SPEC® CINT2006 Result
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Supermicro
(Test Sponsor: Advanced Micro Devices)

Supermicro A+ Server 1022G-NTF,
AMD Opteron 6278

$SPECint®\_rate2006 = 520$

$SPECint\_rate\_base2006 = 455$

CPU2006 license: 49	**Test date:** Mar-2012
Test sponsor: Advanced Micro Devices	**Hardware Availability:** Jun-2012
Tested by: Advanced Micro Devices	**Software Availability:** Dec-2011

Copies scale: 0 150 300 450 600 750 900 1050 1200 1350 1500 1650 1800 1950 2100 2250 2400 2550 2700 2850 3000 3150 3300 3450 3700

Benchmark	Copies (blue)	Value (blue)	Copies (black)	Value (black)
400.perlbench	32	400	32	332
401.bzip2	32	308	32	292
403.gcc	32	393	32	353
429.mcf	32	758	32	431
445.gobmk	32	373	32	336
456.hmmer	32	764	32	684
458.sjeng	32	342	32	313
462.libquantum	32	3590	32	3660
464.h264ref	32	481	32	408
471.omnetpp	32	348		
473.astar	32	369	32	304
483.xalancbmk	32	486	32	475

SPECint_rate_base2006 = 455

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Hardware

CPU Name:	AMD Opteron 6278
CPU Characteristics:	AMD Turbo CORE technology up to 3.30 GHz
CPU MHz:	2400
FPU:	Integrated
CPU(s) enabled:	32 cores, 2 chips, 16 cores/chip
CPU(s) orderable:	1,2 chips
Primary Cache:	512 KB I on chip per chip, 64 KB I shared / 2 cores; 16 KB D on chip per core
Secondary Cache:	16 MB I+D on chip per chip, 2 MB shared / 2 cores
L3 Cache:	16 MB I+D on chip per chip, 8 MB shared / 8 cores
Other Cache:	None
Memory:	128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC)
Disk Subsystem:	1 x 500 GB SATA, 7200 RPM
Other Hardware:	None

Software

Operating System:	Red Hat Enterprise Linux Server release 6.2, Kernel 2.6.32-220.el6.x86_64
Compiler:	C/C++: Version 4.5.1 of x86 Open64 Compiler Suite (from AMD)
Auto Parallel:	No
File System:	ext3
System State:	Run level 3 (Full multiuser with network)
Base Pointers:	32/64-bit
Peak Pointers:	32/64-bit
Other Software:	SmartHeap 10.0 32-bit Library for Linux

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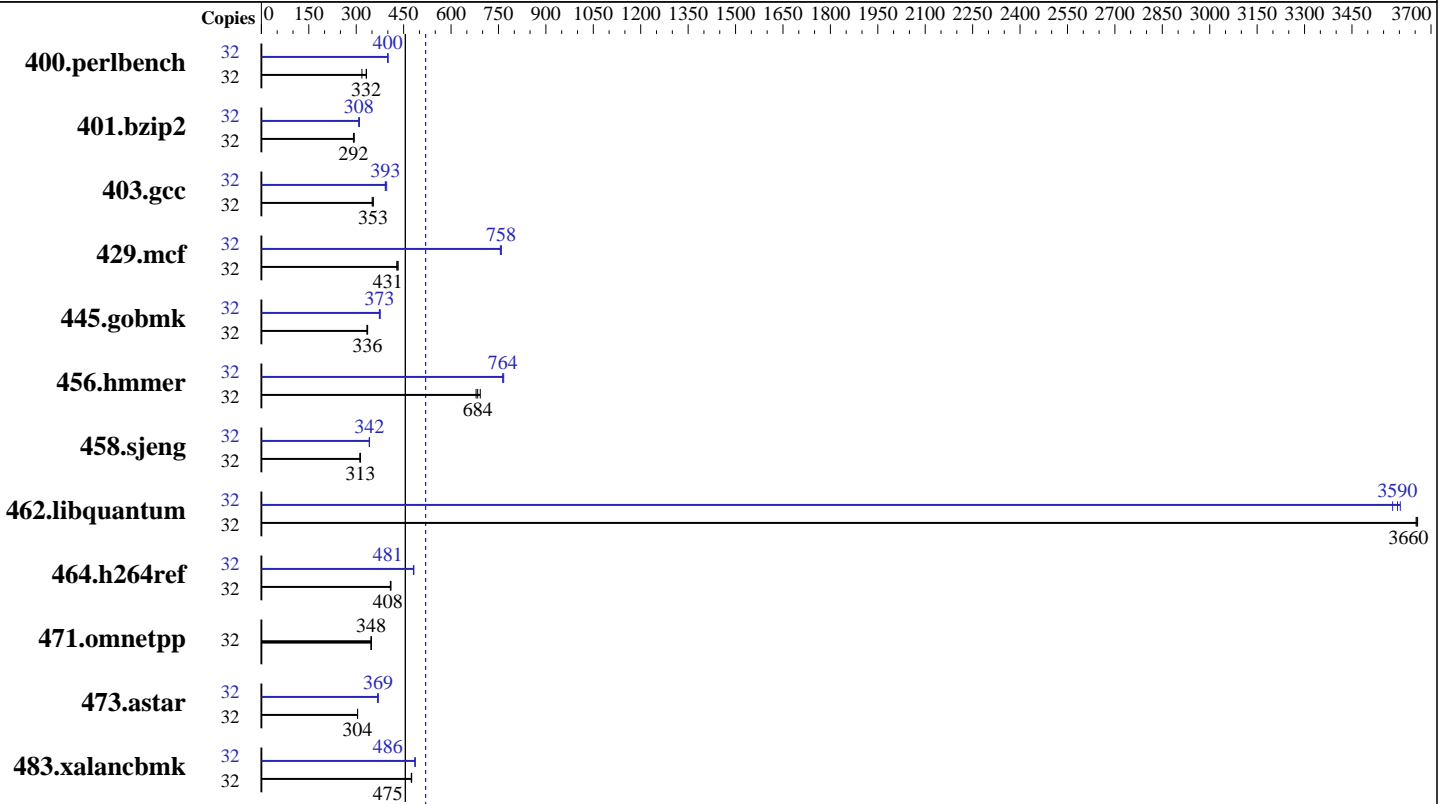
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Results Table

Benchmark	Copies	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Copies	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
400.perlbench	32	941	332	983	318	**942**	**332**	32	**782**	**400**	780	401	782	400
401.bzip2	32	**1058**	**292**	1051	294	1060	291	32	1002	308	**1002**	**308**	995	310
403.gcc	32	728	354	**729**	**353**	735	351	32	657	392	**656**	**393**	650	396
429.mcf	32	675	433	**677**	**431**	681	428	32	**385**	**758**	386	756	385	759
445.gobmk	32	**1000**	**336**	999	336	1006	334	32	**899**	**373**	899	373	893	376
456.hmmer	32	**436**	**684**	431	692	440	679	32	391	764	389	767	**391**	**764**
458.sjeng	32	1236	313	1244	311	**1236**	**313**	32	1132	342	1135	341	**1133**	**342**
462.libquantum	32	181	3660	**181**	**3660**	182	3650	32	**184**	**3590**	184	3600	185	3580
464.h264ref	32	1727	410	1735	408	**1735**	**408**	32	**1472**	**481**	1468	482	1472	481
471.omnetpp	32	577	347	575	348	**575**	**348**	32	577	347	575	348	**575**	**348**
473.astar	32	739	304	738	304	**738**	**304**	32	608	369	611	368	**608**	**369**
483.xalancbmk	32	466	474	464	475	**465**	**475**	32	454	486	454	486	**454**	**486**

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

Set vm/nr_hugepages=15360 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 = "480"
LD_LIBRARY_PATH = "/root/work/cpu2006v1.2/amd1104-rate-libs-revC/32:/root/work/cpu2006v1.2/amd1104-rate-libs-revC/64"

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 6274 chips + 64GB Memory using RHEL 6.1
```

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Base Compiler Invocation

C benchmarks:
    opencc

C++ benchmarks:
    openCC

Base Portability Flags

    400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
       401.bzip2: -DSPEC_CPU_LP64
         403.gcc: -DSPEC_CPU_LP64
         429.mcf: -DSPEC_CPU_LP64
       445.gobmk: -DSPEC_CPU_LP64
       456.hmmer: -DSPEC_CPU_LP64
        458.sjeng: -DSPEC_CPU_LP64
    462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
      464.h264ref: -DSPEC_CPU_LP64
    483.xalancbmk: -DSPEC_CPU_LINUX

Base Optimization Flags

C benchmarks:
    -march=bdver1 -Ofast -CG:local_sched_alg=1 -INLINE:aggressive=ON
    -IPA:plimit=8000 -IPA:small_pu=100 -HP:bd=2m:heap=2m -mso
    -LNO:prefetch=2

C++ benchmarks:
    -march=bdver1 -Ofast -m32 -INLINE:aggressive=on -CG:cmp_peep=on
    -D__OPEN64_FAST_SET -L/root/work/libraries/SmartHeap-10/lib -lsmartheap

Peak Compiler Invocation

C benchmarks:
    opencc

C++ benchmarks:
    openCC

Peak Portability Flags

    400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64

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Peak Portability Flags (Continued)

```
    401.bzip2: -DSPEC_CPU_LP64
    445.gobmk: -DSPEC_CPU_LP64
    456.hmmer: -DSPEC_CPU_LP64
    458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
   464.h264ref: -DSPEC_CPU_LP64
 483.xalancbmk: -DSPEC_CPU_LINUX
```

Peak Optimization Flags

C benchmarks:

```
  400.perlbench: -march=bdver1 -fb_create fbdata(pass 1)
                 -fb_opt fbdata(pass 2) -Ofast -LNO:prefetch=2 -LNO:opt=0
                 -IPA:plimit=20000 -OPT:unroll_times_max=8
                 -OPT:unroll_size=256 -OPT:unroll_level=2 -OPT:keep_ext=on
                 -WOPT:if_conv=0 -WOPT:sib=on -CG:local_sched_alg=1
                 -CG:unroll_fb_req=on -CG:movext_icmp=off -HP:bd=2m:heap=2m

     401.bzip2: -march=bdver1 -fb_create fbdata(pass 1)
                 -fb_opt fbdata(pass 2) -O3 -LNO:prefetch=2 -LNO:pf2=0
                 -OPT:alias=disjoint -OPT:goto=off -CG:local_sched_alg=1
                 -HP:bdt=2m:heap=2m

       403.gcc: -march=bdver1 -fb_create fbdata(pass 1)
                 -fb_opt fbdata(pass 2) -Ofast -LNO:trip_count=256
                 -CG:cmp_peep=on -CG:pre_minreg_level=2 -m32
                 -HP:bdt=2m:heap=2m -GRA:unspill=on -IPA:small_pu=200
                 -WOPT:sib=on

       429.mcf: -march=bdver1 -O3 -OPT:unroll_times_max=5 -ipa
                 -INLINE:aggressive=on -CG:gcm=off -CG:dsched=on
                 -GRA:prioritize_by_density=on -m32 -HP:bdt=2m:heap=2m -mso

     445.gobmk: -march=bdver1 -fb_create fbdata(pass 1)
                 -fb_opt fbdata(pass 2) -Ofast -OPT:unroll_size=256
                 -OPT:unroll_times_max=8 -OPT:keep_ext=on -IPA:plimit=750
                 -IPA:min_hotness=300 -IPA:pu_reorder=1
                 -LNO:ignore_feedback=off -WOPT:if_conv=2 -HP:bd=2m:heap=2m

     456.hmmer: -march=bdver1 -fb_create fbdata(pass 1)
                 -fb_opt fbdata(pass 2) -Ofast -LNO:prefetch=2
                 -OPT:alias=disjoint -OPT:unroll_times_max=16
                 -OPT:unroll_size=512 -OPT:unroll_level=2 -OPT:keep_ext=on
                 -CG:cflow=0 -CG:cmp_peep=on -CG:pre_local_sched=off
                 -HP:bdt=2m:heap=2m
```

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Peak Optimization Flags (Continued)

```
    458.sjeng: -march=bdver1 -fb_create fbdata(pass 1)
               -fb_opt fbdata(pass 2) -Ofast -CG:ptr_load_use=0
               -CG:divrem_opt=on -CG:movext_icmp=off -CG:locs_best=on
               -LNO:full_unroll=10 -IPA:pu_reorder=2 -HP:heap=2m:bd=2m
               -WOPT:sib=on

  462.libquantum: -march=bdver1 -Ofast -mso -OPT:unroll_size=512
               -OPT:unroll_times_max=16 -LNO:prefetch=2
               -LNO:prefetch_ahead=4 -LNO:pf2=0 -CG:local_sched_alg=1
               -CG:p2align=0 -INLINE:aggressive=ON -IPA:plimit=15000
               -IPA:small_pu=100 -HP:bdt=2m:heap=2m,limit=300

    464.h264ref: -march=bdver1 -fb_create fbdata(pass 1)
               -fb_opt fbdata(pass 2) -O3 -OPT:unroll_size=256
               -OPT:unroll_times_max=2 -IPA:plimit=20000
               -OPT:alias=disjoint -CG:ptr_load_use=0
               -CG:local_sched_alg=1 -HP:bdt=2m:heap=2m
```

C++ benchmarks:

```
    471.omnetpp: basepeak = yes

       473.astar: -march=bdver1 -fb_create fbdata(pass 1)
               -fb_opt fbdata(pass 2) -Ofast -TENV:frame_pointer=off
               -WOPT:if_conv=0 -WOPT:sib=on -CG:divrem_opt=on
               -CG:p2align=1 -CG:dsched=on -GRA:optimize_boundary=on
               -OPT:alias=disjoint -INLINE:aggressive=on
               -IPA:small_pu=3000 -IPA:plimit=3000 -m32
               -HP:bdt=2m:heap=2m

    483.xalancbmk: -march=bdver1 -Ofast -LNO:prefetch=2 -OPT:unroll_size=512
               -OPT:unroll_times_max=8 -D__OPEN64_FAST_SET
               -INLINE:aggressive=on -m32 -CG:cmp_peep=on
               -CG:local_sched=off -CG:p2align=1 -GRA:unspill=on
               -TENV:frame_pointer=off -fno-emit-exceptions
               -L/root/work/libraries/SmartHeap-10/lib -lsmartheap
```

The flags file that was used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/x86-open64-451-flags-rate-revC-I.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/cpu2006/flags/x86-open64-451-flags-rate-revC-I.xml

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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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