



# SPEC® CINT2006 Result

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## Dell Inc.

PowerEdge R940 (Intel Xeon Platinum 8176, 2.10 GHz)

**SPECint®2006 = 73.5**

**SPECint\_base2006 = 70.5**

CPU2006 license: 55

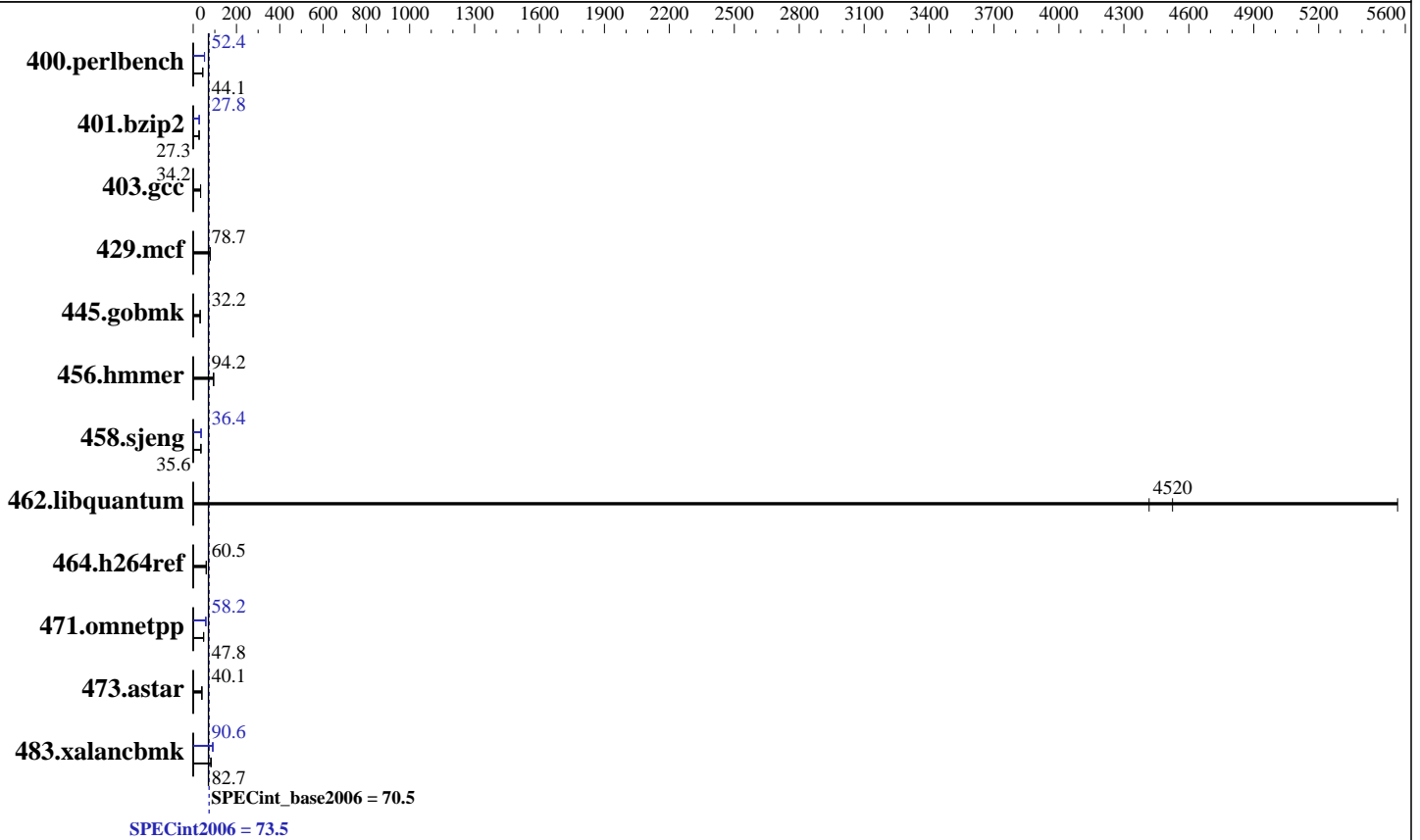
Test sponsor: Dell Inc.

Tested by: Dell Inc.

Test date: May-2017

Hardware Availability: Jul-2017

Software Availability: Nov-2016



### Hardware

CPU Name: Intel Xeon Platinum 8176  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.80 GHz  
 CPU MHz: 2100  
 FPU: Integrated  
 CPU(s) enabled: 112 cores, 4 chips, 28 cores/chip, 2 threads/core  
 CPU(s) orderable: 2,4 chip  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 1 MB I+D on chip per core  
 L3 Cache: 38.5 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 768 GB (48 x 16 GB 2Rx8 PC4-2666V-R)  
 Disk Subsystem: 1 x 960 GB SATA SSD  
 Other Hardware: None

### Software

Operating System: SUSE Linux Enterprise Server 12 SP2  
 4.4.21-69-default  
 Compiler: C/C++: Version 17.0.1.132 of Intel C/C++  
 Compiler for Linux  
 Auto Parallel: Yes  
 File System: btrfs  
 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	223	43.9	221	44.1	<u>222</u>	<u>44.1</u>	<u>187</u>	<u>52.4</u>	186	52.5	188	51.9
401.bzip2	<u>353</u>	<u>27.3</u>	354	27.2	352	27.4	348	27.8	347	27.8	<u>348</u>	<u>27.8</u>
403.gcc	235	34.2	236	34.2	<u>235</u>	<u>34.2</u>	235	34.2	236	34.2	<u>235</u>	<u>34.2</u>
429.mcf	117	78.1	116	78.8	<u>116</u>	<u>78.7</u>	117	78.1	116	78.8	<u>116</u>	<u>78.7</u>
445.gobmk	<u>326</u>	<u>32.2</u>	326	32.2	326	32.2	<u>326</u>	<u>32.2</u>	326	32.2	326	32.2
456.hammer	99.0	94.3	<u>99.1</u>	<u>94.2</u>	99.2	94.1	99.0	94.3	<u>99.1</u>	<u>94.2</u>	99.2	94.1
458.sjeng	340	35.6	<u>340</u>	<u>35.6</u>	340	35.6	332	36.4	332	36.5	<u>332</u>	<u>36.4</u>
462.libquantum	4.69	4420	3.72	5560	<u>4.58</u>	<u>4520</u>	4.69	4420	3.72	5560	<u>4.58</u>	<u>4520</u>
464.h264ref	366	60.5	<u>366</u>	<u>60.5</u>	366	60.4	366	60.5	<u>366</u>	<u>60.5</u>	366	60.4
471.omnetpp	131	47.7	<u>131</u>	<u>47.8</u>	128	48.8	<u>107</u>	<u>58.2</u>	108	58.1	107	58.3
473.astar	176	40.0	175	40.1	<u>175</u>	<u>40.1</u>	176	40.0	175	40.1	<u>175</u>	<u>40.1</u>
483.xalancbmk	82.7	83.5	<u>83.4</u>	<u>82.7</u>	85.4	80.8	76.1	90.7	<u>76.2</u>	<u>90.6</u>	76.2	90.6

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

## Platform Notes

BIOS settings:  
Sub NUMA Cluster disabled  
Virtualization Technology disabled  
System Profile set to Custom  
CPU Performance set to Maximum Performance  
C States set to autonomous  
C1E disabled  
Energy Efficient Turbo disabled  
Uncore Frequency set to Dynamic  
Energy Efficiency Policy set to Performance  
Memory Patrol Scrub disabled  
Logical Processor enabled  
Sysinfo program /root/Desktop/SPECcpu2006/config/sysinfo.rev6993  
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)  
running on linux-crvz Fri May 5 11:00:10 2017

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) Platinum 8176 CPU @ 2.10GHz
 4 "physical id"s (chips)
 224 "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      : 28
siblings       : 56
physical 0:    : cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
                25 26 27 28 29 30
physical 1:    : cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
                25 26 27 28 29 30
physical 2:    : cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
                25 26 27 28 29 30
physical 3:    : cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
                25 26 27 28 29 30
cache size     : 39424 KB

```

From /proc/meminfo

```

MemTotal:      791001344 kB
HugePages_Total: 0
Hugepagesize:  2048 kB

```

```

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP2

```

From /etc/\*release\* /etc/\*version\*

```

SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 2
# 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-SP2"
VERSION_ID="12.2"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"

```

```

uname -a:
Linux linux-crvz 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
(9464f67) x86_64 x86_64 x86_64 GNU/Linux

```

run-level 3 May 5 10:56

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## Platform Notes (Continued)

```

SPEC is set to: /root/Desktop/SPECcpu2006
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda3        btrfs 836G  10G 820G   2% /
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 Dell Inc. 0.5.5 04/27/2017
Memory:
48x 00CE063200CE M393A2K43BB1-CTD 16 GB 2 rank 2666 MHz

```

(End of data from sysinfo program)

## General Notes

```

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/root/Desktop/SPECcpu2006/lib/ia32:/root/Desktop/SPECcpu2006/lib/intel64:/root/Desktop/SPECcpu2006/sh10.2"
OMP_NUM_THREADS = "112"

```

```

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.2
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled

```

## 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

```

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## Base Portability Flags (Continued)

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

## Base Optimization Flags

C benchmarks:

-xCORE-AVX512 -ipo -O3 -no-prec-div -parallel -qopt-prefetch  
-auto-p32

C++ benchmarks:

-xCORE-AVX512 -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

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: -DSPEC\_CPU\_LP64

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## Peak Portability Flags (Continued)

```

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

```

## Peak Optimization Flags

C benchmarks:

```

400.perlbench: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(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-AVX512(pass 2)
            -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
            -no-prec-div -auto-ilp32 -qopt-prefetch

```

403.gcc: basepeak = yes

429.mcf: basepeak = yes

445.gobmk: basepeak = yes

456.hmmer: basepeak = yes

```

458.sjeng: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(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-AVX512(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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
                -Wl,-z,muldefs -L/sh10.2 -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/Intel-ic17.0-official-linux64-revF.html>  
<http://www.spec.org/cpu2006/flags/Dell-Platform-Flags-PowerEdge14G-revB.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-revF.xml>  
<http://www.spec.org/cpu2006/flags/Dell-Platform-Flags-PowerEdge14G-revB.xml>

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

Tested with SPEC CPU2006 v1.2.  
Report generated on Wed Jul 12 12:13:02 2017 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 11 July 2017.