SPEC® CINT2006 Result
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IBM Corporation

IBM System x3655 (AMD Opteron 2352)

SPECint®2006 =　　13.3

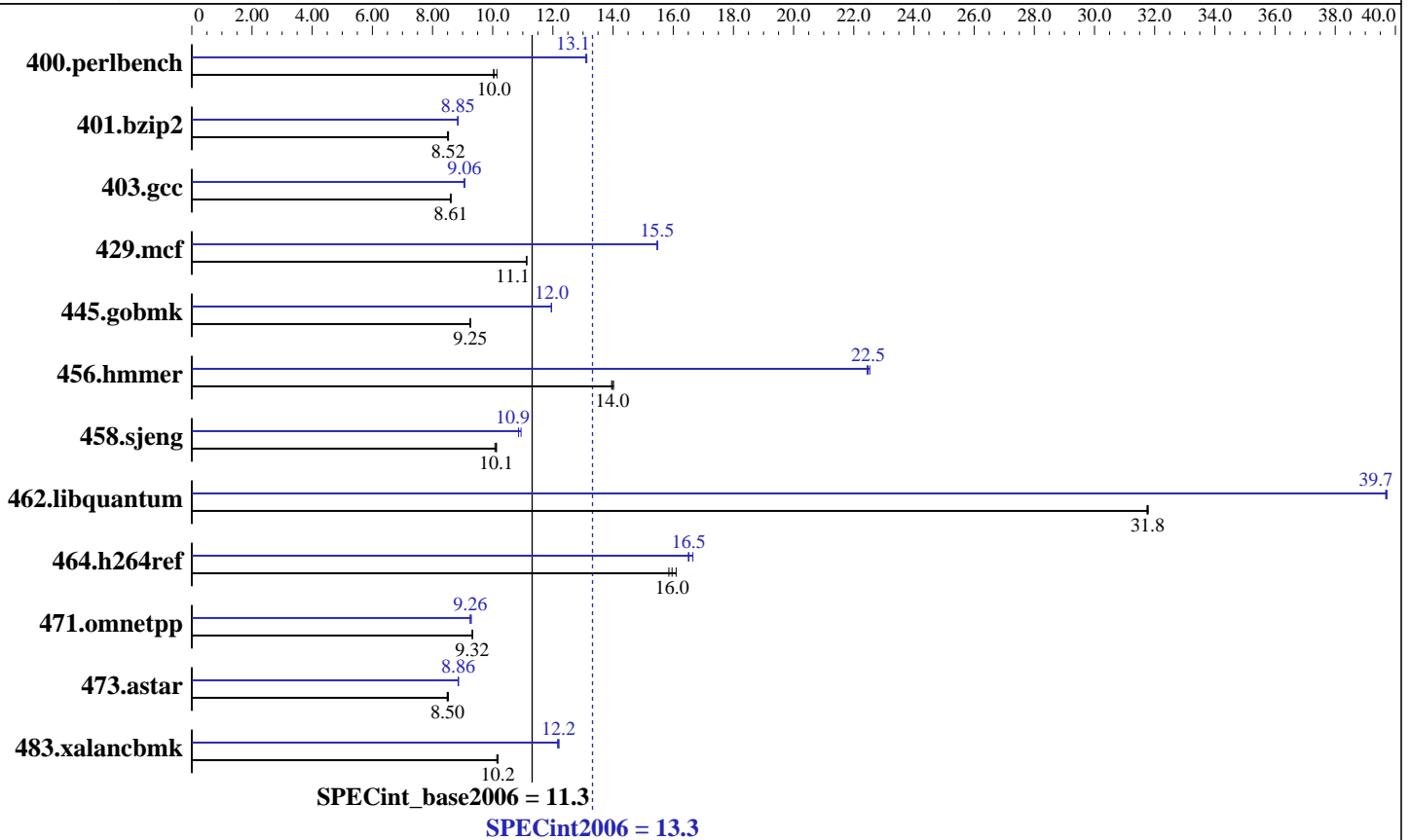SPECint_base2006 =　　11.3

CPU2006 license: 11
Test sponsor: IBM Corporation
Tested by: Advanced Micro Devices

Test date: Jun-2008
Hardware Availability: Jul-2008
Software Availability: Jun-2008

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Hardware

CPU Name:	AMD Opteron 2352
CPU Characteristics:	
CPU MHz:	2100
FPU:	Integrated
CPU(s) enabled:	8 cores, 2 chips, 4 cores/chip
CPU(s) orderable:	1,2 chips
Primary Cache:	64 KB I + 64 KB D on chip per core
Secondary Cache:	512 KB I+D on chip per core
L3 Cache:	2 MB I+D on chip per chip
Other Cache:	None
Memory:	16 GB (8 x 2 GB, DDR2-667 CL5 Reg Dual Rank)
Disk Subsystem:	1 x 73.4 GB SAS, 15000 RPM
Other Hardware:	None

Software

Operating System:	SuSE Linux Enterprise Server 10 (x86_64) SP1, Kernel 2.6.16.46-0.12-smp
Compiler:	PGI Server Complete Version 7.2 PathScale Compiler Suite Version 3.2
Auto Parallel:	No
File System:	ext3
System State:	Runlevel 3 (Full multiuser with network)
Base Pointers:	32/64-bit
Peak Pointers:	32/64-bit
Other Software:	SmartHeap 8.0 32-bit Library for Linux

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Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	964	10.1	974	10.0	**973**	**10.0**	746	13.1	**745**	**13.1**	744	13.1
401.bzip2	1136	8.50	**1132**	**8.52**	1131	8.53	1090	8.85	1093	8.83	**1091**	**8.85**
403.gcc	**935**	**8.61**	934	8.62	937	8.59	**888**	**9.06**	888	9.07	890	9.04
429.mcf	820	11.1	820	11.1	**820**	**11.1**	589	15.5	**589**	**15.5**	590	15.5
445.gobmk	**1133**	**9.25**	1133	9.26	1134	9.25	**877**	**12.0**	877	12.0	878	11.9
456.hmmer	669	14.0	666	14.0	**667**	**14.0**	**415**	**22.5**	414	22.5	416	22.4
458.sjeng	**1196**	**10.1**	1201	10.1	1195	10.1	1106	10.9	1115	10.9	**1114**	**10.9**
462.libquantum	**652**	**31.8**	652	31.8	653	31.7	**522**	**39.7**	522	39.7	522	39.7
464.h264ref	**1387**	**16.0**	1396	15.9	1375	16.1	1341	16.5	1329	16.7	**1340**	**16.5**
471.omnetpp	670	9.33	**670**	**9.32**	671	9.32	673	9.29	676	9.25	**675**	**9.26**
473.astar	823	8.53	827	8.49	**826**	**8.50**	792	8.86	793	8.85	**793**	**8.86**
483.xalancbmk	681	10.1	678	10.2	**678**	**10.2**	565	12.2	**566**	**12.2**	568	12.2

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

Operating System Notes

```
'numactl' was used to bind copies to the cores
Environment variable PGI_HUGE_PAGES set to 896
'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 2097152'  was used to set environment locked pages in memory limit
Set vm/nr_hugepages=1792 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
powersave -f was used to set the CPU frequency to its maximum.
```

Base Compiler Invocation

C benchmarks:
    pgcc

C++ benchmarks:
    pgcpp

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
```

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Base Portability Flags (Continued)

```
     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:
```
    -fastsse -Msmartalloc=huge:150 -Mfprelaxed -Mipa=fast -Mipa=inline
    -tp barcelona-64 -Bstatic_pgi
```

C++ benchmarks:
```
    -fastsse -Msmartalloc=huge:150 -Mfprelaxed --zc_eh -Mipa=fast
    -Mipa=inline -tp barcelona -Bstatic_pgi
```

Base Other Flags

C benchmarks:
```
    -Mipa=jobs:4
```

C++ benchmarks:
```
    -Mipa=jobs:4
```

Peak Compiler Invocation

C benchmarks (except as noted below):
```
    pgcc
```

```
    400.perlbench: pathcc
```

```
    403.gcc: pathcc
```

```
    445.gobmk: pathcc
```

```
    464.h264ref: pathcc
```

C++ benchmarks (except as noted below):
```
    pathCC
```

```
    473.astar: pgcpp
```

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Peak Portability Flags

```
400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
   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=barcelona -fb_create fbdata(pass 1)
               -fb_opt fbdata(pass 2) -Ofast -IPA:plimit=20000 -LNO:opt=0
               -WOPT:if_conv=0 -CG:local_sched_alg=1

   401.bzip2: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2) -fastsse -O4
              -Msmartalloc=huge:150 -Mprefetch=t0 -Mnounroll
              -tp barcelona-64 -Bstatic_pgi

    403.gcc: -march=barcelona -fb_create fbdata(pass 1)
             -fb_opt fbdata(pass 2) -O3 -OPT:Ofast -m32

    429.mcf: -fastsse -Msmartalloc=huge:150 -Mipa=fast -Mipa=inline:1
             -tp barcelona -Bstatic_pgi

  445.gobmk: -march=barcelona -fb_create fbdata(pass 1)
             -fb_opt fbdata(pass 2) -O3 -OPT:alias=restrict
             -LNO:prefetch=1 -LNO:ignore_feedback=off -CG:p2align=on

  456.hmmer: -fastsse -Mvect=partial -Munroll=n:8 -Msmartalloc=huge:150
             -Msafeptr -Mprefetch=t0 -Mfprelaxed -Mipa=const -Mipa=ptr
             -Mipa=arg -Mipa=inline -tp barcelona-64 -Bstatic_pgi

  458.sjeng: -Mpfi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)
             -Mipa=inline:1(pass 2) -Mipa=noarg(pass 2) -fastsse
             -Msmartalloc=huge:150 -Mfprelaxed -tp barcelona-64
             -Bstatic_pgi

462.libquantum: -fastsse -Munroll=m:8 -Msmartalloc=huge:150
                -Mprefetch=distance:4 -Mfprelaxed -Mipa=fast -Mipa=inline
                -Mipa=noarg -tp barcelona-64 -Bstatic_pgi

  464.h264ref: -march=barcelona -fb_create fbdata(pass 1)
               -fb_opt fbdata(pass 2) -O3 -IPA:plimit=20000
               -OPT:alias=disjoint -LNO:prefetch=0 -CG:ptr_load_use=0
               -CG:push_pop_int_saved_regs=off
```

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Peak Optimization Flags (Continued)

C++ benchmarks:

471.omnetpp: `-march=barcelona -Ofast -CG:gcm=off -INLINE:aggressive=on -OPT:alias=disjoint -WOPT:if_conv=0 -m32 -lsmartheap`

473.astar: `-Mpfi`(pass 1) `-Mpfo`(pass 2) `-Mipa=fast`(pass 2) `-Mipa=inline:6`(pass 2) `-fastsse -O4 -Msmartalloc=huge:150 -Msafeptr=global -Mfprelaxed --zc_eh -tp barcelona -Bstatic_pgi`

483.xalancbmk: `-march=barcelona -Ofast -OPT:unroll_times_max=8 -CG:push_pop_int_saved_regs=off -CG:ptr_load_use=0 -m32 -lsmartheap`

Peak Other Flags

C benchmarks:

429.mcf: `-Mipa=jobs:4`

456.hmmer: `-Mipa=jobs:4`

458.sjeng: `-Mipa=jobs:4`(pass 2)

462.libquantum: `-Mipa=jobs:4`

C++ benchmarks (except as noted below):
`-L/root/work/cpu2006-amd421gh/amd421gh.libs/32`

473.astar: `-Mipa=jobs:4`(pass 2)

The flags file that was used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/amd421GH-flags.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/cpu2006/flags/amd421GH-flags.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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