



SPEC® CINT2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen9

(2.20 GHz, Intel Xeon E5-2699 v4)

SPECint®2006 =

72.7

SPECint_base2006 =

70.4

CPU2006 license: 3

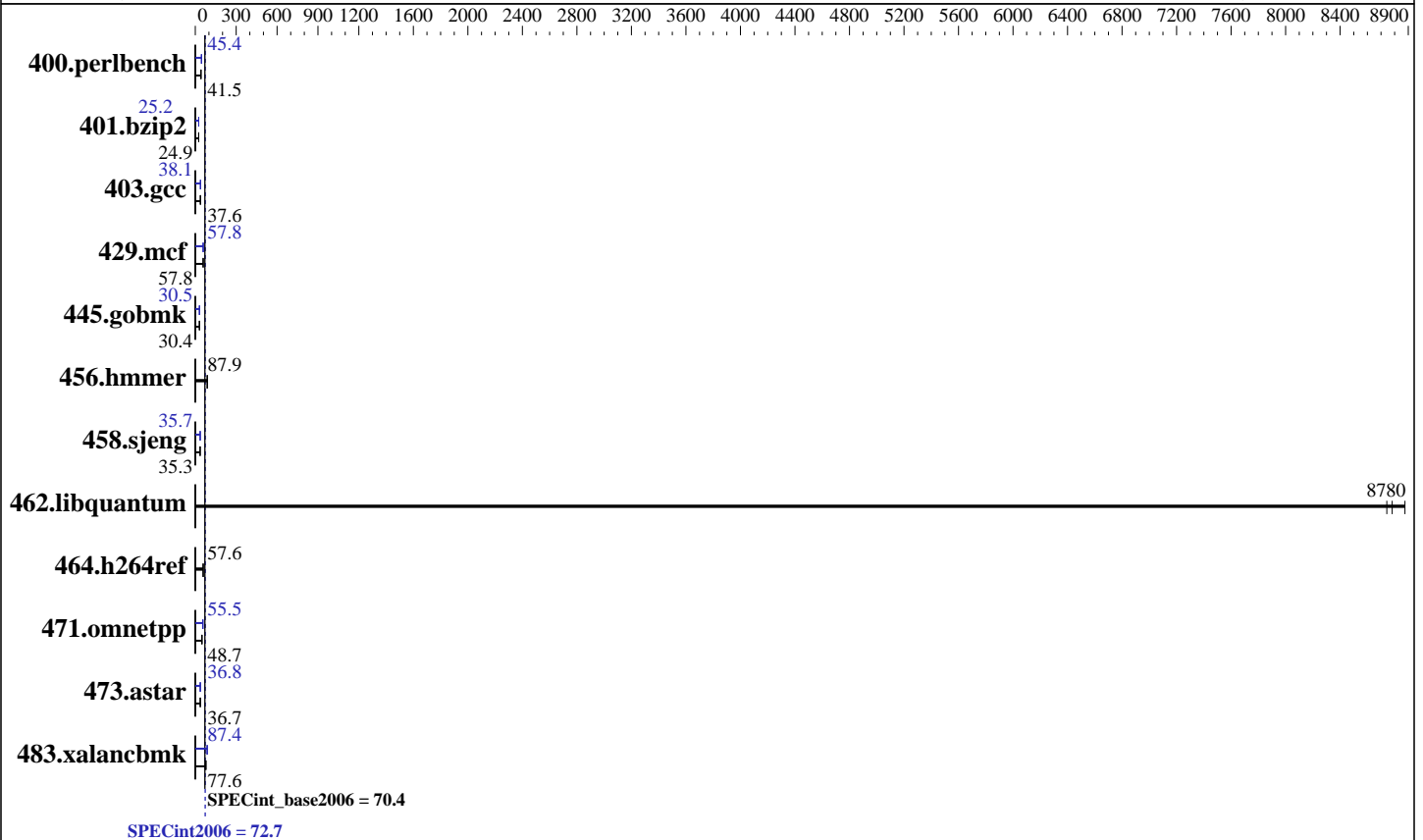
Test sponsor: HPE

Tested by: HPE

Test date: Mar-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015



Hardware

CPU Name: Intel Xeon E5-2699 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz: 2200
FPU: Integrated
CPU(s) enabled: 44 cores, 2 chips, 22 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: 55 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-2400T-R)
Disk Subsystem: 2 x 400 GB SAS SSD, RAID 1
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



SPEC CINT2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen9

(2.20 GHz, Intel Xeon E5-2699 v4)

SPECint2006 = 72.7

SPECint_base2006 = 70.4

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Mar-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	234	41.7	236	41.5	<u>235</u>	<u>41.5</u>	215	45.5	<u>215</u>	<u>45.4</u>	215	45.4
401.bzip2	<u>388</u>	<u>24.9</u>	389	24.8	388	24.9	382	25.3	<u>383</u>	<u>25.2</u>	383	25.2
403.gcc	214	37.6	<u>214</u>	<u>37.6</u>	214	37.7	212	38.0	<u>211</u>	<u>38.1</u>	211	38.1
429.mcf	159	57.4	<u>158</u>	<u>57.8</u>	157	58.0	<u>158</u>	<u>57.8</u>	157	58.0	158	57.8
445.gobmk	345	30.4	346	30.3	<u>345</u>	<u>30.4</u>	344	30.5	<u>344</u>	<u>30.5</u>	344	30.5
456.hammer	106	88.1	<u>106</u>	<u>87.9</u>	106	87.8	106	88.1	<u>106</u>	<u>87.9</u>	106	87.8
458.sjeng	<u>343</u>	<u>35.3</u>	343	35.3	343	35.3	<u>339</u>	<u>35.7</u>	338	35.8	339	35.7
462.libquantum	2.37	8740	2.33	8880	<u>2.36</u>	<u>8780</u>	2.37	8740	2.33	8880	<u>2.36</u>	<u>8780</u>
464.h264ref	383	57.8	384	57.6	<u>384</u>	<u>57.6</u>	383	57.8	384	57.6	<u>384</u>	<u>57.6</u>
471.omnetpp	128	48.9	129	48.6	<u>128</u>	<u>48.7</u>	<u>113</u>	<u>55.5</u>	112	55.8	113	55.5
473.astar	191	36.8	192	36.6	<u>191</u>	<u>36.7</u>	193	36.4	<u>191</u>	<u>36.8</u>	191	36.8
483.xalancbmk	88.9	77.6	<u>88.9</u>	<u>77.6</u>	89.0	77.5	<u>78.9</u>	<u>87.4</u>	78.9	87.5	79.3	87.0

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 C6 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

Energy Performance Bias set to Maximum Performance

Sysinfo program /cpu2006/config/sysinfo.rev6914

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

running on dl360gen9-broadwell-justin.perflab.hp.com Thu Mar 3 23:17:09 2016

This section contains SUT (System Under Test) info as seen by

Continued on next page

Standard Performance Evaluation Corporation

info@spec.org

http://www.spec.org/

Page 2



SPEC CINT2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

SPECint2006 = 72.7

SPECint_base2006 = 70.4

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Mar-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

Platform Notes (Continued)

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 E5-2699 v4 @ 2.20GHz
 2 "physical id"s (chips)
 44 "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      : 22
siblings       : 22
physical 0:    cores 0 2 3 4 8 10 11 12 16 17 18 19 20 21 24 25 26 27 28
physical 1:    cores 0 2 3 4 8 10 11 12 16 17 18 19 20 21 24 25 26 27 28
cache size     : 56320 KB
```

```
From /proc/meminfo
MemTotal:      528065224 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 dl360gen9-broadwell-justin.perflab.hp.com 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 Mar 3 23:16

```
SPEC is set to: /cpu2006
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda4       xfs   368G  7.1G  361G   2% /
```

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 P89 02/22/2016

Continued on next page



SPEC CINT2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen9

(2.20 GHz, Intel Xeon E5-2699 v4)

SPECint2006 =

72.7

SPECint_base2006 =

70.4

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Mar-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

Platform Notes (Continued)

Memory:

8x UNKNOWN NOT AVAILABLE

16x 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 512 GB and the dmidecode description should have one line reading as:

16x 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 = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"

OMP_NUM_THREADS = "44"

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.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



SPEC CINT2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

SPECint2006 = 72.7

SPECint_base2006 = 70.4

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Mar-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

Base Optimization Flags

C benchmarks:

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

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.hmmmer: -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`



SPEC CINT2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen9

(2.20 GHz, Intel Xeon E5-2699 v4)

SPECint2006 =

72.7

SPECint_base2006 =

70.4

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Mar-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

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: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
-auto-p32 -Wl,-z,muldefs -L/sh -lsmartheap64

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



SPEC CINT2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

SPECint2006 = 72.7

SPECint_base2006 = 70.4

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Mar-2016

Hardware Availability: Mar-2016

Software Availability: Nov-2015

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-ic16.0-official-linux64.html>

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

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

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

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

SPEC and SPECint are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.2.
Report generated on Tue Apr 5 14:55:32 2016 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 5 April 2016.