



# SPEC® CINT2006 Result

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**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

Synergy 480 Gen9  
(2.20 GHz, Intel Xeon E5-2698 v4)

**SPECint®2006 = 73.5**

**SPECint\_base2006 = 70.7**

**CPU2006 license:** 3

**Test sponsor:** HPE

**Tested by:** HPE

**Test date:** Nov-2016

**Hardware Availability:** Dec-2016

**Software Availability:** Sep-2016



## 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 (16 x 16 GB 2Rx4 PC4-2400T-R)  
**Disk Subsystem:** 1 x 600 GB 10 K SAS, RAID 0  
**Other Hardware:** None

## 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:** 32/64-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	238	41.0	<b><u>239</u></b>	<b><u>40.9</u></b>	239	40.8	<b><u>206</u></b>	<b><u>47.3</u></b>	206	47.3	206	47.4
401.bzip2	382	25.3	382	25.3	<b><u>382</u></b>	<b><u>25.3</u></b>	376	25.7	<b><u>376</u></b>	<b><u>25.7</u></b>	375	25.7
403.gcc	<b><u>209</u></b>	<b><u>38.5</u></b>	209	38.5	209	38.5	208	38.7	<b><u>208</u></b>	<b><u>38.7</u></b>	209	38.6
429.mcf	136	67.0	140	65.2	<b><u>136</u></b>	<b><u>67.0</u></b>	134	67.9	<b><u>135</u></b>	<b><u>67.7</u></b>	137	66.5
445.gobmk	<b><u>337</u></b>	<b><u>31.2</u></b>	336	31.2	337	31.2	331	31.7	<b><u>331</u></b>	<b><u>31.7</u></b>	331	31.6
456.hmmer	106	88.0	106	87.9	<b><u>106</u></b>	<b><u>88.0</u></b>	106	88.0	106	87.9	<b><u>106</u></b>	<b><u>88.0</u></b>
458.sjeng	343	35.3	343	35.2	<b><u>343</u></b>	<b><u>35.2</u></b>	332	36.4	<b><u>333</u></b>	<b><u>36.3</u></b>	333	36.3
462.libquantum	2.64	7840	<b><u>2.74</u></b>	<b><u>7570</u></b>	2.75	7540	2.64	7840	<b><u>2.74</u></b>	<b><u>7570</u></b>	2.75	7540
464.h264ref	377	58.7	<b><u>377</u></b>	<b><u>58.7</u></b>	377	58.7	377	58.7	<b><u>377</u></b>	<b><u>58.7</u></b>	377	58.7
471.omnetpp	<b><u>127</u></b>	<b><u>49.1</u></b>	128	48.8	125	50.1	<b><u>110</u></b>	<b><u>56.6</u></b>	110	56.6	110	56.6
473.astar	197	35.6	<b><u>197</u></b>	<b><u>35.7</u></b>	196	35.8	197	35.6	<b><u>197</u></b>	<b><u>35.7</u></b>	196	35.8
483.xalancbmk	88.4	78.1	89.6	77.0	<b><u>89.0</u></b>	<b><u>77.6</u></b>	80.6	85.6	<b><u>80.5</u></b>	<b><u>85.7</u></b>	80.3	85.9

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 set to Disabled

Power Profile set to Custom

Power Regulator 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

Energy/Performance Bias set to Maximum Performance

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.rev6993

Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)

running on linux-hiyk Mon Nov 7 13:50:53 2016

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## Platform Notes (Continued)

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>

```

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:      264546324 kB
HugePages_Total: 0
Hugepagesize:  2048 kB

```

```

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP1

```

```

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-hiyk 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 Nov 7 13:49

```

SPEC is set to: /home/cpu2006
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda4       xfs   331G  3.8G  327G  2% /home

```

Additional information from dmidecode:

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## Platform Notes (Continued)

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 I37 09/14/2016

Memory:

8x UNKNOWN NOT AVAILABLE

16x UNKNOWN NOT AVAILABLE 16 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: 16x UNKNOWN NOT AVAILABLE 16 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/sh10.2"

OMP\_NUM\_THREADS = "40"

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

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## Base Portability Flags (Continued)

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 -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

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## Peak Portability Flags (Continued)

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

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

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

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## Peak Optimization Flags (Continued)

483.xalanbmk: -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

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-revD.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-revD.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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