



# SPEC® CINT2006 Result

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## IBM Corporation

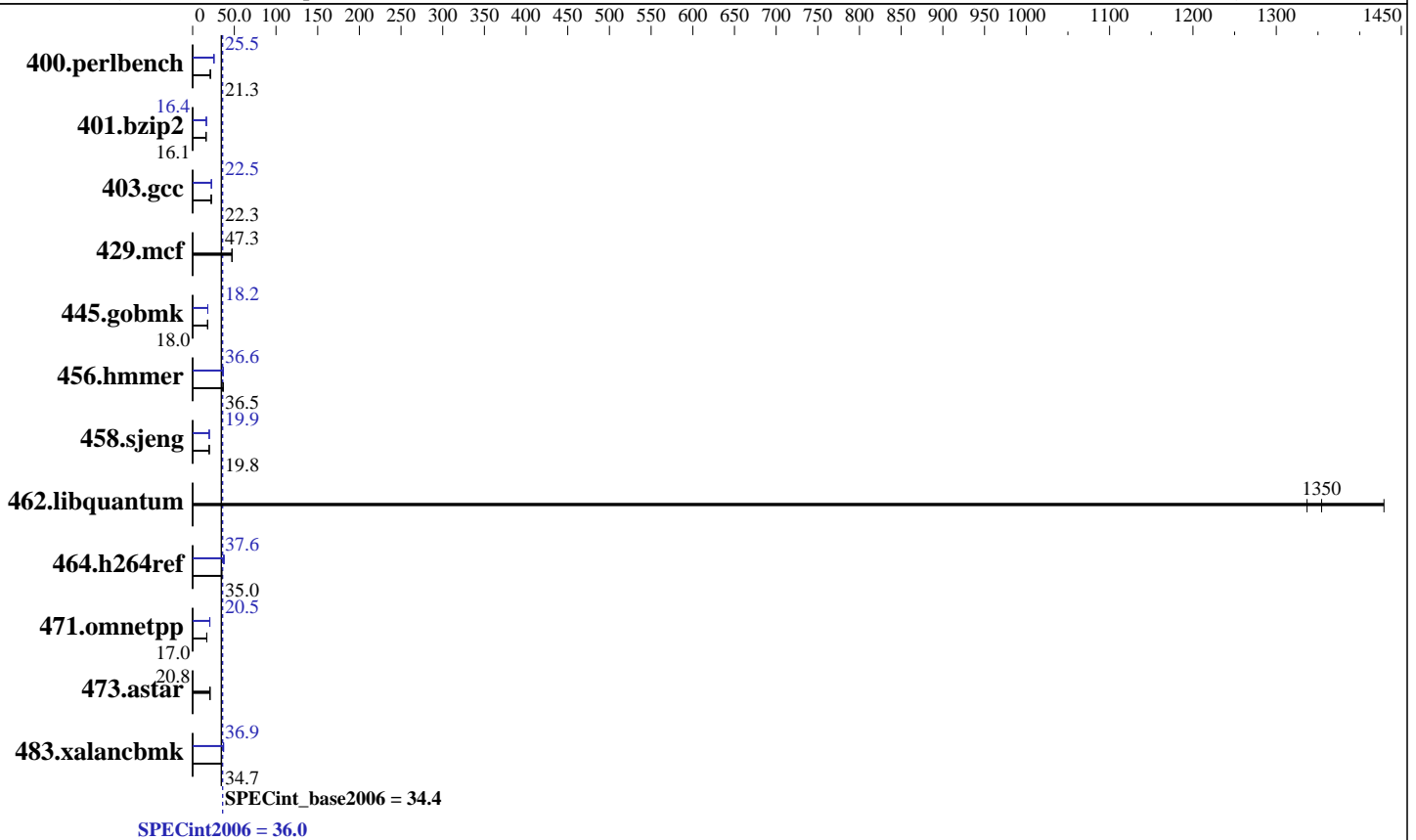
**SPECint®2006 = 36.0**

IBM System x3650 M4 (Intel Xeon E5-2609)

**SPECint\_base2006 = 34.4**

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

Test date: Mar-2012  
Hardware Availability: Mar-2012  
Software Availability: Oct-2011



### Hardware

CPU Name: Intel Xeon E5-2609  
 CPU Characteristics:  
 CPU MHz: 2400  
 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: 10 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC, running at 1066 MHz)  
 Disk Subsystem: 1 x 1 TB SAS, 7200 RPM  
 Other Hardware: None

### Software

Operating System: Red Hat Enterprise Linux Server release 6.1 (Santiago)  
 2.6.32-131.0.15.el6.x86\_64  
 Compiler: C/C++: Version 12.1.0.225 of Intel C++ Studio XE for Linux  
 Auto Parallel: Yes  
 File System: ext4  
 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	<b><u>460</u></b>	<b><u>21.3</u></b>	460	21.2	458	21.3	<b><u>382</u></b>	<b><u>25.5</u></b>	382	25.6	383	25.5
401.bzip2	<b><u>599</u></b>	<b><u>16.1</u></b>	599	16.1	600	16.1	<b><u>588</u></b>	<b><u>16.4</u></b>	588	16.4	586	16.5
403.gcc	<b><u>360</u></b>	<b><u>22.3</u></b>	360	22.3	361	22.3	<b><u>357</u></b>	<b><u>22.5</u></b>	357	22.5	357	22.5
429.mcf	<b><u>193</u></b>	<b><u>47.3</u></b>	193	47.3	193	47.1	<b><u>193</u></b>	<b><u>47.3</u></b>	193	47.3	193	47.1
445.gobmk	<b><u>583</u></b>	<b><u>18.0</u></b>	583	18.0	582	18.0	<b><u>577</u></b>	<b><u>18.2</u></b>	577	18.2	<b><u>577</u></b>	<b><u>18.2</u></b>
456.hammer	255	36.6	257	36.4	<b><u>255</u></b>	<b><u>36.5</u></b>	<b><u>255</u></b>	<b><u>36.6</u></b>	255	36.6	255	36.5
458.sjeng	<b><u>610</u></b>	<b><u>19.8</u></b>	610	19.8	609	19.9	<b><u>608</u></b>	<b><u>19.9</u></b>	<b><u>608</u></b>	<b><u>19.9</u></b>	609	19.9
462.libquantum	<b><u>15.3</u></b>	<b><u>1350</u></b>	15.5	1340	14.5	1430	<b><u>15.3</u></b>	<b><u>1350</u></b>	15.5	1340	14.5	1430
464.h264ref	<b><u>633</u></b>	<b><u>35.0</u></b>	641	34.5	632	35.0	<b><u>597</u></b>	<b><u>37.1</u></b>	586	37.7	<b><u>589</u></b>	<b><u>37.6</u></b>
471.omnetpp	369	16.9	368	17.0	<b><u>368</u></b>	<b><u>17.0</u></b>	<b><u>305</u></b>	<b><u>20.5</u></b>	305	20.5	302	20.7
473.astar	<b><u>337</u></b>	<b><u>20.8</u></b>	335	20.9	341	20.6	<b><u>337</u></b>	<b><u>20.8</u></b>	335	20.9	341	20.6
483.xalancbmk	<b><u>199</u></b>	<b><u>34.7</u></b>	200	34.6	199	34.7	<b><u>185</u></b>	<b><u>37.3</u></b>	187	36.9	<b><u>187</u></b>	<b><u>36.9</u></b>

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

## Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"  
Zone reclaim mode enabled with:  
echo 1 > /proc/sys/vm/zone\_reclaim\_mode

## Platform Notes

BIOS Settings:  
Operating Mode set to Maximum Performance  
Sysinfo program /root/SPECcpu-v1.2/config/sysinfo.rev6800  
\$Rev: 6800 \$ \$Date:: 2011-10-11 #\$ 6f2ebdff5032aaa42e583f96b07f99d3  
running on x3650M4 Mon Mar 26 14:25:18 2012

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:  
<http://www.spec.org/cpu2006/Docs/config.html#sysinfo>

From /proc/cpuinfo  
model name : Intel(R) Xeon(R) CPU E5-2609 0 @ 2.40GHz  
2 "physical id"s (chips)  
8 "processors"  
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)  
cpu cores : 4  
siblings : 4  
physical 0: cores 0 1 2 3  
physical 1: cores 0 1 2 3

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## Platform Notes (Continued)

cache size : 10240 KB

From /proc/meminfo

MemTotal: 132116104 kB

HugePages\_Total: 0

Hugepagesize: 2048 kB

/usr/bin/lsb\_release -d

Red Hat Enterprise Linux Server release 6.1 (Santiago)

From /etc/\*release\* /etc/\*version\*

redhat-release: Red Hat Enterprise Linux Server release 6.1 (Santiago)

system-release: Red Hat Enterprise Linux Server release 6.1 (Santiago)

system-release-cpe: cpe:/o:redhat:enterprise\_linux:6server:ga:server

uname -a:

Linux x3650M4 2.6.32-131.0.15.el6.x86\_64 #1 SMP Tue May 10 15:42:40 EDT 2011  
x86\_64 x86\_64 x86\_64 GNU/Linux

run-level 3 Mar 26 14:21

SPEC is set to: /root/SPECcpu-v1.2

```
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/mapper/vg_x3650m4-lv_root
                ext4      790G   69G  681G  10% /
```

Additional information from dmidecode:

Memory:

16x Samsung M393B1K70DH0-CK0 8 GB 1600 MHz 2 rank

(End of data from sysinfo program)

## General Notes

Environment variables set by runspec before the start of the run:

KMP\_AFFINITY = "granularity=fine,compact,1,0"

LD\_LIBRARY\_PATH = "/root/SPECcpu-v1.2/libs/32:/root/SPECcpu-v1.2/libs/64"

OMP\_NUM\_THREADS = "8"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB  
memory using RHEL5.5

Transparent Huge Pages enabled with:

echo always > /sys/kernel/mm/redhat\_transparent\_hugepage/enabled

## Base Compiler Invocation

C benchmarks:

icc -m64

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## Base Compiler Invocation (Continued)

C++ benchmarks:  
icpc -m64

## 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.xalanbmk: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_LINUX

## Base Optimization Flags

C benchmarks:  
-xAVX -ipo -O3 -no-prec-div -parallel -opt-prefetch -auto-p32  
C++ benchmarks:  
-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -Wl,-z,muldefs  
-L/smartheap -lsmartheap64

## Base Other Flags

C benchmarks:  
403.gcc: -Dalloca=\_alloca

## Peak Compiler Invocation

C benchmarks (except as noted below):  
icc -m64  
400.perlbench: icc -m32  
445.gobmk: icc -m32

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## Peak Compiler Invocation (Continued)

464.h264ref: icc -m32

C++ benchmarks (except as noted below):

icpc -m32

473.astar: icpc -m64

## Peak Portability Flags

400.perlbench: -DSPEC\_CPU\_LINUX\_IA32

401.bzip2: -DSPEC\_CPU\_LP64

403.gcc: -DSPEC\_CPU\_LP64

429.mcf: -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\_LINUX

## Peak Optimization Flags

C benchmarks:

400.perlbench: -xAVX(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

401.bzip2: -xAVX(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: -xAVX -ipo -O3 -no-prec-div -inline-calloc  
-opt-malloc-options=3 -auto-ilp32

429.mcf: basepeak = yes

445.gobmk: -xAVX(pass 2) -prof-gen(pass 1) -prof-use(pass 2)  
-ansi-alias

456.hmmer: -xAVX -ipo -O3 -no-prec-div -unroll2 -auto-ilp32  
-ansi-alias

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

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## Peak Optimization Flags (Continued)

462.libquantum: basepeak = yes

464.h264ref: -xAVX(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: -xAVX(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

473.astar: basepeak = yes

483.xalancbmk: -xAVX -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias  
-Wl,-z,muldefs -L/smartheap -lsmartheap

## 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-ic12.1-official-linux64.20111122.html>  
<http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-SNB-C.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20111122.xml>  
<http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-SNB-C.xml>

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

Tested with SPEC CPU2006 v1.2.  
Report generated on Thu Jul 24 04:13:57 2014 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 24 April 2012.