access latency ((Tick/Count))
system.mem_ctrl.requestorReadAvgLat::cpu.data      11706.23
# Per-requestor read average memory access latency ((Tick/Count))
system.mem_ctrl.requestorWriteAvgLat::cpu.data 12133150.76
# Per-requestor write average memory access latency ((Tick/Count))
system.mem_ctrl.dram.bytesRead::cpu.inst      380237144
# Number of bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesRead::cpu.data      59298162
# Number of bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesRead::total      439535306
# Number of bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesInstRead::cpu.inst      380237144
# Number of instructions bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesInstRead::total      380237144
# Number of instructions bytes read from this memory (Byte)
system.mem_ctrl.dram.bytesWritten::cpu.data      19943987
# Number of bytes written to this memory (Byte)
system.mem_ctrl.dram.bytesWritten::total      19943987
# Number of bytes written to this memory (Byte)
system.mem_ctrl.dram.numReads::cpu.inst      47529643
# Number of read requests responded to by this memory (Count)
system.mem_ctrl.dram.numReads::cpu.data      15574083
# Number of read requests responded to by this memory (Count)
system.mem_ctrl.dram.numReads::total      63103726
# Number of read requests responded to by this memory (Count)
system.mem_ctrl.dram.numWrites::cpu.data      7325807
# Number of write requests responded to by this memory (Count)
system.mem_ctrl.dram.numWrites::total      7325807
# Number of write requests responded to by this memory (Count)
system.mem_ctrl.dram.bwRead::cpu.inst      112232832
# Total read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwRead::cpu.data      17502763
# Total read bandwidth from this memory ((Byte/Second))
```

```

system.mem_ctrl.dram.bwRead::total          129735595
# Total read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwInstRead::cpu.inst    112232832
# Instruction read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwInstRead::total       112232832
# Instruction read bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwWrite::cpu.data       5886774
# Write bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwWrite::total          5886774
# Write bandwidth from this memory ((Byte/Second))
system.mem_ctrl.dram.bwTotal::cpu.inst       112232832
# Total bandwidth to/from this memory ((Byte/Second))
system.mem_ctrl.dram.bwTotal::cpu.data       23389537
# Total bandwidth to/from this memory ((Byte/Second))
system.mem_ctrl.dram.bwTotal::total          135622369
# Total bandwidth to/from this memory ((Byte/Second))
system.mem_ctrl.dram.readBursts              53793570
# Number of DRAM read bursts (Count)
system.mem_ctrl.dram.writeBursts             992371
# Number of DRAM write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::0      126621
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::1      126555
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::2      127943
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::3      126552
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::4      126701
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::5      40486923
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::6      7284384
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankRdBursts::7      5387891
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankWrBursts::0      118186
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankWrBursts::1      116867
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankWrBursts::2      116664
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankWrBursts::3      116551
# Per bank write bursts (Count)
system.mem_ctrl.dram.perBankWrBursts::4      116808
# Per bank write bursts (Count)

```

system.mem_ctrl.dram.perBankWrBursts::5	116455	
# Per bank write bursts (Count)		
system.mem_ctrl.dram.perBankWrBursts::6	118233	
# Per bank write bursts (Count)		
system.mem_ctrl.dram.perBankWrBursts::7	172607	
# Per bank write bursts (Count)		
system.mem_ctrl.dram.totQLat	196846254000	
# Total ticks spent queuing (Tick)		
system.mem_ctrl.dram.totBusLat	403451775000	
# Total ticks spent in databus transfers (Tick)		
system.mem_ctrl.dram.totMemAccLat	1407201579000	
# Total ticks spent from burst creation until serviced by the DRAM (Tick)		
system.mem_ctrl.dram.avgQLat	3659.29	
# Average queueing delay per DRAM burst ((Tick/Count))		
system.mem_ctrl.dram.avgBusLat	7500.00	
# Average bus latency per DRAM burst ((Tick/Count))		
system.mem_ctrl.dram.avgMemAccLat	26159.29	
# Average memory access latency per DRAM burst ((Tick/Count))		
system.mem_ctrl.dram.readRowHits	48755173	
# Number of row buffer hits during reads (Count)		
system.mem_ctrl.dram.writeRowHits	813478	
# Number of row buffer hits during writes (Count)		
system.mem_ctrl.dram.readRowHitRate	90.63	
# Row buffer hit rate for reads (Ratio)		
system.mem_ctrl.dram.writeRowHitRate	81.97	
# Row buffer hit rate for writes (Ratio)		
system.mem_ctrl.dram.bytesPerActivate::samples	5217285	
# Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::mean	336.027119	
# Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::gmean	262.139173	
# Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::stdev	176.764011	
# Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::0-63	454273	8.71%
8.71% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::64-127	291986	5.60%
14.30% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::128-191	629921	12.07%
26.38% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::192-255	679885	13.03%
39.41% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::256-319	166639	3.19%
42.60% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::320-383	478304	9.17%
51.77% # Bytes accessed per row activation (Byte)		

system.mem_ctrl.dram.bytesPerActivate::384-447	230113	4.41%
56.18% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::448-511	25557	0.49%
56.67% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::512-575	2260607	43.33%
100.00% # Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesPerActivate::total	5217285	
# Bytes accessed per row activation (Byte)		
system.mem_ctrl.dram.bytesRead	1721394240	
# Total bytes read (Byte)		
system.mem_ctrl.dram.bytesWritten	31755872	
# Total bytes written (Byte)		
system.mem_ctrl.dram.avgRdBW	508.095945	
# Average DRAM read bandwidth in MiBytes/s ((Byte/Second))		
system.mem_ctrl.dram.avgWrBW	9.373233	
# Average DRAM write bandwidth in MiBytes/s ((Byte/Second))		
system.mem_ctrl.dram.peakBW	4266.00	
# Theoretical peak bandwidth in MiByte/s ((Byte/Second))		
system.mem_ctrl.dram.busUtil	12.13	
# Data bus utilization in percentage (Ratio)		
system.mem_ctrl.dram.busUtilRead	11.91	
# Data bus utilization in percentage for reads (Ratio)		
system.mem_ctrl.dram.busUtilWrite	0.22	
# Data bus utilization in percentage for writes (Ratio)		
system.mem_ctrl.dram.pageHitRate	90.48	
# Row buffer hit rate, read and write combined (Ratio)		
system.mem_ctrl.dram.power_state.pwrStateResidencyTicks::UNDEFINED		
3387931467000		# Cumulative time (in ticks) in
various power states (Tick)		
system.mem_ctrl.dram.rank0.actEnergy	15870651838.931707	
# Energy for activate commands per rank (pJ) (Joule)		
system.mem_ctrl.dram.rank0.preEnergy	5590692348.189857	
# Energy for precharge commands per rank (pJ) (Joule)		
system.mem_ctrl.dram.rank0.readEnergy	92399364690.435654	
# Energy for read commands per rank (pJ) (Joule)		
system.mem_ctrl.dram.rank0.writeEnergy	1530307532.710258	
# Energy for write commands per rank (pJ) (Joule)		
system.mem_ctrl.dram.rank0.refreshEnergy	24220584765.927349	
# Energy for refresh commands per rank (pJ) (Joule)		
system.mem_ctrl.dram.rank0.actBackEnergy	135013861347.384048	
# Energy for active background per rank (pJ) (Joule)		
system.mem_ctrl.dram.rank0.preBackEnergy	2148532790.391415	
# Energy for precharge background per rank (pJ) (Joule)		
system.mem_ctrl.dram.rank0.actPowerDownEnergy	0	
# Energy for active power-down per rank (pJ) (Joule)		
system.mem_ctrl.dram.rank0.prePowerDownEnergy	0	
# Energy for precharge power-down per rank (pJ) (Joule)		

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system.mem_ctrl.dram.rank0.selfRefreshEnergy          0
# Energy for self refresh per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.totalEnergy      276773995313.910522
# Total energy per rank (pJ) (Joule)
system.mem_ctrl.dram.rank0.averagePower      81.694095
# Core power per rank (mW) (Watt)
system.mem_ctrl.dram.rank0.totalIdleTime      0
# Total Idle time Per DRAM Rank (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::IDLE  21526133500
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::REF  113367020000
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::SREF          0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::PRE_PDN      0
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::ACT  3253038313500
# Time in different power states (Tick)
system.mem_ctrl.dram.rank0.pwrStateTime::ACT_PDN      0
# Time in different power states (Tick)
system.mem_ctrl.power_state.pwrStateResidencyTicks::UNDEFINED
3387931467000          # Cumulative time (in ticks) in
various power states (Tick)
system.membus.transDist::ReadReq              63103710
# Transaction distribution (Count)
system.membus.transDist::ReadResp            63103710
# Transaction distribution (Count)
system.membus.transDist::WriteReq            7325791
# Transaction distribution (Count)
system.membus.transDist::WriteResp          7325791
# Transaction distribution (Count)
system.membus.transDist::LockedRMWReadReq    16
# Transaction distribution (Count)
system.membus.transDist::LockedRMWReadResp   16
# Transaction distribution (Count)
system.membus.transDist::LockedRMWWriteReq   16
# Transaction distribution (Count)
system.membus.transDist::LockedRMWWriteResp  16
# Transaction distribution (Count)
system.membus.pktCount_system.cpu.icache_port::system.mem_ctrl.port
95059286          # Packet count per connected requestor and
responder (Count)
system.membus.pktCount_system.cpu.icache_port::total      95059286
# Packet count per connected requestor and responder (Count)
system.membus.pktCount_system.cpu.dcache_port::system.mem_ctrl.port
45799780          # Packet count per connected requestor and
responder (Count)

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```

system.membus.pktCount_system.cpu.dcache_port::total      45799780
# Packet count per connected requestor and responder (Count)
system.membus.pktCount::total      140859066
# Packet count per connected requestor and responder (Count)
system.membus.pktSize_system.cpu.icache_port::system.mem_ctrl.port
380237144      # Cumulative packet size per connected
requestor and responder (Byte)
system.membus.pktSize_system.cpu.icache_port::total      380237144
# Cumulative packet size per connected requestor and responder (Byte)
system.membus.pktSize_system.cpu.dcache_port::system.mem_ctrl.port
79242149      # Cumulative packet size per connected
requestor and responder (Byte)
system.membus.pktSize_system.cpu.dcache_port::total      79242149
# Cumulative packet size per connected requestor and responder (Byte)
system.membus.pktSize::total      459479293
# Cumulative packet size per connected requestor and responder (Byte)
system.membus.snoops      0
# Total snoops (Count)
system.membus.snoopTraffic      0
# Total snoop traffic (Byte)
system.membus.snoopFanout::samples      70429533
# Request fanout histogram (Count)
system.membus.snoopFanout::mean      0
# Request fanout histogram (Count)
system.membus.snoopFanout::stdev      0
# Request fanout histogram (Count)
system.membus.snoopFanout::underflows      0      0.00%
0.00% # Request fanout histogram (Count)
system.membus.snoopFanout::0      70429533      100.00%
100.00% # Request fanout histogram (Count)
system.membus.snoopFanout::1      0      0.00%
100.00% # Request fanout histogram (Count)
system.membus.snoopFanout::overflows      0      0.00%
100.00% # Request fanout histogram (Count)
system.membus.snoopFanout::min_value      0
# Request fanout histogram (Count)
system.membus.snoopFanout::max_value      0
# Request fanout histogram (Count)
system.membus.snoopFanout::total      70429533
# Request fanout histogram (Count)
system.membus.power_state.pwrStateResidencyTicks::UNDEFINED 3387931467000
# Cumulative time (in ticks) in various power states (Tick)
system.membus.reqLayer2.occupancy      77755340000
# Layer occupancy (ticks) (Tick)
system.membus.reqLayer2.utilization      0.0
# Layer utilization (Ratio)

```

```

system.membus.respLayer0.occupancy      118807065000
# Layer occupancy (ticks) (Tick)
system.membus.respLayer0.utilization    0.0
# Layer utilization (Ratio)
system.membus.respLayer1.occupancy      41604287000
# Layer occupancy (ticks) (Tick)
system.membus.respLayer1.utilization    0.0
# Layer utilization (Ratio)
system.membus.snoop_filter.totRequests  0
# Total number of requests made to the snoop filter. (Count)
system.membus.snoop_filter.hitSingleRequests  0
# Number of requests hitting in the snoop filter with a single holder of
the requested data. (Count)
system.membus.snoop_filter.hitMultiRequests  0
# Number of requests hitting in the snoop filter with multiple (>1)
holders of the requested data. (Count)
system.membus.snoop_filter.totSnoops      0
# Total number of snoops made to the snoop filter. (Count)
system.membus.snoop_filter.hitSingleSnoops  0
# Number of snoops hitting in the snoop filter with a single holder of the
requested data. (Count)
system.membus.snoop_filter.hitMultiSnoops  0
# Number of snoops hitting in the snoop filter with multiple (>1) holders
of the requested data. (Count)
system.workload.inst.arm                  0
# number of arm instructions executed (Count)
system.workload.inst.quiesce              0
# number of quiesce instructions executed (Count)

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

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