SPEC® CINT2006 Result

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IBM Corporation

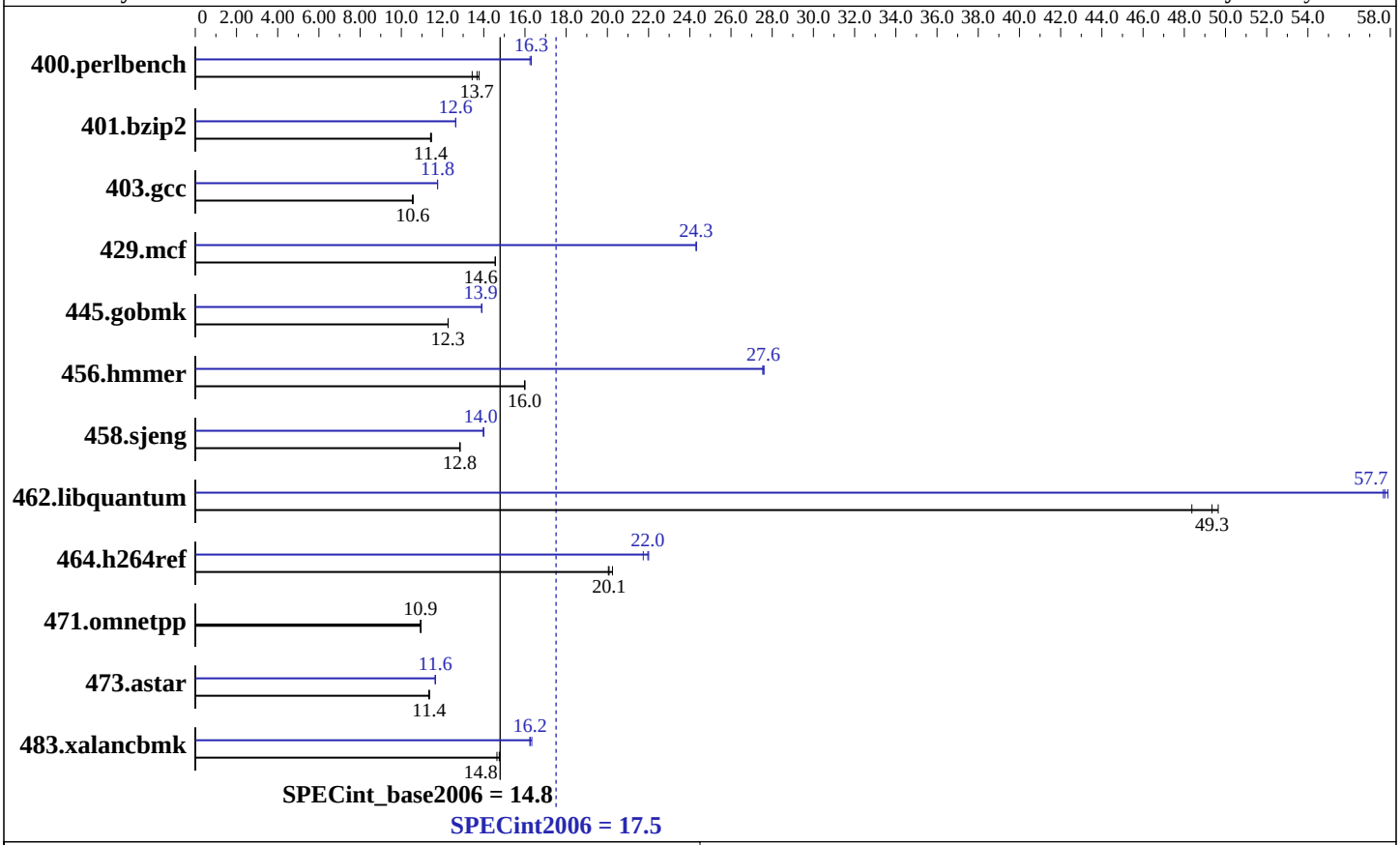
IBM System x3755 (AMD Opteron 8378)

SPECint®2006 = 17.5

SPECint_base2006 = 14.8

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

Test date: Feb-2009
Hardware Availability: Mar-2009
Software Availability: May-2008



Hardware

CPU Name:	AMD Opteron 8378
CPU Characteristics:	
CPU MHz:	2400
FPU:	Integrated
CPU(s) enabled:	16 cores, 4 chips, 4 cores/chip
CPU(s) orderable:	1,2,3,4 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:	6 MB I+D on chip per chip
Other Cache:	None
Memory:	64 GB (16 x 4 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
Auto Parallel:	Yes
File System:	ReiserFS
System State:	Run level 3 (Full multiuser with network)
Base Pointers:	32/64-bit
Peak Pointers:	32/64-bit
Other Software:	SmartHeap 8.1 32-bit Library for Linux binutils 2.18.50

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Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	709	13.8	727	13.4	**714**	**13.7**	601	16.2	599	16.3	**599**	**16.3**
401.bzip2	**844**	**11.4**	842	11.5	845	11.4	764	12.6	763	12.6	**763**	**12.6**
403.gcc	762	10.6	**762**	**10.6**	764	10.5	**685**	**11.8**	684	11.8	685	11.8
429.mcf	**626**	**14.6**	626	14.6	626	14.6	375	24.3	**375**	**24.3**	375	24.3
445.gobmk	855	12.3	**855**	**12.3**	855	12.3	**754**	**13.9**	754	13.9	755	13.9
456.hmmer	584	16.0	583	16.0	**583**	**16.0**	339	27.5	**338**	**27.6**	338	27.6
458.sjeng	941	12.9	943	12.8	**943**	**12.8**	866	14.0	864	14.0	**865**	**14.0**
462.libquantum	**420**	**49.3**	428	48.4	417	49.6	**359**	**57.7**	358	57.9	359	57.7
464.h264ref	1093	20.2	1104	20.0	**1102**	**20.1**	1018	21.7	**1008**	**22.0**	1006	22.0
471.omnetpp	**571**	**10.9**	571	10.9	572	10.9	**571**	**10.9**	571	10.9	572	10.9
473.astar	**618**	**11.4**	618	11.4	620	11.3	602	11.7	**603**	**11.6**	603	11.6
483.xalancbmk	467	14.8	**468**	**14.8**	471	14.6	422	16.3	425	16.2	**425**	**16.2**

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.
```

Operating System Notes

```
Environment stack size set to 'unlimited'.
Total number of huge pages available is 14336.
'ulimit -l 2097152' was used to set environment locked pages in memory quantity.
Set vm/nr_hugepages=14336 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/root/work/cpu2006v1.1/pgi72/linux_lib64:/root/work/cpu2006v1.1/pgi72/linux_lib32"
NCPUS = "16"
```

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
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:
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mloop32
-Mconcur=innermost -Mfprelaxed -Mipa=fast -Mipa=inline
-tp barcelona-64 -Bstatic_pgi

C++ benchmarks:
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mloop32
-Mfprelaxed --zc_eh -Mipa=fast -Mipa=inline:10 -tp barcelona-32
-Bstatic_pgi

Base Other Flags

C benchmarks:
-Mipa=jobs:8

C++ benchmarks:
-Mipa=jobs:8

Peak Compiler Invocation

C benchmarks:
pgcc

C++ benchmarks:
pgcpp

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: -Mpfi(pass 1) -Mpfo(pass 2) -Mipa=inline(pass 2)
-Mvect=cachesize:6291456 -fastsse -O4 -Msmartalloc=huge
-Mnovect -Mnounroll -Mfprelaxed -tp barcelona-64
-Bstatic_pgi

401.bzip2: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)
-Mvect=cachesize:6291456 -fastsse -O4 -Msmartalloc=huge
-Mprefetch=t0 -Mnounroll -tp barcelona-64 -Bstatic_pgi

403.gcc: -Mpfi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)
-Mipa=inline(pass 2) -Mvect=cachesize:6291456 -fastsse
-Msmartalloc=huge -Mprefetch=t0 -Mnodalign -Mloop32
-Mfprelaxed -tp barcelona-32 -Bstatic_pgi

429.mcf: -Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge
-Mipa=fast -Mipa=inline:1 -tp barcelona-32 -Bstatic_pgi

445.gobmk: -Mpfi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)
-Mvect=cachesize:6291456 -fastsse -O4 -Msmartalloc=huge
-Mnovect -Mfprelaxed -tp barcelona-64 -Bstatic_pgi

456.hmmer: -Mvect=cachesize:6291456 -fastsse -Mvect=partial
-Munroll=n:8 -Msmartalloc=huge -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)
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge
-Mfprelaxed -tp barcelona-64 -Bstatic_pgi

462.libquantum: -Mvect=cachesize:6291456 -fastsse -Munroll=m:8
-Msmartalloc=huge -Mprefetch=distance:8 -Mconcur=innermost
-Mconcur=noaltcode -Mfprelaxed -Mipa=fast -Mipa=noarg
-tp barcelona-64 -Bstatic_pgi

Continued on next page

Peak Optimization Flags (Continued)

464.h264ref: `-Mpfi=indirect`(pass 1) `-Mpfo=indirect`(pass 2)
`-Mipa=fast`(pass 2) `-Mipa=inline`(pass 2)
`-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge`
`-Mfprelaxed -tp barcelona-64 -Bstatic_pgi`

C++ benchmarks:

471.omnetpp: `basepeak = yes`

473.astar: `-Mpfi`(pass 1) `-Mpfo`(pass 2) `-Mipa=fast`(pass 2)
`-Mipa=inline:6`(pass 2) `-Mvect=cachesize:6291456 -fastsse`
`-O4 -Msmartalloc=huge -Msafeptr=global -Mloop32`
`-Mfprelaxed --zc_eh -tp barcelona-32 -Bstatic_pgi`

483.xalancbmk: `-Mvect=cachesize:6291456 --zc_eh -fastsse -O4 -Mfprelaxed`
`-Msmartalloc -Mipa=fast -Mipa=inline -tp barcelona-32`
`-Bstatic_pgi -lsmartheap`

Peak Other Flags

C benchmarks (except as noted below):
`-Mipa=jobs:8`(pass 2)

401.bzip2: `No flags used`

C++ benchmarks (except as noted below):
`-Mipa=jobs:8`(pass 2)

483.xalancbmk: `-Mipa=jobs:8 -L/proj/qa/smartheap/SmartHeap_8.1/lib`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/pgi72_linux_flags.20090710.00.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/pgi72_linux_flags.20090710.00.xml`

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