SPEC® CFP2006 Result

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Fujitsu

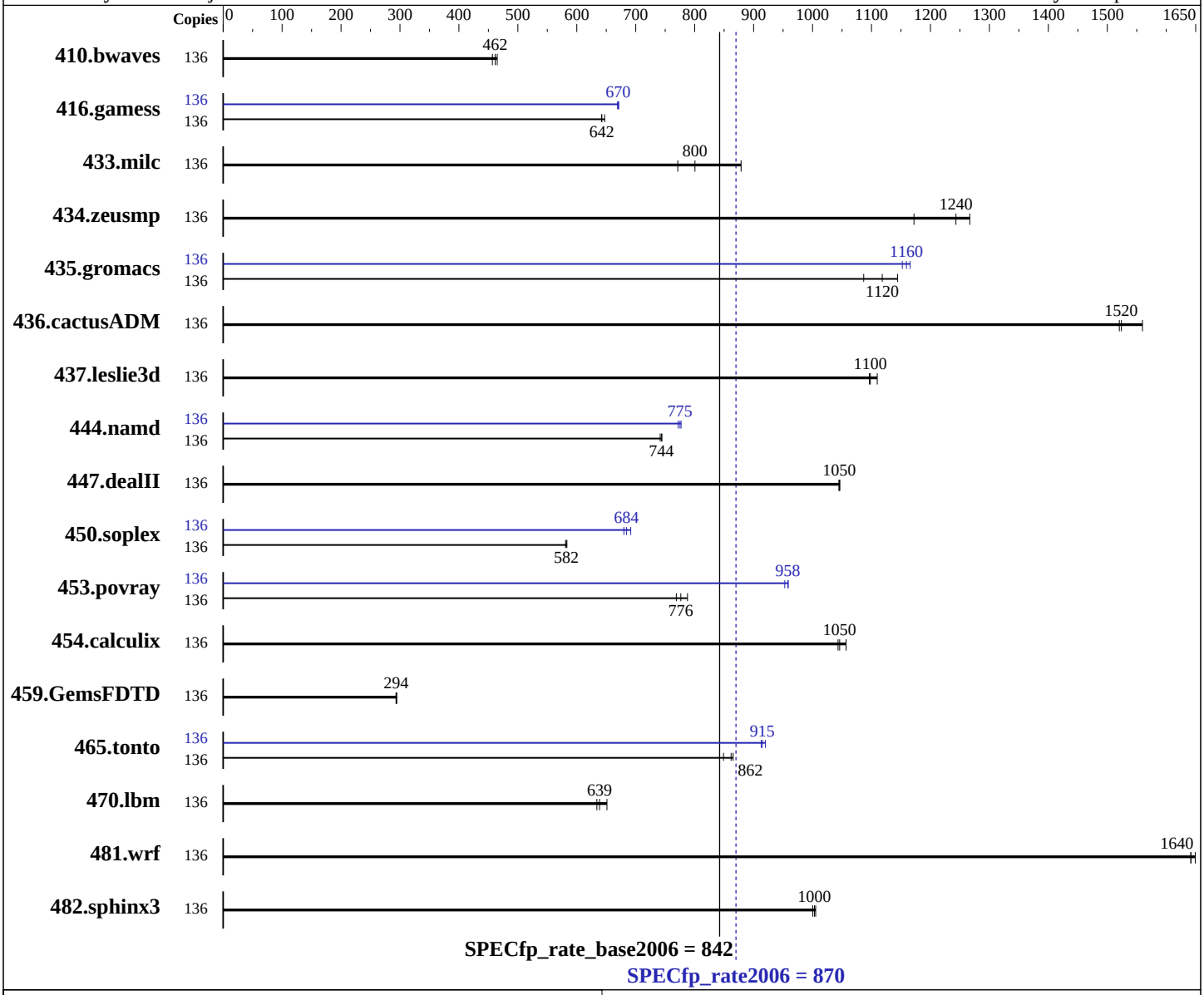
PRIMERGY CX1640 M1, Intel Xeon Phi 7250, 1.40GHz

SPECfp®_rate2006 = 870

SPECfp_rate_base2006 = 842

CPU2006 license: 19
Test sponsor: Fujitsu
Tested by: Fujitsu

Test date: Jun-2016
Hardware Availability: Sep-2016
Software Availability: Sep-2016



Hardware

CPU Name:	Intel Xeon Phi 7250
CPU Characteristics:	Intel Turbo Boost Technology up to 1.60 GHz
CPU MHz:	1400
FPU:	Integrated
CPU(s) enabled:	68 cores, 1 chip, 68 cores/chip, 4 threads/core
CPU(s) orderable:	1 chip
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	1 MB I+D on chip per two cores

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Software

Operating System:	Red Hat Enterprise Linux Server release 7.2 (Maipo) 3.10.0-327.13.1.el7.mpsp_1.3.2.100.x86_64
Compiler:	C/C++: Version 16.0.2.181 of Intel C++ Studio XE for Linux; Fortran: Version 16.0.2.181 of Intel Fortran Studio XE for Linux
Auto Parallel:	No
File System:	xfs

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L3 Cache: None
Other Cache: None
Memory: 192 GB (6 x 32 GB 2Rx4 PC4-2400T-R, running at 1200 MHz)
Disk Subsystem: 1 x SATA SSD, 741 GB, 6.0 Gbps
Other Hardware: 16 GB MCDRAM

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	136	4046	457	3975	465	**4005**	**462**	136	4046	457	3975	465	**4005**	**462**
416.gamess	136	4114	647	4148	642	**4145**	**642**	136	**3972**	**670**	3967	671	3980	669
433.milc	136	1421	879	**1560**	**800**	1619	771	136	1421	879	**1560**	**800**	1619	771
434.zeusmp	136	**995**	**1240**	977	1270	1056	1170	136	**995**	**1240**	977	1270	1056	1170
435.gromacs	136	849	1140	**868**	**1120**	894	1090	136	**838**	**1160**	843	1150	833	1170
436.cactusADM	136	1042	1560	**1066**	**1520**	1069	1520	136	1042	1560	**1066**	**1520**	1069	1520
437.leslie3d	136	**1164**	**1100**	1166	1100	1152	1110	136	**1164**	**1100**	1166	1100	1152	1110
444.namd	136	**1467**	**744**	1465	744	1471	742	136	1413	772	**1407**	**775**	1404	777
447.dealII	136	1489	1040	1487	1050	**1488**	**1050**	136	1489	1040	1487	1050	**1488**	**1050**
450.soplex	136	1952	581	1945	583	**1948**	**582**	136	**1657**	**684**	1668	680	1640	692
453.povray	136	**932**	**776**	918	788	941	769	136	755	959	**755**	**958**	759	953
454.calculix	136	1062	1060	**1073**	**1050**	1075	1040	136	1062	1060	**1073**	**1050**	1075	1040
459.GemsFDTD	136	**4911**	**294**	4920	293	4899	295	136	**4911**	**294**	4920	293	4899	295
465.tonto	136	1547	865	1576	849	**1553**	**862**	136	1454	920	1466	913	**1463**	**915**
470.lbm	136	2870	651	**2926**	**639**	2947	634	136	2870	651	**2926**	**639**	2947	634
481.wrf	136	**925**	**1640**	925	1640	921	1650	136	**925**	**1640**	925	1640	921	1650
482.sphinx3	136	2637	1010	**2642**	**1000**	2649	1000	136	2637	1010	**2642**	**1000**	2649	1000

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

Submit Notes

```
The taskset mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate taskset 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 configuration:
Cluster Mode = Quadrant
Memory Mode = Cache
```

Continued on next page

Platform Notes (Continued)

```
Patrol Scrub = Disabled
Power Technology = Custom
Enhanced Speedstep = Enabled
Turbo Mode = Enabled
CPU C6 Report = Disabled
Package C State limit = C0
Cooling System:
Cool-Central Liquid Cooling Technology
For details of cooling system please visit: http://www.fujitsu.com/fts/products/computing/servers/primergy/scale-out/cclc/index.html
For information about Fujitsu please visit: http://www.fujitsu.com
 Sysinfo program /root/cpu2006/config/sysinfo.rev6914
 $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
 running on cx1640m1-42 Thu Jun  2 19:29:43 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 Phi(TM) CPU 7250 @ 1.40GHz
       1 "physical id"s (chips)
       272 "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 : 68
       siblings  : 272
       physical 0: cores 0 1 2 3 4 5 6 7 12 13 14 15 16 17 18 19 24 25 26 27 28
       29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
       54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75
    cache size : 1024 KB

 From /proc/meminfo
    MemTotal:       197741932 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:
```

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Platform Notes (Continued)

```
      Linux cx1640m1-42 3.10.0-327.13.1.el7.mpsp_1.3.2.100.x86_64 #1 SMP Mon May 23
      05:37:07 EDT 2016 x86_64 x86_64 x86_64 GNU/Linux

   run-level 3 Jun 2 19:06

   SPEC is set to: /root/cpu2006
      Filesystem            Type  Size  Used Avail Use% Mounted on
      /dev/mapper/rhel-root xfs   741G  295G  447G  40% /
   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 FUJITSU // American Megatrends Inc. V5.0.0.11 R0.97.0 for D3727-A1x
     05/21/2016
     Memory:
      6x Samsung M393A4K40BB1-CRC 32 GB 2 rank 2400 MHz, configured at 1200 MHz

   (End of data from sysinfo program)
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/root/cpu2006/libs/32:/root/cpu2006/libs/64:/root/cpu2006/sh"

 Binaries compiled on a system with
 1x Intel 2nd Generation Xeon Phi CPU
 + 96GB memory using RedHat EL 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
```

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:
-xMIC-AVX512 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias

C++ benchmarks:
-xMIC-AVX512 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias

Fortran benchmarks:
-xMIC-AVX512 -ipo -O3 -no-prec-div -opt-prefetch

Benchmarks using both Fortran and C:
-xMIC-AVX512 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias

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

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Peak Compiler Invocation (Continued)

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
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: -xMIC-AVX512 -ipo -O3 -no-prec-div -prof-gen(pass 1)
-prof-use(pass 2) -par-num-threads=1(pass 1) -fno-alias
-auto-ilp32

447.dealII: basepeak = yes

450.soplex: -xMIC-AVX512 -ipo -O3 -no-prec-div -prof-gen(pass 1)
-prof-use(pass 2) -par-num-threads=1(pass 1)
-opt-malloc-options=3

Continued on next page

Peak Optimization Flags (Continued)

453.povray: -xMIC-AVX512 -ipo -O3 -no-prec-div -prof-gen(pass 1) -prof-use(pass 2) -par-num-threads=1(pass 1) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xMIC-AVX512 -ipo -O3 -no-prec-div -prof-gen(pass 1) -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

465.tonto: -xMIC-AVX512 -ipo -O3 -no-prec-div -prof-gen(pass 1) -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: -xMIC-AVX512 -ipo -O3 -no-prec-div -prof-gen(pass 1) -prof-use(pass 2) -par-num-threads=1(pass 1) -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-revB.html
http://www.spec.org/cpu2006/flags/Fujitsu-Platform-Settings-V1.2-KNL-RevA.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-revB.xml
http://www.spec.org/cpu2006/flags/Fujitsu-Platform-Settings-V1.2-KNL-RevA.xml

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