



# SPEC<sup>®</sup> CINT2006 Result

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## IBM Corporation

SPECint<sup>®</sup>\_rate2006 = **325**

### IBM System x3650 M3 (Intel Xeon E5649)

SPECint\_rate\_base2006 = 303

CPU2006 license: 11

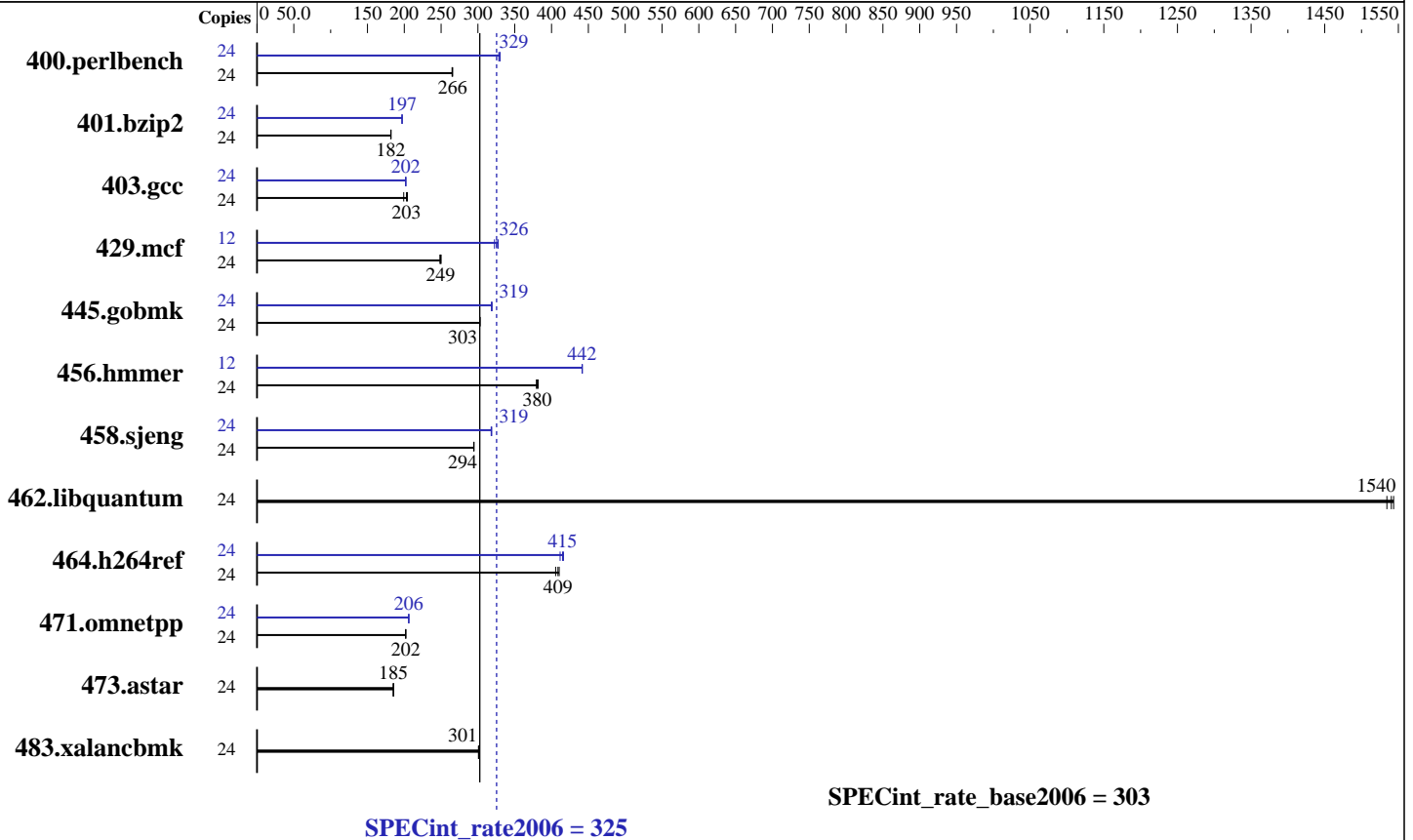
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Apr-2011

Hardware Availability: Feb-2011

Software Availability: Jan-2011



### Hardware

CPU Name: Intel Xeon E5649  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.93 GHz  
 CPU MHz: 2533  
 FPU: Integrated  
 CPU(s) enabled: 12 cores, 2 chips, 6 cores/chip, 2 threads/core  
 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: 12 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 96 GB (12 x 8 GB 2Rx4 PC3-10600R-9, ECC)  
 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++ Compiler XE for applications running on IA-32 Version 12.0.1.116 Build 20101116  
 Auto Parallel: No  
 File System: ext3  
 System State: Run level 3 (multi-user)  
 Base Pointers: 32-bit  
 Peak Pointers: 32/64-bit  
 Other Software: Microquill SmartHeap V9.01



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## Results Table

| Benchmark      | Base   |            |            |             |             |            |            | Peak   |            |            |             |             |            |            |
|----------------|--------|------------|------------|-------------|-------------|------------|------------|--------|------------|------------|-------------|-------------|------------|------------|
|                | Copies | Seconds    | Ratio      | Seconds     | Ratio       | Seconds    | Ratio      | Copies | Seconds    | Ratio      | Seconds     | Ratio       | Seconds    | Ratio      |
| 400.perlbench  | 24     | 885        | 265        | <b>883</b>  | <b>266</b>  | 883        | 266        | 24     | <b>712</b> | <b>329</b> | 714         | 328         | 710        | 330        |
| 401.bzip2      | 24     | 1273       | 182        | <b>1273</b> | <b>182</b>  | 1275       | 182        | 24     | 1175       | 197        | <b>1175</b> | <b>197</b>  | 1176       | 197        |
| 403.gcc        | 24     | <b>952</b> | <b>203</b> | 946         | 204         | 970        | 199        | 24     | 955        | 202        | <b>956</b>  | <b>202</b>  | 957        | 202        |
| 429.mcf        | 24     | <b>878</b> | <b>249</b> | 875         | 250         | 881        | 248        | 12     | <b>336</b> | <b>326</b> | 334         | 328         | 339        | 322        |
| 445.gobmk      | 24     | <b>832</b> | <b>303</b> | 833         | 302         | 831        | 303        | 24     | 791        | 318        | 789         | 319         | <b>790</b> | <b>319</b> |
| 456.hammer     | 24     | 590        | 379        | 586         | 382         | <b>589</b> | <b>380</b> | 12     | 254        | 441        | 253         | 442         | <b>254</b> | <b>442</b> |
| 458.sjeng      | 24     | 987        | 294        | 985         | 295         | <b>986</b> | <b>294</b> | 24     | 911        | 319        | <b>912</b>  | <b>319</b>  | 913        | 318        |
| 462.libquantum | 24     | 322        | 1540       | <b>323</b>  | <b>1540</b> | 324        | 1530       | 24     | 322        | 1540       | <b>323</b>  | <b>1540</b> | 324        | 1530       |
| 464.h264ref    | 24     | 1294       | 410        | <b>1300</b> | <b>409</b>  | 1310       | 406        | 24     | 1276       | 416        | <b>1280</b> | <b>415</b>  | 1290       | 412        |
| 471.omnetpp    | 24     | 743        | 202        | 742         | 202         | <b>743</b> | <b>202</b> | 24     | 728        | 206        | <b>728</b>  | <b>206</b>  | 728        | 206        |
| 473.astar      | 24     | <b>909</b> | <b>185</b> | 908         | 186         | 911        | 185        | 24     | <b>909</b> | <b>185</b> | 908         | 186         | 911        | 185        |
| 483.xalancbmk  | 24     | <b>550</b> | <b>301</b> | 551         | 301         | 550        | 301        | 24     | <b>550</b> | <b>301</b> | 551         | 301         | 550        | 301        |

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

```
'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 10800 > /proc/sys/vm/nr_hugepages
export HUGETLB_MORECORE=yes
export LD_PRELOAD=/usr/lib64/libhugetlbfs.so
```

## Platform Notes

Turbo Mode enabled in BIOS  
Turbo Boost set to Traditional in BIOS  
Power C-State enabled in BIOS  
Data Reuse disabled in BIOS  
Demand Scrub disabled in BIOS

## General Notes

Binaries compiled on RHEL5.5



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## Base Compiler Invocation

C benchmarks:

icc -m32

C++ benchmarks:

icpc -m32

## Base Portability Flags

400.perlbench: -DSPEC\_CPU\_LINUX\_IA32  
462.libquantum: -DSPEC\_CPU\_LINUX  
483.xalancbmk: -DSPEC\_CPU\_LINUX

## Base Optimization Flags

C benchmarks:

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

C++ benchmarks:

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

## Base Other Flags

C benchmarks:

403.gcc: -Dalloca=\_alloca

## Peak Compiler Invocation

C benchmarks (except as noted below):

icc -m32

400.perlbench: icc -m64

401.bzip2: icc -m64

456.hmmer: icc -m64

458.sjeng: icc -m64

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## Peak Compiler Invocation (Continued)

C++ benchmarks:  
icpc -m32

## Peak Portability Flags

400.perlbench: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_LINUX\_X64  
401.bzip2: -DSPEC\_CPU\_LP64  
456.hmmer: -DSPEC\_CPU\_LP64  
458.sjeng: -DSPEC\_CPU\_LP64  
462.libquantum: -DSPEC\_CPU\_LINUX  
483.xalancbmk: -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)  
-B /usr/share/libhugetlbfs/ -Wl,-melf\_x86\_64 -Wl,-hugetlbfs-link=BDT

401.bzip2: -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 -auto-ilp32 -ansi-alias  
-B /usr/share/libhugetlbfs/ -Wl,-melf\_x86\_64 -Wl,-hugetlbfs-link=BDT

403.gcc: -xSSE4.2 -ipo -O3 -no-prec-div  
-B /usr/share/libhugetlbfs/ -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)  
-ansi-alias -auto-ilp32

445.gobmk: -xSSE4.2(pass 2) -prof-gen(pass 1) -prof-use(pass 2)  
-ansi-alias -auto-ilp32

456.hmmer: -xSSE4.2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32  
-B /usr/share/libhugetlbfs/ -Wl,-melf\_x86\_64 -Wl,-hugetlbfs-link=BDT

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 -auto-ilp32  
-B /usr/share/libhugetlbfs/ -Wl,-melf\_x86\_64 -Wl,-hugetlbfs-link=BDT

462.libquantum: basepeak = yes

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## Peak Optimization Flags (Continued)

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

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)  
-ansi-alias -opt-ra-region-strategy=block -Wl,-z,muldefs  
-L/smartheap -lsmartheap

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 other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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