



# SPEC® CINT2006 Result

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**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

**ProLiant DL380 Gen9**

(2.00 GHz, Intel Xeon E5-2660 v4)

**SPECint®2006 =**

**65.5**

**SPECint\_base2006 =**

**62.9**

**CPU2006 license:** 3

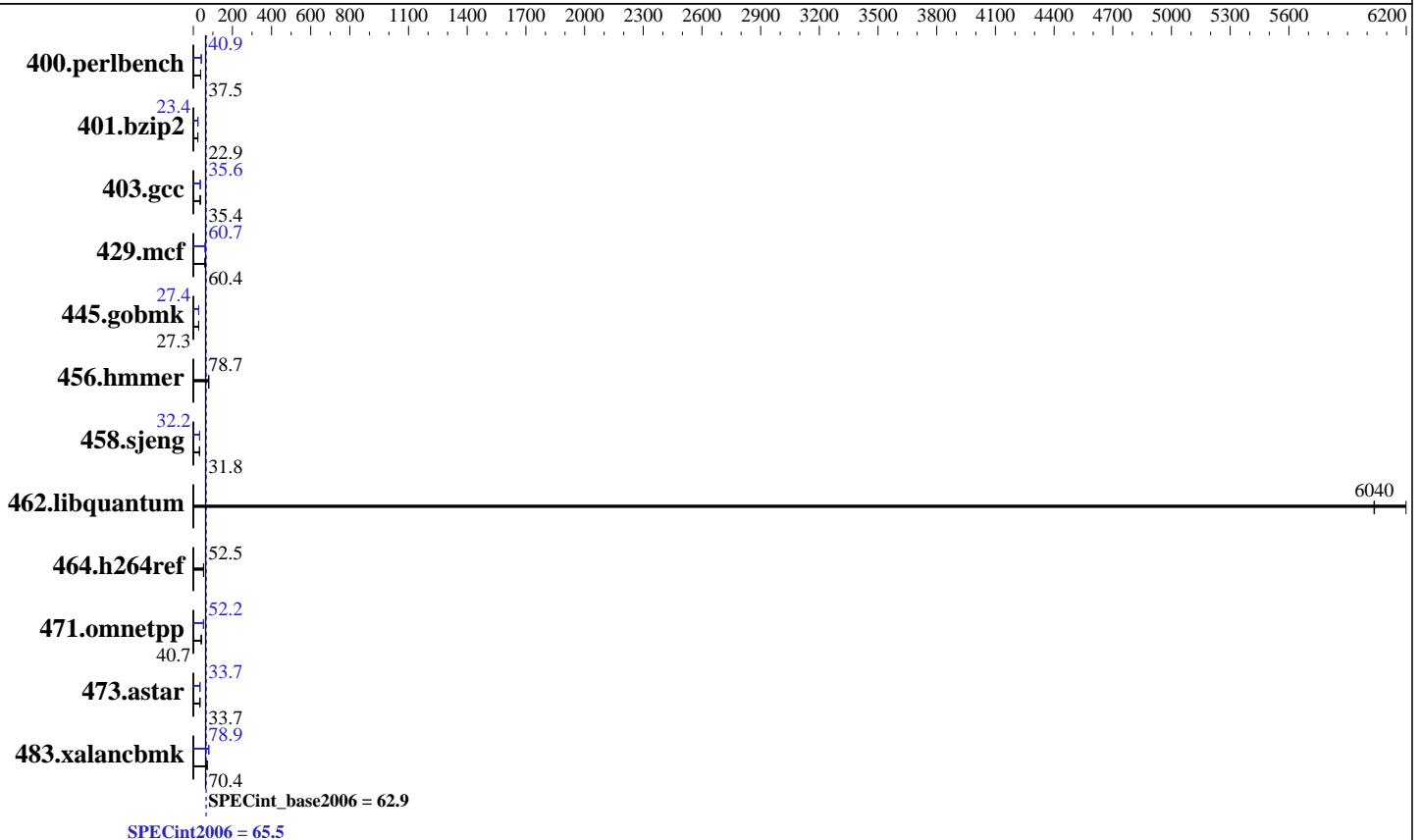
**Test sponsor:** HPE

**Tested by:** HPE

**Test date:** Apr-2016

**Hardware Availability:** Mar-2016

**Software Availability:** Nov-2015



## Hardware

**CPU Name:** Intel Xeon E5-2660 v4  
**CPU Characteristics:** Intel Turbo Boost Technology up to 3.20 GHz  
**CPU MHz:** 2000  
**FPU:** Integrated  
**CPU(s) enabled:** 28 cores, 2 chips, 14 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:** 35 MB I+D on chip per chip  
**Other Cache:** None  
**Memory:** 512 GB (16 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-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	260	37.5	<b><u>261</u></b>	<b><u>37.5</u></b>	261	37.4	238	41.0	<b><u>239</u></b>	<b><u>40.9</u></b>	239	40.9
401.bzip2	420	23.0	421	22.9	<b><u>421</u></b>	<b><u>22.9</u></b>	414	23.3	<b><u>413</u></b>	<b><u>23.4</u></b>	413	23.4
403.gcc	227	35.5	<b><u>227</u></b>	<b><u>35.4</u></b>	227	35.4	226	35.6	<b><u>226</u></b>	<b><u>35.6</u></b>	226	35.6
429.mcf	152	60.0	151	60.4	<b><u>151</u></b>	<b><u>60.4</u></b>	152	60.1	150	60.7	<b><u>150</u></b>	<b><u>60.7</u></b>
445.gobmk	384	27.3	383	27.4	<b><u>384</u></b>	<b><u>27.3</u></b>	383	27.4	<b><u>383</u></b>	<b><u>27.4</u></b>	384	27.3
456.hammer	<b><u>119</u></b>	<b><u>78.7</u></b>	119	78.7	119	78.6	<b><u>119</u></b>	<b><u>78.7</u></b>	119	78.7	119	78.6
458.sjeng	<b><u>380</u></b>	<b><u>31.8</u></b>	380	31.8	380	31.9	375	32.3	<b><u>375</u></b>	<b><u>32.2</u></b>	376	32.2
462.libquantum	3.43	6040	3.34	6200	<b><u>3.43</u></b>	<b><u>6040</u></b>	3.43	6040	3.34	6200	<b><u>3.43</u></b>	<b><u>6040</u></b>
464.h264ref	421	52.6	<b><u>422</u></b>	<b><u>52.5</u></b>	423	52.3	421	52.6	<b><u>422</u></b>	<b><u>52.5</u></b>	423	52.3
471.omnetpp	152	41.2	154	40.6	<b><u>154</u></b>	<b><u>40.7</u></b>	<b><u>120</u></b>	<b><u>52.2</u></b>	120	52.1	120	52.2
473.astar	209	33.6	<b><u>208</u></b>	<b><u>33.7</u></b>	208	33.8	209	33.6	208	33.8	<b><u>208</u></b>	<b><u>33.7</u></b>
483.xalancbmk	98.0	70.4	<b><u>98.0</u></b>	<b><u>70.4</u></b>	98.1	70.3	<b><u>87.4</u></b>	<b><u>78.9</u></b>	87.6	78.8	87.3	79.0

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:

HP Power Profile set to Custom

HP Power Regulator to HP 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

QPI Snoop Configuration set to Home Snoop

Collaborative Power Control set to Disabled

Thermal Configuration set to Maximum Cooling

Processor Power and Utilization Monitoring set to Disabled

Memory Refresh Rate set to 1x Refresh

Intel Hyperthreading set to Disabled

Sysinfo program /home/intel\_binary/cpu2006/config/sysinfo.rev6914

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

running on DL380Gen9allbin Thu Apr 28 01:52:33 2016

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

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http://www.spec.org/

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## 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 E5-2660 v4@ 2.00GHz
    2 "physical id"s (chips)
    28 "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 : 14
    siblings  : 14
    physical 0: cores 0 2 4 5 6 8 9 10 11 12 13 14
    physical 1: cores 0 2 4 5 6 8 9 10 11 12 13 14
  cache size : 35840 KB

```

```

From /proc/meminfo
MemTotal:      528067196 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 DL380Gen9allbin 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 28 01:29

```

SPEC is set to: /home/intel_binary/cpu2006
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda5       xfs   318G  155G  164G  49% /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 P89 03/23/2016

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

OMP\_NUM\_THREADS = "28"

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



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## 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`



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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: -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



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## 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/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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