



SPEC® CINT2006 Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant BL460c Gen9
(2.20 GHz, Intel Xeon E5-2698 v4)

SPECint®2006 = 72.4

SPECint_base2006 = 70.2

CPU2006 license: 3

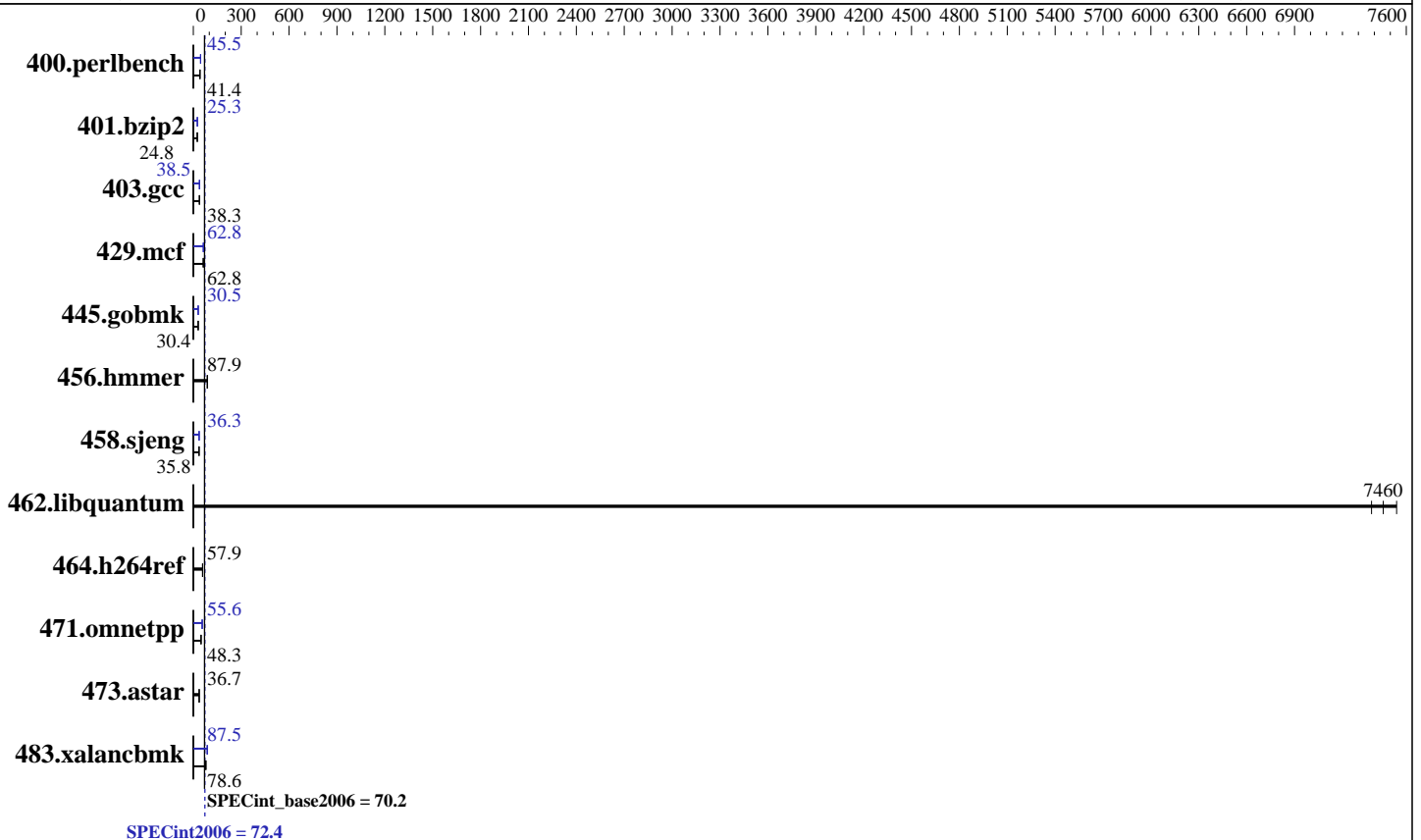
Test sponsor: HPE

Tested by: HPE

Test date: Mar-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015



Hardware

CPU Name: Intel Xeon E5-2698 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz: 2200
FPU: Integrated
CPU(s) enabled: 40 cores, 2 chips, 20 cores/chip
CPU(s) orderable: 1,2 chip
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 256 KB I+D on chip per core
L3 Cache: 50 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (8 x 32 GB 2Rx4 PC4-2400T-R)
Disk Subsystem: 1 x 400 GB SAS SSD, RAID 0
Other Hardware: None

Software

Operating System: Red Hat Enterprise Linux Server release 7.2 (Maipo)
 Kernel 3.10.0-327.el7.x86_64
Compiler: C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux
Auto Parallel: Yes
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: Microquill SmartHeap V10.2



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Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|----------------|--------------------|--------------------|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------------------|--------------------|--------------------|--------------------|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 400.perlbench | <u>236</u> | <u>41.4</u> | 236 | 41.4 | 233 | 41.9 | 215 | 45.5 | <u>215</u> | <u>45.5</u> | 215 | 45.5 |
| 401.bzip2 | <u>389</u> | <u>24.8</u> | 391 | 24.7 | 387 | 24.9 | <u>382</u> | <u>25.3</u> | 382 | 25.3 | 382 | 25.3 |
| 403.gcc | 210 | 38.3 | <u>210</u> | <u>38.3</u> | 210 | 38.2 | 209 | 38.6 | 209 | 38.5 | <u>209</u> | <u>38.5</u> |
| 429.mcf | 145 | 62.9 | <u>145</u> | <u>62.8</u> | 147 | 62.0 | 145 | 62.8 | 144 | 63.2 | <u>145</u> | <u>62.8</u> |
| 445.gobmk | 345 | 30.4 | 345 | 30.4 | <u>345</u> | <u>30.4</u> | 343 | 30.6 | <u>344</u> | <u>30.5</u> | 344 | 30.5 |
| 456.hammer | 106 | 87.8 | <u>106</u> | <u>87.9</u> | 106 | 88.1 | 106 | 87.8 | <u>106</u> | <u>87.9</u> | 106 | 88.1 |
| 458.sjeng | 338 | 35.8 | <u>338</u> | <u>35.8</u> | 338 | 35.8 | 333 | 36.3 | <u>333</u> | <u>36.3</u> | 333 | 36.3 |
| 462.libquantum | 2.75 | 7540 | 2.81 | 7380 | <u>2.78</u> | <u>7460</u> | 2.75 | 7540 | 2.81 | 7380 | <u>2.78</u> | <u>7460</u> |
| 464.h264ref | 382 | 57.9 | 380 | 58.2 | <u>382</u> | <u>57.9</u> | 382 | 57.9 | 380 | 58.2 | <u>382</u> | <u>57.9</u> |
| 471.omnetpp | 130 | 48.2 | 129 | 48.5 | <u>129</u> | <u>48.3</u> | 113 | 55.5 | 112 | 55.7 | <u>112</u> | <u>55.6</u> |
| 473.astar | 191 | 36.8 | <u>191</u> | <u>36.7</u> | 191 | 36.7 | 191 | 36.8 | <u>191</u> | <u>36.7</u> | 191 | 36.7 |
| 483.xalancbmk | <u>87.8</u> | <u>78.6</u> | 87.8 | 78.6 | 87.9 | 78.5 | <u>78.9</u> | <u>87.5</u> | 78.8 | 87.5 | 79.0 | 87.3 |

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.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Transparent Huge Pages enabled with:

```
echo always > /sys/kernel/mm/transparent_hugepage/enabled
```

Platform Notes

BIOS Configuration:

Intel Hyperthreading Option set to Disabled

Power Profile set to Custom

Power Regulator set to Static High Performance Mode

Minimum Processor Idle Power Core C-State set to C1E State

Minimum Processor Idle Power Package C-State set to No Package State

Collaborative Power Control set to Disabled

QPI Snoop Configuration set to Home Snoop

Thermal Configuration set to Maximum Cooling

Processor Power and Utilization Monitoring set to Disabled

Memory Refresh Rate set to 1x Refresh

Sysinfo program /home/cpu2006/config/sysinfo.rev6914

\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1

running on BL460c-Gen9-B Thu Apr 7 11:10:53 2016

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:

Continued on next page

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info@spec.org

http://www.spec.org/

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Platform Notes (Continued)

<http://www.spec.org/cpu2006/Docs/config.html#sysinfo>

From /proc/cpuinfo

model name : Intel(R) Xeon(R) CPU E5-2698 v4 @ 2.20GHz

2 "physical id"s (chips)

40 "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 : 20

siblings : 20

physical 0: cores 0 2 3 4 9 10 11 12 16 17 18 19 20 24 25 26 27 28

physical 1: cores 0 2 3 4 9 10 11 12 16 17 18 19 20 24 25 26 27 28

cache size : 51200 KB

From /proc/meminfo

MemTotal: 263840532 kB

HugePages_Total: 0

Hugepagesize: 2048 kB

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

os-release:

NAME="Red Hat Enterprise Linux Server"

VERSION="7.2 (Maipo)"

ID="rhel"

ID_LIKE="fedora"

VERSION_ID="7.2"

PRETTY_NAME="Red Hat Enterprise Linux Server 7.2 (Maipo)"

ANSI_COLOR="0;31"

CPE_NAME="cpe:/o:redhat:enterprise_linux:7.2:GA:server"

redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)

system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)

system-release-cpe: cpe:/o:redhat:enterprise_linux:7.2:ga:server

uname -a:

Linux BL460c-Gen9-B 3.10.0-327.el7.x86_64 #1 SMP Thu Oct 29 17:29:29 EDT 2015

x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Apr 7 09:46

SPEC is set to: /home/cpu2006

Filesystem Type Size Used Avail Use% Mounted on

/dev/sda5 xfs 314G 275G 40G 88% /home

Additional information from dmidecode:

Warning: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS HP I36 02/22/2016

Memory:

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Platform Notes (Continued)

8x UNKNOWN NOT AVAILABLE
8x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 MHz

(End of data from sysinfo program)

Regarding the sysinfo display about the memory installed, the correct amount of memory is 256 GB and the dmidecode description should have one line reading as:
8x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 MHz

General Notes

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

KMP_AFFINITY = "granularity=fine,scatter"

LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh"

OMP_NUM_THREADS = "40"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1

Base Compiler Invocation

C benchmarks:

icc -m64

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.hmmmer: -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:

-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -auto-p32

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Base Optimization Flags (Continued)

C++ benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-Wl,-z,muldefs -L/sh -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 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin

445.gobmk: icc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin

C++ benchmarks (except as noted below):

icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin

473.astar: icpc -m64

Peak Portability Flags

400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32

401.bzip2: -DSPEC_CPU_LP64

403.gcc: -DSPEC_CPU_LP64

429.mcf: -DSPEC_CPU_LP64

445.gobmk: -D_FILE_OFFSET_BITS=64

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: -D_FILE_OFFSET_BITS=64

473.astar: -DSPEC_CPU_LP64

483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX



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Peak Optimization Flags

C benchmarks:

400.perlbench: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -prof-use(pass 2) -opt-prefetch
-ansi-alias

401.bzip2: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div
-par-num-threads=1(pass 1) -prof-use(pass 2) -auto-ilp32
-opt-prefetch -ansi-alias

403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div -inline-calloc
-opt-malloc-options=3 -auto-ilp32

429.mcf: -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel
-opt-prefetch -auto-p32

445.gobmk: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-prof-use(pass 2) -par-num-threads=1(pass 1) -ansi-alias

456.hmmer: basepeak = yes

458.sjeng: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4

462.libquantum: basepeak = yes

464.h264ref: basepeak = yes

C++ benchmarks:

471.omnetpp: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -prof-use(pass 2)
-opt-ra-region-strategy=block -ansi-alias
-Wl,-z,muldefs -L/sh -lsmartheap

473.astar: basepeak = yes

483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
-ansi-alias -Wl,-z,muldefs -L/sh -lsmartheap

Peak Other Flags

C benchmarks:

Continued on next page



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Peak Other Flags (Continued)

403.gcc: -Dalloca=_alloca

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.html>

<http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.html>

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

<http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml>

<http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml>

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For other inquiries, please contact webmaster@spec.org.

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