SPEC® CINT2006 Result
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Dell Inc.

PowerEdge R940
(Intel Xeon Platinum 8168, 2.70 GHz)

SPECint®2006 =	79.2

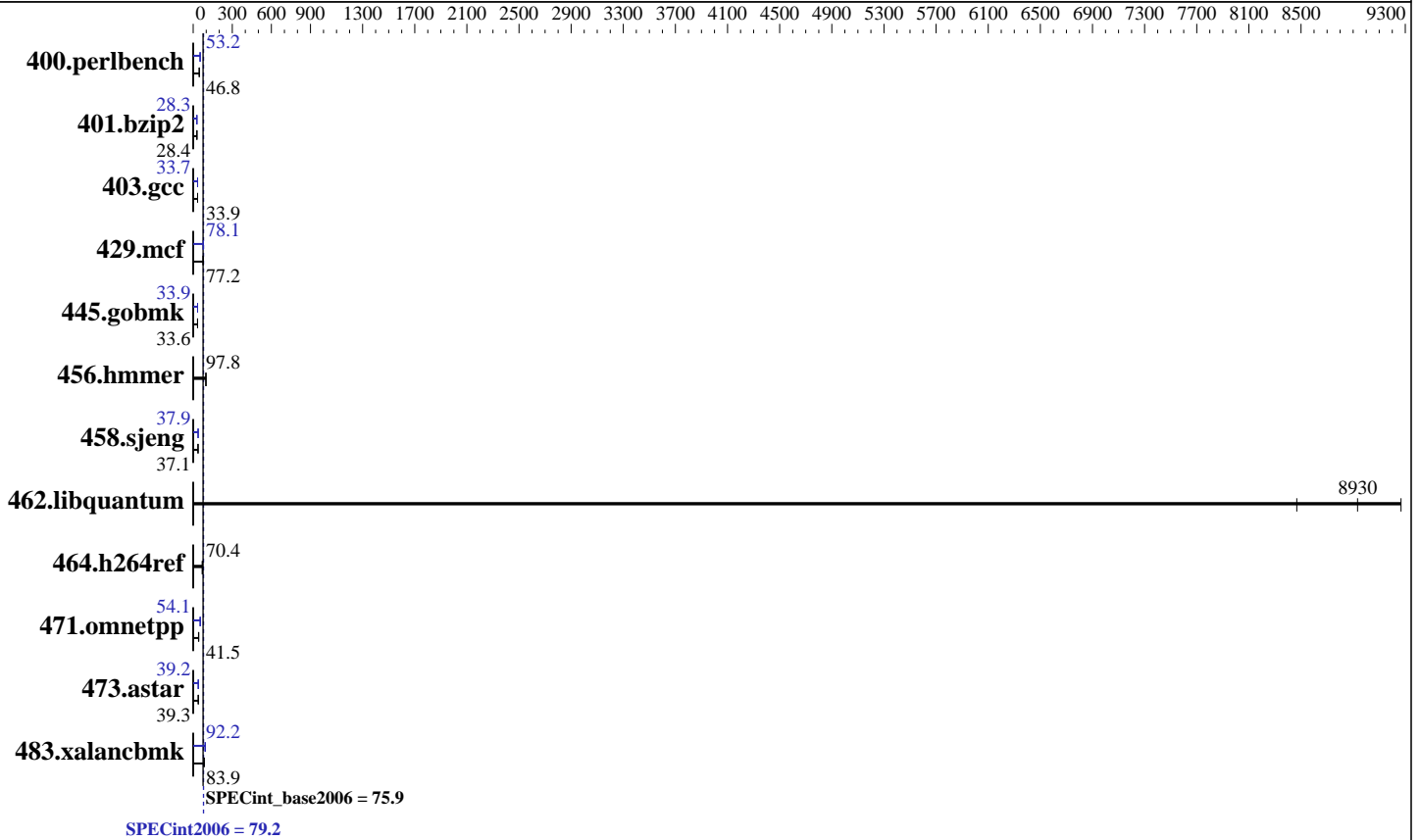SPECint_base2006 =	75.9

CPU2006 license: 55	**Test date:** Oct-2017
Test sponsor: Dell Inc.	**Hardware Availability:** Jul-2017
Tested by: Dell Inc.	**Software Availability:** Apr-2017

400.perlbench	53.2 / 46.8
401.bzip2	28.3 / 28.4
403.gcc	33.7 / 33.9
429.mcf	78.1 / 77.2
445.gobmk	33.9 / 33.6
456.hmmer	97.8
458.sjeng	37.9 / 37.1
462.libquantum	8930
464.h264ref	70.4
471.omnetpp	54.1 / 41.5
473.astar	39.2 / 39.3
483.xalancbmk	92.2 / 83.9

SPECint_base2006 = 75.9

SPECint2006 = 79.2

Hardware

CPU Name:	Intel Xeon Platinum 8168
CPU Characteristics:	Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz:	2700
FPU:	Integrated
CPU(s) enabled:	96 cores, 4 chips, 24 cores/chip
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:	33 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 900 GB 15K RPM SAS12
Other Hardware:	None

Software

Operating System:	SUSE Linux Enterprise Server 12 (x86_64) SP2
	4.4.21-69-default
Compiler:	C/C++: Version 17.0.3.191 of Intel C/C++
	Compiler 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	**209**	**46.8**	209	46.8	209	46.8	184	53.1	**184**	**53.2**	183	53.3
401.bzip2	**340**	**28.4**	340	28.3	340	28.4	**341**	**28.3**	341	28.3	340	28.4
403.gcc	238	33.9	**238**	**33.9**	237	33.9	**239**	**33.7**	237	34.0	240	33.5
429.mcf	119	76.5	**118**	**77.2**	118	77.4	**117**	**78.1**	117	77.7	117	78.2
445.gobmk	312	33.6	313	33.6	**312**	**33.6**	310	33.9	**310**	**33.9**	311	33.7
456.hmmer	95.3	97.9	**95.4**	**97.8**	95.5	97.7	95.3	97.9	**95.4**	**97.8**	95.5	97.7
458.sjeng	325	37.2	**326**	**37.1**	327	37.0	**319**	**37.9**	320	37.8	319	37.9
462.libquantum	2.24	9270	**2.32**	**8930**	2.45	8470	2.24	9270	**2.32**	**8930**	2.45	8470
464.h264ref	314	70.4	315	70.2	**314**	**70.4**	314	70.4	315	70.2	**314**	**70.4**
471.omnetpp	145	43.1	153	40.8	**150**	**41.5**	117	53.6	115	54.2	**116**	**54.1**
473.astar	178	39.3	**179**	**39.3**	180	38.9	179	39.2	180	39.0	**179**	**39.2**
483.xalancbmk	**82.2**	**83.9**	83.7	82.4	81.3	84.9	**74.8**	**92.2**	74.6	92.4	75.3	91.7

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"

Platform Notes

```
        BIOS settings:
        Logical Processor Disabled
        Virtualization Technology Disabled
        Sub NUMA Cluster Disabled
        System Profile set to Custom
        CPU Performance set to Maximum Performance
        C1E Disabled
        C States set to Autonomous
        Uncore Frequency set to Dynamic
        Memory Patrol Scrub Disabled
        Energy Efficiency Policy set to Performance
        CPU Interconnect Bus Link Power Management Disabled
        PCI ASPM L1 Link Power Management Disabled
        Sysinfo program /home/cpu2006/config/sysinfo.rev6993
        Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
        running on linux-4qdv Fri Oct 13 11:33:08 2017

        This section contains SUT (System Under Test) info as seen by
        some common utilities.  To remove or add to this section, see:
```

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Test date: Oct-2017

Hardware Availability: Jul-2017

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Platform Notes (Continued)

```
   http://www.spec.org/cpu2006/Docs/config.html#sysinfo

 From /proc/cpuinfo
    model name : Intel(R) Xeon(R) Platinum 8168 CPU @ 2.70GHz
       4 "physical id"s (chips)
       96 "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 : 24
       siblings  : 24
       physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
       27 28 29
       physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
       27 28 29
       physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
       27 28 29
       physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
       27 28 29
    cache size : 33792 KB

 From /proc/meminfo
    MemTotal:       791225344 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-4qdv 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 Oct 13 11:32
```

Continued on next page

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Platform Notes (Continued)

```
   SPEC is set to: /home/cpu2006
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/sda4       xfs   796G   17G  779G   3% /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 Dell Inc. 1.1.7 08/10/2017
   Memory:
    3x 002C00B3002C 18ASF2G72PDZ-2G6D1 16 GB 2 rank 2666 MHz
    21x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666 MHz
    24x 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,compact"
LD_LIBRARY_PATH = "/home/cpu2006/lib/ia32:/home/cpu2006/lib/intel64:/home/cpu2006/sh10.2"
OMP_NUM_THREADS = "96"

 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 by default.
 Filesystem page cache cleared with:
 shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
```

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

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Base 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: -DSPEC_CPU_LP64
       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
```

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Peak Portability Flags (Continued)

```
    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
```

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
```

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Peak Optimization Flags (Continued)

471.omnetpp (continued):
```
-Wl,-z,muldefs -L/sh10.2 -lsmartheap
```

473.astar: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch`
`-auto-p32 -Wl,-z,muldefs -L/sh10.2 -lsmartheap64`

483.xalancbmk: `-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-revF.html
http://www.spec.org/cpu2006/flags/Dell-Platform-Flags-PowerEdge14G-revC.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-revC.xml

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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