



# SPEC® CINT2006 Result

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**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

**ProLiant ML350 Gen9**

(2.30 GHz, Intel Xeon E5-2697 v4)

**SPECint®2006 =**

**73.2**

**SPECint\_base2006 =**

**71.0**

**CPU2006 license:** 3

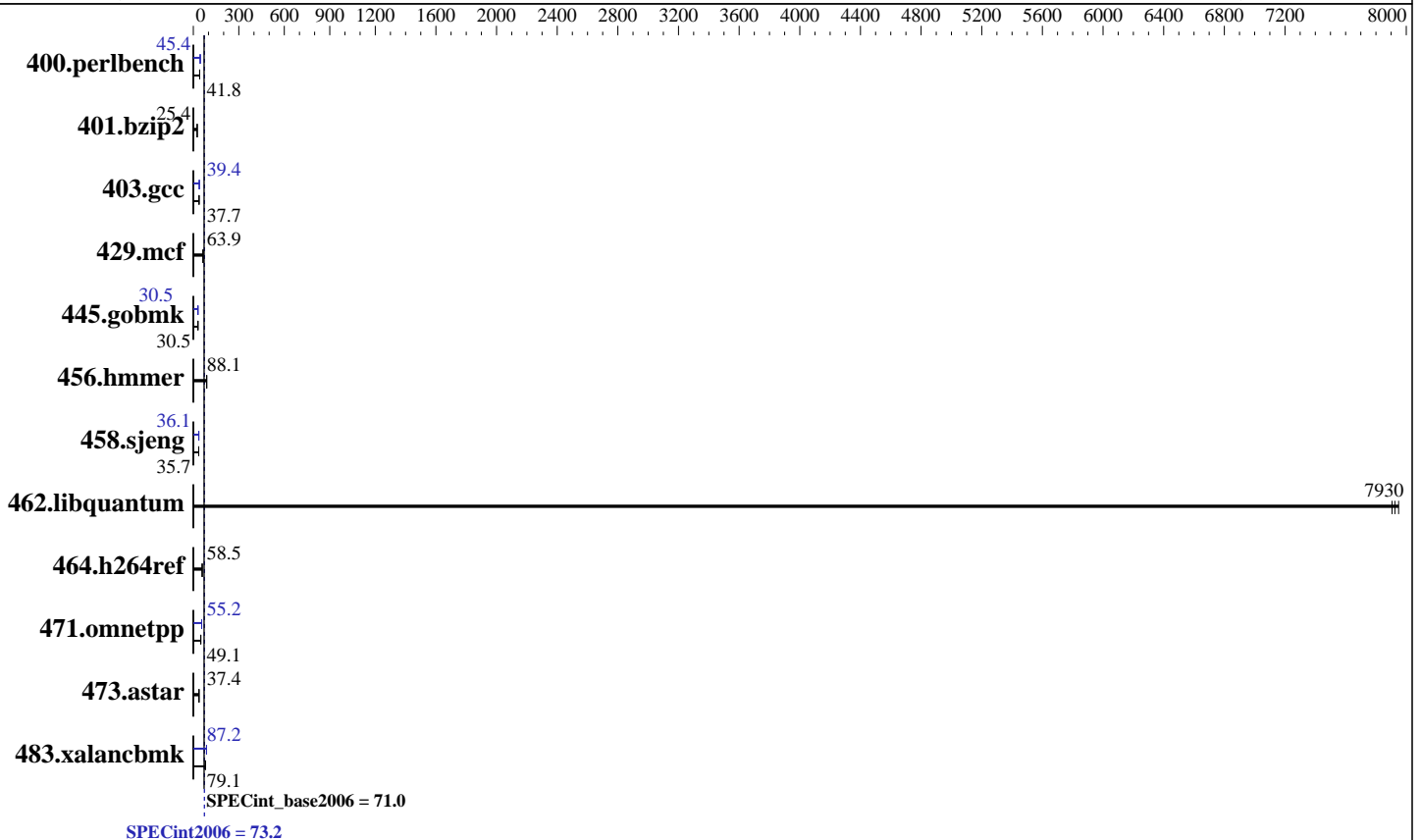
**Test sponsor:** HPE

**Tested by:** HPE

**Test date:** Apr-2016

**Hardware Availability:** Mar-2016

**Software Availability:** Nov-2015



## Hardware

**CPU Name:** Intel Xeon E5-2697 v4  
**CPU Characteristics:** Intel Turbo Boost Technology up to 3.60 GHz  
**CPU MHz:** 2300  
**FPU:** Integrated  
**CPU(s) enabled:** 36 cores, 2 chips, 18 cores/chip  
**CPU(s) orderable:** 1, 2 chips  
**Primary Cache:** 32 KB I + 32 KB D on chip per core  
**Secondary Cache:** 256 KB I+D on chip per core  
**L3 Cache:** 45 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 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



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## Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	233	41.9	<u>234</u>	<u>41.8</u>	234	41.7	<u>215</u>	<u>45.4</u>	215	45.5	215	45.4
401.bzip2	380	25.4	<u>380</u>	<u>25.4</u>	381	25.3	380	25.4	<u>380</u>	<u>25.4</u>	381	25.3
403.gcc	213	37.7	214	37.7	<u>214</u>	<u>37.7</u>	<u>204</u>	<u>39.4</u>	204	39.4	204	39.4
429.mcf	141	64.6	143	63.7	<u>143</u>	<u>63.9</u>	141	64.6	143	63.7	<u>143</u>	<u>63.9</u>
445.gobmk	345	30.4	<u>344</u>	<u>30.5</u>	344	30.5	344	30.5	<u>344</u>	<u>30.5</u>	344	30.5
456.hammer	106	88.3	<u>106</u>	<u>88.1</u>	106	88.1	106	88.3	<u>106</u>	<u>88.1</u>	106	88.1
458.sjeng	<u>339</u>	<u>35.7</u>	339	35.7	340	35.6	335	36.1	<u>335</u>	<u>36.1</u>	335	36.1
462.libquantum	<u>2.61</u>	<u>7930</u>	2.61	7950	2.62	7910	<u>2.61</u>	<u>7930</u>	2.61	7950	2.62	7910
464.h264ref	<u>378</u>	<u>58.5</u>	378	58.6	379	58.4	<u>378</u>	<u>58.5</u>	378	58.6	379	58.4
471.omnetpp	<u>127</u>	<u>49.1</u>	128	48.9	127	49.4	113	55.3	114	55.0	<u>113</u>	<u>55.2</u>
473.astar	189	37.2	<u>188</u>	<u>37.4</u>	187	37.5	189	37.2	<u>188</u>	<u>37.4</u>	187	37.5
483.xalancbmk	87.3	79.1	<u>87.2</u>	<u>79.1</u>	87.2	79.1	79.1	87.2	79.2	87.1	<u>79.1</u>	<u>87.2</u>

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 C1E 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 Double Refresh Rate set to 1x Refresh  
Energy Performance Bias set to Maximum Performance  
Sysinfo program /home/specuser/specsuite/icl6/config/sysinfo.rev6914  
\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1  
running on ml350bdwspec Fri Apr 15 12:22:40 2016

This section contains SUT (System Under Test) info as seen by  
Continued on next page



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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 E5-2697 v4 @ 2.30GHz
 2 "physical id"s (chips)
 36 "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     : 18
  siblings      : 18
  physical 0:   cores 0 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  physical 1:   cores 0 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
cache size     : 46080 KB

```

```

From /proc/meminfo
MemTotal:      528066200 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 ml350bdwspec 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 15 12:12

```

SPEC is set to: /home/specuser/specsuite/ic16
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda5       xfs   318G  241G   78G  76% /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 P92 02/22/2016

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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/specuser/specsuite/ic16/libs/32:/home/specuser/specsuite/ic16/libs/64:/home/specuser/specsuite/ic16/sh"

OMP\_NUM\_THREADS = "36"

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.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: basepeak = yes

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

429.mcf: basepeak = yes

445.gobmk: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
-prof-use(pass 2) -par-num-threads=1(pass 1) -ansi-alias

456.hmmmer: 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: basepeak = yes

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