SPEC® CFP2006 Result

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Huawei

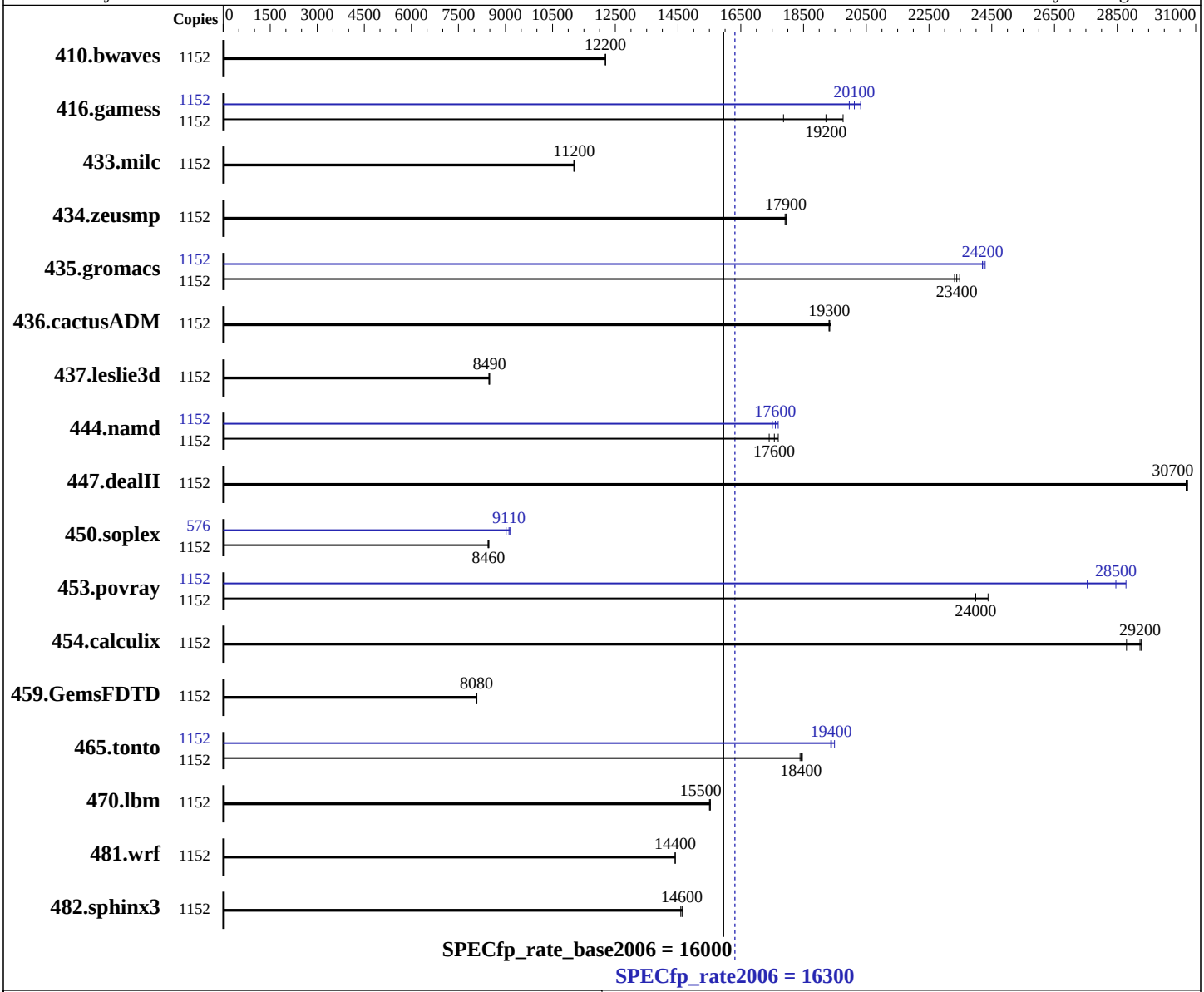
KunLun 9032 (Intel Xeon E7-8890 v3)

SPECfp®_rate2006 = 16300

SPECfp_rate_base2006 = 16000

CPU2006 license: 3175
Test sponsor: Huawei
Tested by: Huawei

Test date: Feb-2016
Hardware Availability: Jan-2016
Software Availability: Aug-2015



Hardware

CPU Name:	Intel Xeon E7-8890 v3
CPU Characteristics:	Intel Turbo Boost Technology up to 3.30 GHz
CPU MHz:	2500
FPU:	Integrated
CPU(s) enabled:	576 cores, 32 chips, 18 cores/chip, 2 threads/core
CPU(s) orderable:	4,8,16,24,32 chips
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	256 KB I+D on chip per core

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Software

Operating System:	Red Hat Enterprise Linux Server release 7.1 (Maipo) 3.10.0-229.20.1.el7.x86_64
Compiler:	C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux; Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux
Auto Parallel:	No
File System:	tmpfs

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L3 Cache: 45 MB I+D on chip per chip
Other Cache: None
Memory: 8 TB (512 x 16 GB 2Rx4 PC4-2133P-R, running at 1600Mhz)
Disk Subsystem: 3 x 300 GB SAS, 10K RPM
Other Hardware: None

System State: Run level 3 (multi-user)
Base Pointers: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: None

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	1152	1285	12200	1284	12200	**1285**	**12200**	1152	1285	12200	1284	12200	**1285**	**12200**
416.gamess	1152	1263	17900	1141	19800	**1174**	**19200**	1152	**1121**	**20100**	1110	20300	1130	20000
433.milc	1152	943	11200	946	11200	**945**	**11200**	1152	943	11200	946	11200	**945**	**11200**
434.zeusmp	1152	585	17900	584	18000	**584**	**17900**	1152	585	17900	584	18000	**584**	**17900**
435.gromacs	1152	350	23500	**352**	**23400**	353	23300	1152	339	24300	340	24200	**340**	**24200**
436.cactusADM	1152	711	19400	**712**	**19300**	713	19300	1152	711	19400	**712**	**19300**	713	19300
437.leslie3d	1152	1278	8470	1275	8490	**1275**	**8490**	1152	1278	8470	1275	8490	**1275**	**8490**
444.namd	1152	522	17700	**526**	**17600**	531	17400	1152	**525**	**17600**	522	17700	528	17500
447.dealII	1152	**429**	**30700**	429	30700	429	30700	1152	**429**	**30700**	429	30700	429	30700
450.soplex	1152	1134	8470	**1136**	**8460**	1138	8440	576	**527**	**9110**	525	9140	533	9020
453.povray	1152	251	24400	256	24000	**255**	**24000**	1152	213	28800	**215**	**28500**	223	27500
454.calculix	1152	330	28800	**325**	**29200**	325	29300	1152	330	28800	**325**	**29200**	325	29300
459.GemsFDTD	1152	**1513**	**8080**	1511	8090	1514	8070	1152	**1513**	**8080**	1511	8090	1514	8070
465.tonto	1152	614	18500	**615**	**18400**	616	18400	1152	585	19400	**585**	**19400**	582	19500
470.lbm	1152	1021	15500	**1020**	**15500**	1019	15500	1152	1021	15500	**1020**	**15500**	1019	15500
481.wrf	1152	895	14400	893	14400	**893**	**14400**	1152	895	14400	893	14400	**893**	**14400**
482.sphinx3	1152	1533	14600	**1535**	**14600**	1539	14600	1152	1533	14600	**1535**	**14600**	1539	14600

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"
Tmpfs filesystem can be set with:
 mkdir -p /home/shm
 mount -t tmpfs -o size=2048g,rw tmpfs /home/shm
Turbo mode set with:
 cpupower -c all frequency-set -g performance
```

Platform Notes

```
BIOS configuration:
Set Power Efficiency Mode to Performance
Set Lock_step to disabled
Baseboard Management Controller used to adjust the fan speed to 100%
Set C-State to C0/C1
Sysinfo program /home/shm/speccpu-1.2-ic16/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on 9016 Fri Feb 19 06:21:30 2016

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 E7-8890 v3 @ 2.50GHz
      32 "physical id"s (chips)
      1152 "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  : 36
      physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 4: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 5: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 6: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 7: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 8: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 9: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 10: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 11: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 12: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 13: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 14: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 15: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 16: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 17: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 18: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 19: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 20: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 21: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 22: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 23: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 24: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 25: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 26: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 27: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 28: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 29: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
```

Continued on next page

Platform Notes (Continued)

```
        physical 30: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
        physical 31: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
     cache size : 46080 KB

  From /proc/meminfo
     MemTotal:       8454947816 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB

  From /etc/*release* /etc/*version*
     os-release:
        NAME="Red Hat Enterprise Linux Server"
        VERSION="7.1 (Maipo)"
        ID="rhel"
        ID_LIKE="fedora"
        VERSION_ID="7.1"
        PRETTY_NAME="Red Hat Enterprise Linux Server 7.1 (Maipo)"
        ANSI_COLOR="0;31"
        CPE_NAME="cpe:/o:redhat:enterprise_linux:7.1:GA:server"
     redhat-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
     system-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
     system-release-cpe: cpe:/o:redhat:enterprise_linux:7.1:ga:server

  uname -a:
     Linux 9016 3.10.0-229.20.1.el7.x86_64 #1 SMP Thu Sep 24 12:23:56 EDT 2015
     x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Feb 19 06:05

  SPEC is set to: /home/shm/speccpu-1.2-ic16
     Filesystem     Type   Size  Used Avail Use% Mounted on
     tmpfs          tmpfs  2.0T  7.2G  2.0T   1% /home/shm
  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 American Megatrends Inc. BLXSV919 12/24/2015

  (End of data from sysinfo program)
  Because Huawei KunLun 9032 uses System Management BIOS (SMBIOS) v3.0,but the dmidoce of
  RHEL7.1 is based on V2.0,so can not read the memory information.
```

General Notes

```
 Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/shm/speccpu-1.2-ic16/libs/32:/home/shm/speccpu-1.2-ic16/libs/64:/home/shm/speccpu-1.2-ic16/sh"

  Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
```

Continued on next page

General Notes (Continued)

```
memory using RedHat EL 7.1
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled
Filesystem page cache cleared with:
echo 1>       /proc/sys/vm/drop_caches
runspec command invoked through numactl i.e.:
numactl --interleave=all runspec <etc>
```

Base Compiler Invocation

C benchmarks:
```
icc   -m64
```

C++ benchmarks:
```
icpc  -m64
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
icc   -m64 ifort -m64
```

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64 -nofor_main
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -nofor_main
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
482.sphinx3: -DSPEC_CPU_LP64

Base Optimization Flags

C benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

Continued on next page

Base Optimization Flags (Continued)

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3

Peak Compiler Invocation

C benchmarks:
icc -m64

C++ benchmarks (except as noted below):
icpc -m64

450.soplex: icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
icc -m64 ifort -m64

Peak Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64 -nofor_main
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64
450.soplex: -D_FILE_OFFSET_BITS=64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -nofor_main
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64

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Peak Portability Flags (Continued)

470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
482.sphinx3: -DSPEC_CPU_LP64

Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

444.namd: -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) -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2) -fno-alias -auto-ilp32

447.dealII: basepeak = yes

450.soplex: -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) -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2) -opt-malloc-options=3

453.povray: -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) -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -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) -unroll2 -inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: basepeak = yes

Continued on next page

Peak Optimization Flags (Continued)

465.tonto: `-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 -auto -inline-calloc -opt-malloc-options=3`

Benchmarks using both Fortran and C:

435.gromacs: `-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) `-opt-mem-layout-trans=3`(pass 2) `-prof-use`(pass 2) `-opt-prefetch -auto-ilp32`

436.cactusADM: `basepeak = yes`

454.calculix: `basepeak = yes`

481.wrf: `basepeak = yes`

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/Huawei-Platform-Settings-V1.2-HSW-RevG.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/Huawei-Platform-Settings-V1.2-HSW-RevG.xml`

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