Supermicro A+ Server 1022G-NTF, AMD Opteron 6366 HE

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name: AMD Opteron 6366 HE</td>
<td>Operating System: Red Hat Enterprise Linux Server release 6.3, Kernel 2.6.32-279.el6.x86_64</td>
</tr>
<tr>
<td>CPU Characteristics: AMD Turbo CORE technology up to 3.10 GHz</td>
<td>Compiler: C/C++/Fortran: Version 4.2.5.2 of x86 Open64 Compiler Suite (from AMD)</td>
</tr>
<tr>
<td>CPU MHz: 1800</td>
<td>Auto Parallel: Yes</td>
</tr>
<tr>
<td>CPU(s) enabled: 32 cores, 2 chips, 16 cores/chip</td>
<td>File System: ext3</td>
</tr>
<tr>
<td>CPU(s) orderable: 1.2 chips</td>
<td>System State: Run level 3 (Full multiuser with network)</td>
</tr>
<tr>
<td></td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td></td>
<td>Peak Pointers: 32/64-bit</td>
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</tbody>
</table>

SPECfp base2006 = 36.0

SPECfp2006 = 43.2

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### Supermicro
(Test Sponsor: Advanced Micro Devices)
Supermicro A+ Server 1022G-NTF, AMD Opteron 6366 HE

#### SPECfp2006 Result

<table>
<thead>
<tr>
<th>SPECfp2006</th>
<th>SPECfp_base2006</th>
</tr>
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<tbody>
<tr>
<td>43.2</td>
<td>36.0</td>
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</table>

**CPU2006 license:** 49
**Test date:** Oct-2012
**Hardware Availability:** Nov-2012
**Test sponsor:** Advanced Micro Devices
**Software Availability:** Jun-2012
**Tested by:** Advanced Micro Devices

<table>
<thead>
<tr>
<th>Primary Cache</th>
<th>Secondary Cache</th>
<th>L3 Cache</th>
<th>Other Cache</th>
<th>Memory</th>
<th>Disk Subsystem</th>
<th>Other Hardware</th>
<th>Other Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>512 KB I on chip per chip, 64 KB I shared / 2 cores; 16 KB D on chip per core</td>
<td>16 MB I+D on chip per chip, 2 MB shared / 2 cores</td>
<td>16 MB I+D on chip per chip, 8 MB shared / 8 cores</td>
<td>None</td>
<td>128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC)</td>
<td>1 x 320 GB SATA, 7200 RPM</td>
<td>None</td>
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</tr>
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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
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<tr>
<td>bwaves</td>
<td>64.4</td>
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<td>42.7</td>
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<td>1039</td>
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<td>gamess</td>
<td>1113</td>
<td>17.6</td>
<td>1115</td>
<td>17.6</td>
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<td>GemsFDTD</td>
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<td>691</td>
<td>28.2</td>
<td>692</td>
<td>28.2</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

### Submit Notes

The config file option 'submit' was used. 'numactl' was used to bind copies to the cores. See the configuration file for details.

### Operating System Notes

'ulimit -s unlimited' was used to set environment stack size 'ulimit -l 2097152' was used to set environment locked pages in memory limit

Set transparent_hugepage=never as a boot parameter in /boot/grub/menu.lst

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Supermicro
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Operating System Notes (Continued)

cpuspeed stop was used to set the CPU frequency to its maximum.
Set vm/nr_hugepages=4000 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages

General Notes

Environment variables set by runspec before the start of the run:

HUGETLB_LIMIT = "4000"
O64_OMP_AFFINITY_MAP = "0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31"
O64_OMP_SPIN_COUNT = "800000"
O64_OMP_SPIN_USER_LOCK = "true"

The x86 Open64 Compiler Suite is only available from (and supported by) AMD at http://developer.amd.com/cpu/open64

Binaries were compiled on a system with 2x AMD Opteron 6220 chips + 64GB Memory using RHEL 6.1

Base Compiler Invocation

C benchmarks:
opencc

C++ benchmarks:
openCC

Fortran benchmarks:
openf95

Benchmarks using both Fortran and C:
opencc openf95

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64
436.cactusADM: -DSPEC_CPU_LP64 -fno-second-underscore
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64

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SPEC CFP2006 Result

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Base Portability Flags (Continued)

454.calculix: -DSPEC_CPU_LP64
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG
-fno-second-underscore
482.sphinx3: -DSPEC_CPU_LP64

Base Optimization Flags

C benchmarks:
-march=bdver1 -Ofast -HP:bdt=2m:heap=2m -apo -mso
-OPT:alias=restricted -OPT:malloc_alg=2 -LNO:parallel_overhead=10000

C++ benchmarks:
-march=bdver1 -Ofast -static -CG:load_exe=0 -CG:p2align=0
-INLINE:aggressive=on -HP:bdt=2m:heap=2m -D__OPEN64_FAST_SET

Fortran benchmarks:
-march=bdver1 -Ofast -LNO:blocking=off -LNO:fusion_peeling_limit=0
-LNO:parallel_overhead=10000 -OPT:rsqrt=2 -OPT:unroll_size=256
-HP:bdt=2m:heap=2m -apo

Benchmarks using both Fortran and C:
-march=bdver1 -Ofast -HP:bdt=2m:heap=2m -apo -mso
-OPT:alias=restricted -OPT:malloc_alg=2 -LNO:parallel_overhead=10000
-LNO:blocking=off -LNO:fusion_peeling_limit=0 -OPT:rsqrt=2
-OPT:unroll_size=256

Peak Compiler Invocation

C benchmarks:
opencc

C++ benchmarks:
openCC

Fortran benchmarks:
openf95

Benchmarks using both Fortran and C:
opencc openf95
Supermicro  
(Test Sponsor: Advanced Micro Devices)  
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Peak Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gameess: -DSPEC_CPU_LP64
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434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64
436.cactusADM: -DSPEC_CPU_LP64 -fno-second-underscore
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64
459.GemsFDTD: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG -fno-second-underscore
482.sphinx3: -DSPEC_CPU_LP64

Peak Optimization Flags

C benchmarks:

433.milc: -march=bdver1 -Ofast -CG:movnti=1 -CG:locs_best=on  
-HP:bdt=2m:heap=2m -IPA:plimit=7000 -IPA:callee_limit=1200  
-OPT:struct_array_copy=2 -OPT:alias=field_sensitive

470.lbm: -march=bdver1 -Ofast -msi -apo -CG:ssse_cse_regs=0  
-LNO:prefetch_ahead=4 -CG:locs_shallow_depth=1  
-HP:bt=2m:heap=2m -LNO:loop_model_simd=on  
-IPA:all=restricted -m3dnow -IPA:inline=off

482.sphinx3: -march=bdver1 -fb_create fbdata(pass 1)  
-fb_opt fbdata(pass 2) -Ofast -LNO:loop_model_simd=on  
-LNO:simd_rm_unity_remainder=on -OPT:malloc_alg=2  
-HP:bdt=2m:heap=2m

C++ benchmarks:

444.namd: -march=bdver1 -fb_create fbdata(pass 1)  
-fb_opt fbdata(pass 2) -Ofast -CG:ignore_feedback=off  
-HP:bt=2m:heap=2m -LNO:loop_model_simd=on  
-IPA:all=restricted -m3dnow -IPA:inline=off

447.dealII: -march=bdver1 -Ofast -LNO:simd=0 -D__OPEN64_FAST_SET  
-HP:bdt=2m:heap=2m -LNO:loop_model_simd=on  
-IPA:all=restricted -m3dnow -IPA:inline=off

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Peak Optimization Flags (Continued)

450.soplex: -march=bdver1 -fb_create fbdata(pass 1)
- fb_opt fbdata(pass 2) -O3 -INLINE:aggressive=on -OPT:RO=1
- OPT:IEEE_arith=3 -OPT:IEEE_NaN_Inf=off
- OPT:fold_unsigned_relops=on -fno-exceptions -CG:p2align=0
- m32 -HP:bdt=2m:heap=2m -WOPT:sib=on

453.povray: -march=bdver1 -fb_create fbdata(pass 1)
- fb_opt fbdata(pass 2) -Ofast -CG:pre_local_sched=off
- INLINE:aggressive=on -HP:bdt=2m:heap=2m -OPT:transform=2
- OPT:alias=disjoint -WOPT:aggcm=0

Fortran benchmarks:

410.bwaves: -march=bdver1 -fb_create fbdata(pass 1)
- fb_opt fbdata(pass 2) -Ofast -apo -OPT:Ofast
- OPT:treeheight=on -LNO:blocking=off -LNO:prefetch=2
- LNO:pf2=0 -LNO:prefetch_ahead=3 -LNO:ignore_feedback=off
- LNO:fu=4 -LNO:loop_model simd=on
- LNO:simd_rm_unity_remainder=on -LNO:prefetch_ahead=3
- HP:bdt=2m:heap=2m -CG:cmp peep=on -CG:p2align=0

416.gamess: -march=bdver1 -fb_create fbdata(pass 1)
- fb_opt fbdata(pass 2) -O3 -LNO:fu=6 -LNO:blocking=0
- LNO:simd=0 -OPT:Ofast -OPT:ro=3 -OPT:unroll_size=256
- OPT:unroll_times_max=2 -CG:local_sched alg=1
- HP:bdt=2m:heap=2m -WOPT:sib=on

434.zeusmp: -march=bdver1 -Ofast -apo -LNO:blocking=off
- LNO:interchange=off -LNO:fusion_peeling_limit=0
- OPT:treeheight=on -OPT:unroll_size=256 -CG:cmp peep=on
- CG:compute_to=on -GRA:prioritize_by_density=on
- HP:bdt=2m:heap=2m

437.leslie3d: basepeak = yes

459.GemsFDTD: -march=bdver1 -Ofast -OPT:unroll_size=0 -LNO:fission=2
- CG:load_exe=0 -CG:local_scheduled=2 -HP -apo

465.tonto: -march=bdver1 -Ofast -OPT:alias=no_f90_pointer_alias
- LNO:blocking=off -CG:load_exe=1 -CG:local_scheduled=1
- IPA:plimit=525 -HP

Benchmarks using both Fortran and C:

435.gromacs: -march=bdver1 -fb_create fbdata(pass 1)
- fb_opt fbdata(pass 2) -Ofast -OPT:rsqrt=2
- HP:bdt=2m:heap=2m

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## SPEC CFP2006 Result

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<td>CPU2006 license: 49</td>
<td>Tested by: Advanced Micro Devices</td>
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</table>

### Peak Optimization Flags (Continued)

- **436.cactusADM**: `-march=bdver1 -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast -LNO:blocking=off -LNO:prefetch=2 -HP:bd=2m:heap=2m -CG:locs_shallow_depth=1 -CG:load_exe=0 -WOPT:sib=on -apo`
- **454.calculix**: `-march=bdver1 -Ofast -OPT:unroll_size=256 -GRA:optimize_boundary=on -HP:bd=2m:heap=2m`
- **481.wrf**: `basepeak = yes`

The flags files that were used to format this result can be browsed at:


You can also download the XML flags sources by saving the following links:


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