



# SPEC® CINT2006 Result

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**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

**ProLiant DL580 Gen9**

(2.80 GHz, Intel Xeon E7-8891 v4)

**SPECint®2006 =**

**73.3**

**SPECint\_base2006 =**

**71.2**

**CPU2006 license:** 3

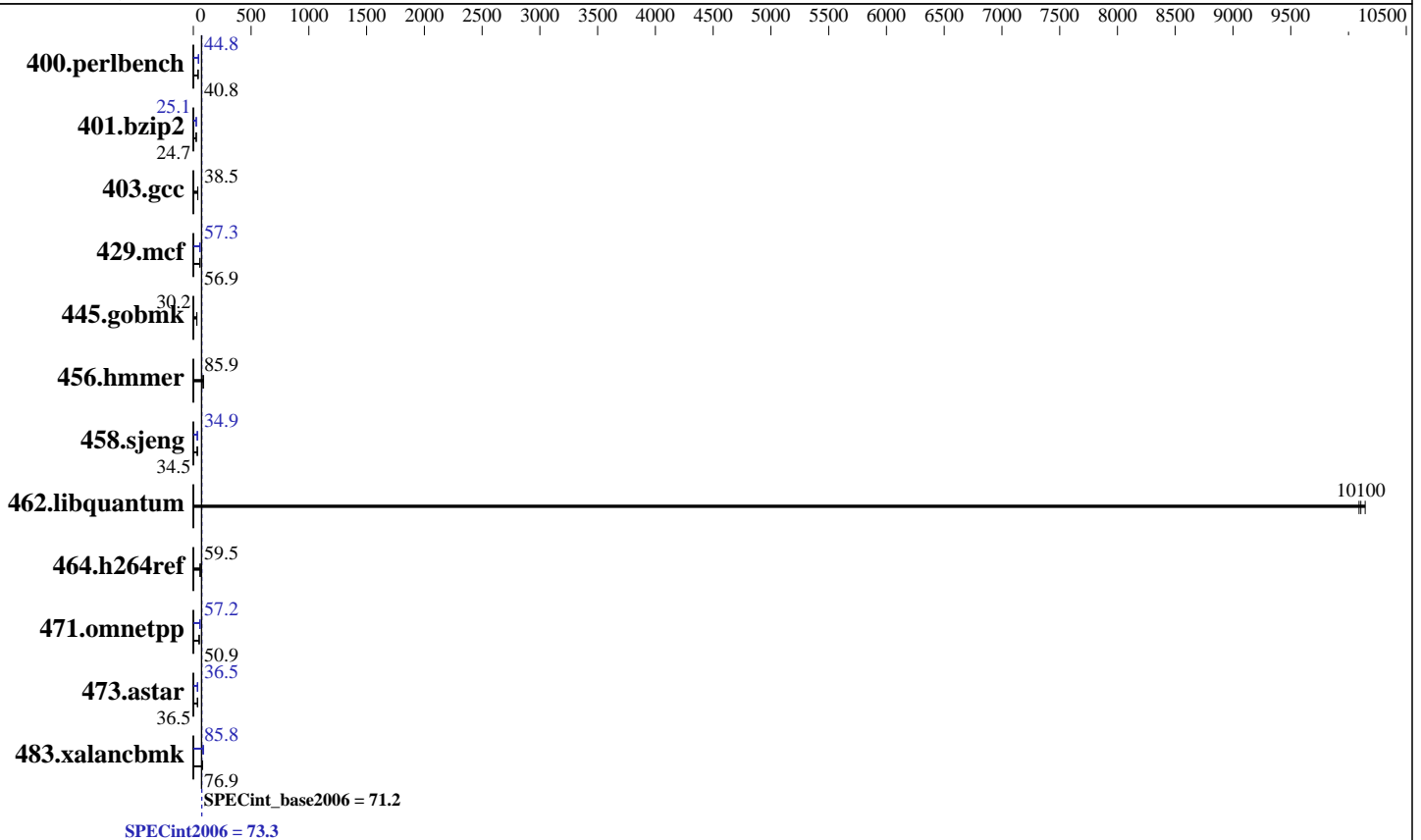
**Test sponsor:** HPE

**Tested by:** HPE

**Test date:** May-2016

**Hardware Availability:** Jun-2016

**Software Availability:** Dec-2015



## Hardware

**CPU Name:** Intel Xeon E7-8891 v4  
**CPU Characteristics:** Intel Turbo Boost Technology up to 3.50 GHz  
**CPU MHz:** 2800  
**FPU:** Integrated  
**CPU(s) enabled:** 40 cores, 4 chips, 10 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:** 60 MB I+D on chip per chip  
**Other Cache:** None  
**Memory:** 512 GB (32 x 16 GB 2Rx4 PC4-2400T-R, running at 1600 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 SP1 (x86\_64) Kernel 3.12.49-11-default  
**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	<b><u>240</u></b>	<b><u>40.8</u></b>	239	40.9	240	40.8	218	44.7	<b><u>218</u></b>	<b><u>44.8</u></b>	218	44.8
401.bzip2	<b><u>391</u></b>	<b><u>24.7</u></b>	391	24.7	390	24.8	<b><u>385</u></b>	<b><u>25.1</u></b>	385	25.1	385	25.1
403.gcc	209	38.4	209	38.5	<b><u>209</u></b>	<b><u>38.5</u></b>	209	38.4	209	38.5	<b><u>209</u></b>	<b><u>38.5</u></b>
429.mcf	159	57.3	165	55.3	<b><u>160</u></b>	<b><u>56.9</u></b>	160	56.8	<b><u>159</u></b>	<b><u>57.3</u></b>	159	57.3
445.gobmk	<b><u>347</u></b>	<b><u>30.2</u></b>	347	30.3	348	30.2	<b><u>347</u></b>	<b><u>30.2</u></b>	347	30.3	348	30.2
456.hammer	109	85.7	<b><u>109</u></b>	<b><u>85.9</u></b>	109	86.0	109	85.7	<b><u>109</u></b>	<b><u>85.9</u></b>	109	86.0
458.sjeng	351	34.5	<b><u>350</u></b>	<b><u>34.5</u></b>	350	34.5	347	34.9	347	34.9	<b><u>347</u></b>	<b><u>34.9</u></b>
462.libquantum	<b><u>2.05</u></b>	<b><u>10100</u></b>	2.04	10100	2.05	10100	<b><u>2.05</u></b>	<b><u>10100</u></b>	2.04	10100	2.05	10100
464.h264ref	372	59.5	373	59.3	<b><u>372</u></b>	<b><u>59.5</u></b>	372	59.5	373	59.3	<b><u>372</u></b>	<b><u>59.5</u></b>
471.omnetpp	<b><u>123</u></b>	<b><u>50.9</u></b>	123	50.9	127	49.1	109	57.4	109	57.2	<b><u>109</u></b>	<b><u>57.2</u></b>
473.astar	192	36.5	<b><u>192</u></b>	<b><u>36.5</u></b>	193	36.4	<b><u>192</u></b>	<b><u>36.5</u></b>	192	36.5	195	36.0
483.xalancbmk	<b><u>89.7</u></b>	<b><u>76.9</u></b>	90.1	76.6	89.1	77.5	80.5	85.7	80.4	85.8	<b><u>80.4</u></b>	<b><u>85.8</u></b>

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 C6 State

Minimum Processor Idle Power Package C-State set to Package C6 (retention) State

Energy/Performance Bias set to Maximum Performance

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

Intel Hyperthreading set to Disabled

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

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

running on linux-vi0i Tue May 17 07:14:52 2016

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

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info@spec.org

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 E7-8891 v4 @ 2.80GHz

4 "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 : 10

siblings : 10

physical 0: cores 5 9 10 11 13 18 24 26 28 29

physical 1: cores 5 9 10 11 13 18 24 26 28 29

physical 2: cores 5 9 10 11 13 18 24 26 28 29

physical 3: cores 5 9 10 11 13 18 24 26 28 29

cache size : 61440 KB

From /proc/meminfo

MemTotal: 529321304 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 May 17 07:10

SPEC is set to: /home/intel\_binary/cpu2006

Filesystem Type Size Used Avail Use% Mounted on  
/dev/nvme0nlp4 xfs 703G 35G 668G 5% /home

Additional information from dmidecode:

Warning: Use caution when you interpret this section. The 'dmidecode' program  
Continued on next page



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## Platform Notes (Continued)

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 U17 04/26/2016

Memory:

64x UNKNOWN NOT AVAILABLE

32x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz, configured at 1600 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 1600 MHz

## General Notes

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

KMP\_AFFINITY = "granularity=fine,compact"

LD\_LIBRARY\_PATH = "/home/intel\_binary/cpu2006/libs/32:/home/intel\_binary/cpu2006/libs/64:/home/intel\_binary/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



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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

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: -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: -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: basepeak = yes

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

445.gobmk: basepeak = yes

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 -lsmarheap

473.astar: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch  
-auto-p32 -Wl,-z,muldefs -L/sh -lsmarheap64

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

## Peak Other Flags

C benchmarks:

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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/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>

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

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