



# SPEC® CINT2006 Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL580 Gen9  
(2.10 GHz, Intel Xeon E7-4850 v4)

SPECint®2006 = 60.5

SPECint\_base2006 = 57.9

CPU2006 license: 3

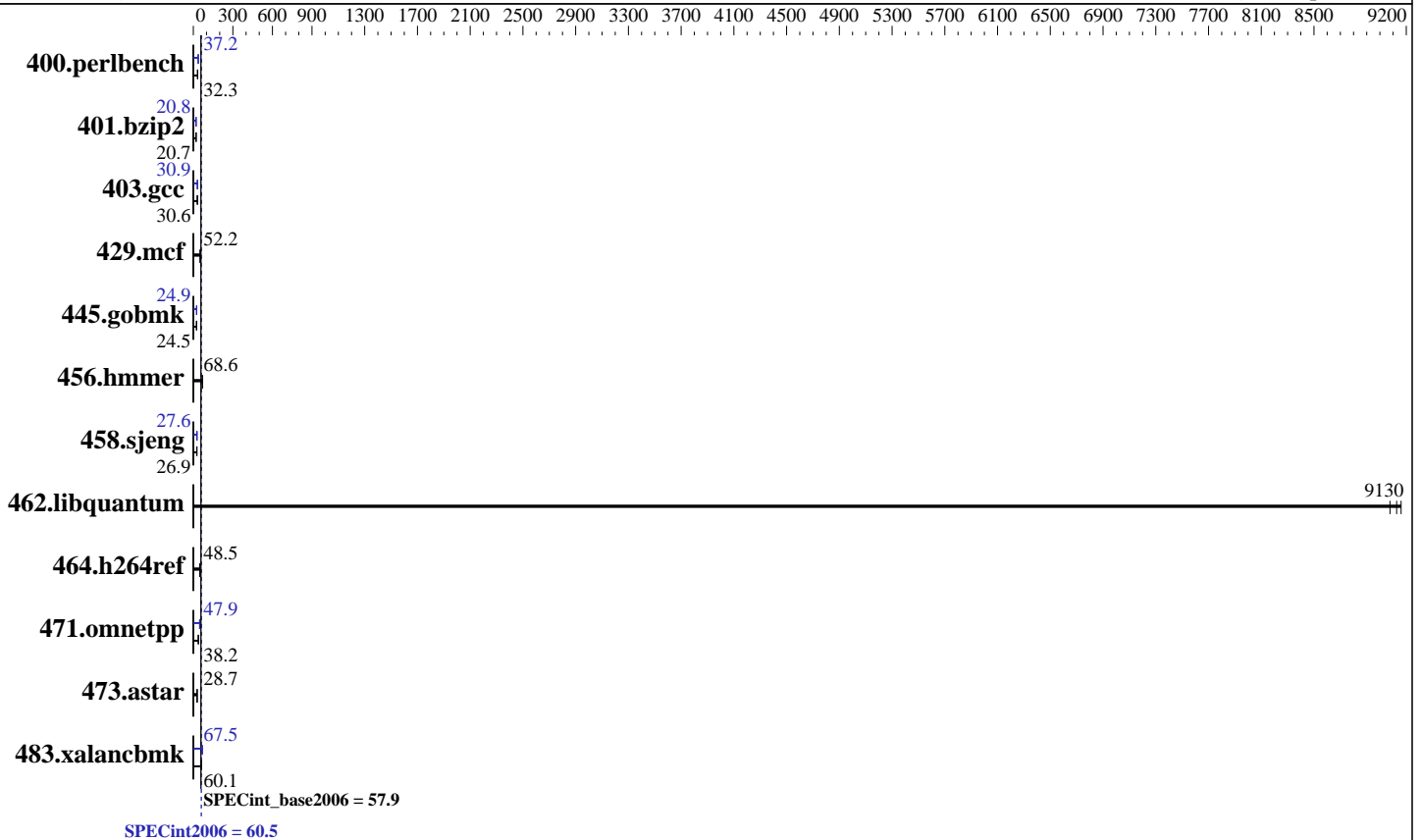
Test sponsor: HPE

Tested by: HPE

Test date: Oct-2016

Hardware Availability: Aug-2016

Software Availability: Sep-2016



## Hardware

CPU Name: Intel Xeon E7-4850 v4  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.80 GHz  
 CPU MHz: 2100  
 FPU: Integrated  
 CPU(s) enabled: 64 cores, 4 chips, 16 cores/chip  
 CPU(s) orderable: 2,4 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: 40 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 512 GB (32 x 16 GB 2Rx4 PC4-2400T-R, running at 1333 MHz)  
 Disk Subsystem: 1 x 800 GB NVMe PCIe SSD, RAID 0  
 Other Hardware: DL580 Gen9 NVMe SSD Express Bay Enablement Kit

## Software

Operating System: SUSE Linux Enterprise Server 12 (x86\_64) SP1, Kernel 3.12.49-11-default  
 Compiler: C/C++; Version 17.0.0.098 of Intel C++ Studio XE for Linux  
 Auto Parallel: Yes  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 32-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	303	32.2	<b><u>303</u></b>	<b><u>32.3</u></b>	302	32.3	263	37.2	263	37.2	<b><u>263</u></b>	<b><u>37.2</u></b>
401.bzip2	468	20.6	<b><u>465</u></b>	<b><u>20.7</u></b>	463	20.8	<b><u>465</u></b>	<b><u>20.8</u></b>	466	20.7	465	20.8
403.gcc	<b><u>263</u></b>	<b><u>30.6</u></b>	263	30.6	263	30.6	<b><u>260</u></b>	<b><u>30.9</u></b>	261	30.8	259	31.1
429.mcf	178	51.4	<b><u>175</u></b>	<b><u>52.2</u></b>	171	53.3	178	51.4	<b><u>175</u></b>	<b><u>52.2</u></b>	171	53.3
445.gobmk	<b><u>428</u></b>	<b><u>24.5</u></b>	428	24.5	428	24.5	<b><u>422</u></b>	<b><u>24.9</u></b>	422	24.9	422	24.9
456.hammer	<b><u>136</u></b>	<b><u>68.6</u></b>	136	68.6	136	68.8	<b><u>136</u></b>	<b><u>68.6</u></b>	136	68.6	136	68.8
458.sjeng	<b><u>451</u></b>	<b><u>26.9</u></b>	453	26.7	451	26.9	438	27.6	439	27.6	<b><u>439</u></b>	<b><u>27.6</u></b>
462.libquantum	2.28	9080	2.26	9160	<b><u>2.27</u></b>	<b><u>9130</u></b>	2.28	9080	2.26	9160	<b><u>2.27</u></b>	<b><u>9130</u></b>
464.h264ref	458	48.3	<b><u>457</u></b>	<b><u>48.5</u></b>	455	48.6	458	48.3	<b><u>457</u></b>	<b><u>48.5</u></b>	455	48.6
471.omnetpp	165	37.9	<b><u>164</u></b>	<b><u>38.2</u></b>	162	38.6	130	48.0	<b><u>130</u></b>	<b><u>47.9</u></b>	131	47.8
473.astar	<b><u>245</u></b>	<b><u>28.7</u></b>	245	28.6	243	28.9	<b><u>245</u></b>	<b><u>28.7</u></b>	245	28.6	243	28.9
483.xalancbmk	<b><u>115</u></b>	<b><u>60.1</u></b>	116	59.5	114	60.6	102	67.6	<b><u>102</u></b>	<b><u>67.5</u></b>	103	67.3

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 by default.

## Platform Notes

### BIOS Configuration:

HP Power Profile set to Custom  
 HP Power Regulator to HP Static High Performance Mode  
 Minimum Processor Idle Power Core C-State set to C6 State  
 Minimum Processor Idle Power Package C-State set to Package C6 (retention) State  
 QPI Snoop Configuration set to Home Snoop  
 Collaborative Power Control set to Disabled  
 Thermal Configuration set to Maximum Cooling  
 Intel Hyper Threading set to Disabled  
 Memory Refresh Rate set to 1x Refresh  
 Processor Power and Utilization Monitoring set to Disabled  
 Sysinfo program /home/IC17/config/sysinfo.rev6993  
 Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)  
 running on linux-vi0i Tue Oct 25 14:10:17 2016

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>

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## Platform Notes (Continued)

```

From /proc/cpuinfo
model name : Intel(R) Xeon(R) CPU E7-4850 v4 @ 2.10GHz
 4 "physical id"s (chips)
64 "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 : 16
  siblings  : 16
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 3: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
cache size : 40960 KB

```

```

From /proc/meminfo
MemTotal:      529318808 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

```

From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 1
# This file is deprecated and will be removed in a future service pack or
release.
# Please check /etc/os-release for details about this release.
os-release:
NAME="SLES"
VERSION="12-SP1"
VERSION_ID="12.1"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp1"

```

```

uname -a:
Linux linux-vi0i 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux

```

run-level 3 Oct 25 14:06

```

SPEC is set to: /home/IC17
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/nvme0n1p4  xfs   703G  163G  541G  24% /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

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## Platform Notes (Continued)

hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS HP U17 08/06/2016

Memory:

64x UNKNOWN NOT AVAILABLE

32x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz, configured at 1333 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:  
32x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz, configured at 1333 MHz

## General Notes

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

KMP\_AFFINITY = "granularity=fine,compact"

LD\_LIBRARY\_PATH = "/home/IC17/libs/32:/home/IC17/libs/64:/home/IC17/sh10.2"

OMP\_NUM\_THREADS = "64"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM  
memory using Redhat Enterprise Linux 7.2

## 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



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## Base Optimization Flags

C benchmarks:

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

C++ benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32  
-Wl,-z,muldefs -L/sh10.2 -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\_2017/linux/lib/ia32

445.gobmk: icc -m32 -L/opt/intel/compilers\_and\_libraries\_2017/linux/lib/ia32

C++ benchmarks (except as noted below):

icc -m32 -L/opt/intel/compilers\_and\_libraries\_2017/linux/lib/ia32

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: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -qopt-prefetch

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

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

429.mcf: basepeak = yes

445.gobmk: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2)

456.hmmer: basepeak = yes

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

462.libquantum: basepeak = yes

464.h264ref: basepeak = yes

C++ benchmarks:

471.omnetpp: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -qopt-ra-region-strategy=block  
-Wl,-z,muldefs -L/sh10.2 -lsmartheap

473.astar: basepeak = yes

483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-Wl,-z,muldefs -L/sh10.2 -lsmartheap

## Peak Other Flags

C benchmarks:

403.gcc: -Dalloca=\_alloca



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

<http://www.spec.org/cpu2006/flags/Intel-ic17.0-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-ic17.0-official-linux64.xml>

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

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

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