SPEC® CINT2006 Result
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IBM Corporation

IBM System x3650 M3 (Intel Xeon E5603)

$SPECint^®2006 =$ 20.0
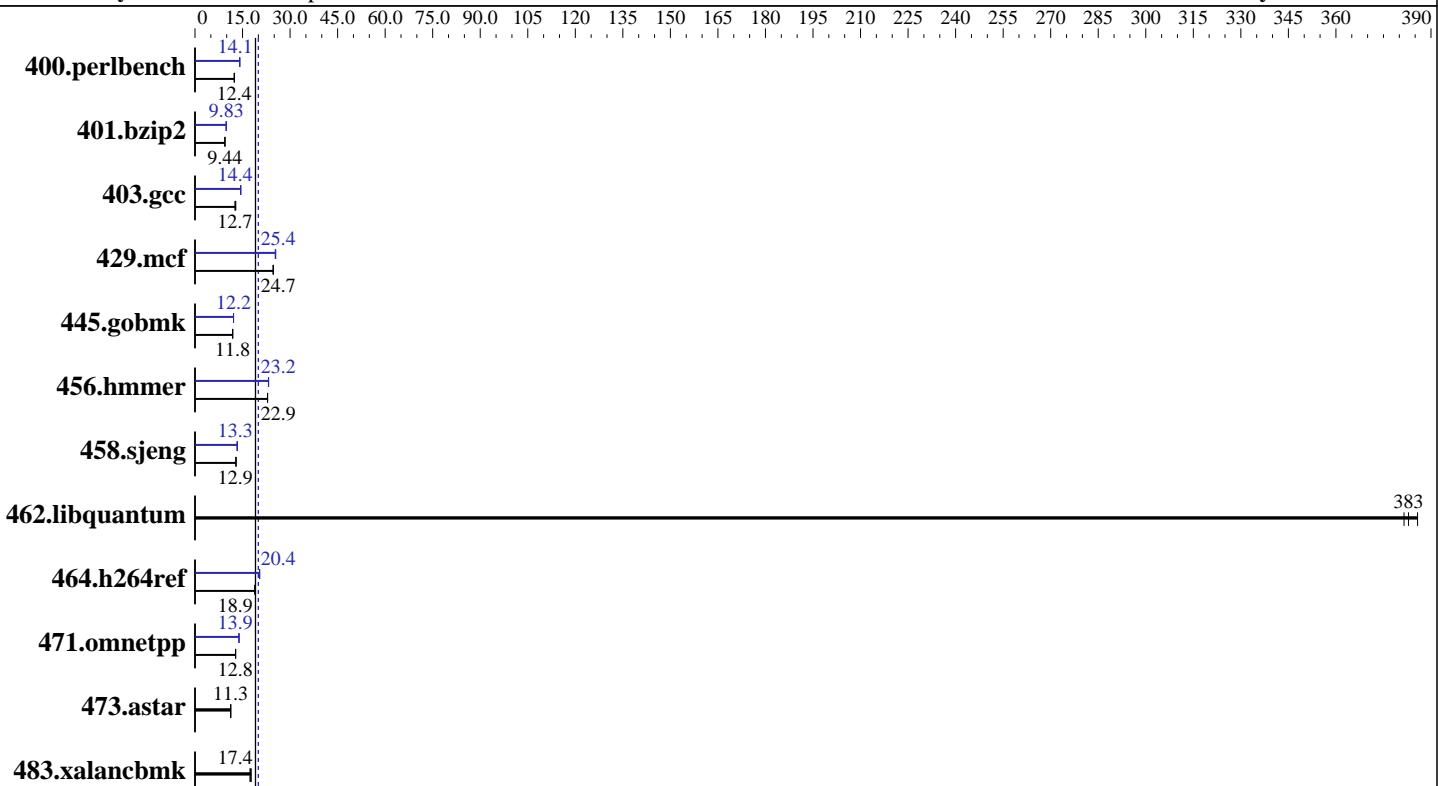
$SPECint\_base2006 =$ 19.1

CPU2006 license: 11
Test sponsor: IBM Corporation
Tested by: IBM Corporation

Test date: Apr-2011
Hardware Availability: Feb-2011
Software Availability: Jan-2011

400.perlbench	14.1 / 12.4
401.bzip2	9.83 / 9.44
403.gcc	14.4 / 12.7
429.mcf	25.4 / 24.7
445.gobmk	12.2 / 11.8
456.hmmer	23.2 / 22.9
458.sjeng	13.3 / 12.9
462.libquantum	383
464.h264ref	20.4 / 18.9
471.omnetpp	13.9 / 12.8
473.astar	11.3
483.xalancbmk	17.4

SPECint_base2006 = 19.1
SPECint2006 = 20.0

Hardware

CPU Name:	Intel Xeon E5603
CPU Characteristics:	
CPU MHz:	1600
FPU:	Integrated
CPU(s) enabled:	8 cores, 2 chips, 4 cores/chip
CPU(s) orderable:	1,2 chips
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	256 KB I+D on chip per core
L3 Cache:	4 MB I+D on chip per chip
Other Cache:	None
Memory:	96 GB (12 x 8 GB 2Rx4 PC3-10600R-9, ECC, running at 1067 MHz)
Disk Subsystem:	1 x 146 GB SAS, 15000 RPM
Other Hardware:	None

Software

Operating System:	SUSE Linux Enterprise Server 11 SP1 (x86_64), Kernel 2.6.32.12-0.7-default
Compiler:	Intel C++ Intel 64 Compiler XE for applications running on Intel 64 Version 12.0.1.116 Build 20101116
Auto Parallel:	Yes
File System:	ext3
System State:	Run level 3 (multi-user)
Base Pointers:	32/64-bit
Peak Pointers:	32/64-bit
Other Software:	Microquill SmartHeap V9.01

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Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	787	12.4	788	12.4	**787**	**12.4**	691	14.1	694	14.1	**691**	**14.1**
401.bzip2	**1022**	**9.44**	1022	9.44	1023	9.44	**981**	**9.83**	975	9.90	981	9.83
403.gcc	636	12.7	**635**	**12.7**	625	12.9	558	14.4	559	14.4	**558**	**14.4**
429.mcf	370	24.7	**369**	**24.7**	369	24.7	358	25.5	360	25.3	**360**	**25.4**
445.gobmk	886	11.8	**886**	**11.8**	876	12.0	863	12.2	**863**	**12.2**	863	12.2
456.hmmer	408	22.9	407	22.9	**408**	**22.9**	**402**	**23.2**	402	23.2	403	23.2
458.sjeng	935	12.9	**935**	**12.9**	936	12.9	**908**	**13.3**	909	13.3	908	13.3
462.libquantum	53.7	386	**54.1**	**383**	54.3	381	53.7	386	**54.1**	**383**	54.3	381
464.h264ref	1168	18.9	1172	18.9	**1171**	**18.9**	**1085**	**20.4**	1087	20.4	1085	20.4
471.omnetpp	488	12.8	**488**	**12.8**	487	12.8	**451**	**13.9**	451	13.9	450	13.9
473.astar	625	11.2	622	11.3	**623**	**11.3**	625	11.2	622	11.3	**623**	**11.3**
483.xalancbmk	397	17.4	389	17.8	**396**	**17.4**	397	17.4	389	17.8	**396**	**17.4**

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

Operating System Notes

```
'ulimit -s unlimited' was used to set the stacksize to unlimited prior to run
'mount -t hugetlbfs nodev /mnt/hugepages' was used to enable large pages
echo 900 > /proc/sys/vm/nr_hugepages
export HUGETLB_MORECORE=yes
export LD_PRELOAD=/usr/lib64/libhugetlbfs.so
```

Platform Notes

```
Power C-State enabled in BIOS
Data Reuse disabled in BIOS
Demand Scrub disabled in BIOS
```

General Notes

```
OMP_NUM_THREADS set to number of cores
Binaries compiled on RHEL5.5
```

Base Compiler Invocation

C benchmarks:
```
icc -m64
```

C++ benchmarks:
```
icpc -m64
```

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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
    471.omnetpp: -DSPEC_CPU_LP64
       473.astar: -DSPEC_CPU_LP64
   483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
```

Base Optimization Flags

C benchmarks:

```
-xSSE4.2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -auto-p32
-B /usr/share/libhugetlbfs/ -Wl,-melf_x86_64 -Wl,-hugetlbfs-link=BDT
```

C++ benchmarks:

```
-xSSE4.2 -ipo -O3 -no-prec-div -opt-prefetch -Wl,-z,muldefs
-L/smartheap -lsmartheap64
-B /usr/share/libhugetlbfs/ -Wl,-melf_x86_64 -Wl,-hugetlbfs-link=BDT
```

Base Other Flags

C benchmarks:

```
403.gcc: -Dalloca=_alloca
```

Peak Compiler Invocation

C benchmarks (except as noted below):
```
icc  -m64
```

400.perlbench: `icc -m32`

429.mcf: `icc -m32`

445.gobmk: `icc -m32`

464.h264ref: `icc -m32`

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Peak Compiler Invocation (Continued)

C++ benchmarks (except as noted below):
```
icpc -m64
```

471.omnetpp: `icpc -m32`

Peak Portability Flags

400.perlbench: `-DSPEC_CPU_LINUX_IA32`
401.bzip2: `-DSPEC_CPU_LP64`
403.gcc: `-DSPEC_CPU_LP64`
456.hmmer: `-DSPEC_CPU_LP64`
458.sjeng: `-DSPEC_CPU_LP64`
462.libquantum: `-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX`
473.astar: `-DSPEC_CPU_LP64`
483.xalancbmk: `-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX`

Peak Optimization Flags

C benchmarks:

400.perlbench: `-xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)`
`-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)`
`-opt-prefetch -ansi-alias`
`-B /usr/share/libhugetlbfs/ -Wl,-hugetlbfs-link=BDT`

401.bzip2: `-xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)`
`-O3(pass 2) -no-prec-div -prof-use(pass 2) -auto-ilp32`
`-opt-prefetch -ansi-alias`

403.gcc: `-xSSE4.2 -ipo -O3 -no-prec-div -inline-calloc`
`-opt-malloc-options=3 -auto-ilp32`
`-B /usr/share/libhugetlbfs/ -Wl,-melf_x86_64 -Wl,-hugetlbfs-link=BDT`

429.mcf: `-xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)`
`-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)`
`-auto-ilp32 -ansi-alias`
`-B /usr/share/libhugetlbfs/ -Wl,-hugetlbfs-link=BDT`

445.gobmk: `-xSSE4.2(pass 2) -prof-gen(pass 1) -prof-use(pass 2)`
`-auto-ilp32 -ansi-alias`
`-B /usr/share/libhugetlbfs/ -Wl,-hugetlbfs-link=BDT`

456.hmmer: `-xSSE4.2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32`
`-ansi-alias`
`-B /usr/share/libhugetlbfs/ -Wl,-melf_x86_64 -Wl,-hugetlbfs-link=BDT`

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Peak Optimization Flags (Continued)

458.sjeng: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-unroll4

462.libquantum: basepeak = yes

464.h264ref: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-unroll2 -ansi-alias
-B /usr/share/libhugetlbfs/ -Wl,-hugetlbfs-link=BDT

C++ benchmarks:

471.omnetpp: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-opt-ra-region-strategy=block -ansi-alias -Wl,-z,muldefs
-L/smartheap -lsmartheap
-B /usr/share/libhugetlbfs/ -Wl,-hugetlbfs-link=BDT

473.astar: basepeak = yes

483.xalancbmk: basepeak = yes

Peak Other Flags

C benchmarks:

403.gcc: -Dalloca=_alloca

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic12.0-linux64-revB.html
http://www.spec.org/cpu2006/flags/IBM-platform-linux64-revA.20110420.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic12.0-linux64-revB.xml
http://www.spec.org/cpu2006/flags/IBM-platform-linux64-revA.20110420.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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