SPEC® CFP2006 Result

Nokia
AirFrame AR-D521U-A

$SPECfp®\_rate2006 =$ 1710

$SPECfp\_rate\_base2006 =$ 1660

Benchmark	Copies	Result
410.bwaves	56	1120
	112	1090
416.gamess	112	2230
	112	2160
433.milc	112	1050
434.zeusmp	112	1970
435.gromacs	112	3100
	112	2900
436.cactusADM	112	2110
437.leslie3d	56	843
	112	800
444.namd	112	2010
	112	1910
447.dealII	112	3340
450.soplex	56	1020
	112	863
453.povray	112	3400
	112	2920
454.calculix	112	3270
459.GemsFDTD	56	713
	112	736
465.tonto	112	1990
	112	1950
470.lbm	112	1440
481.wrf	112	1350
482.sphinx3	112	1550

SPECfp_rate_base2006 = 1660

SPECfp_rate2006 = 1710

Hardware

CPU Name:	Intel Xeon Platinum 8180
CPU Characteristics:	Intel Turbo Boost Technology up to 3.80 GHz
CPU MHz:	2500
FPU:	Integrated
CPU(s) enabled:	56 cores, 2 chips, 28 cores/chip, 2 threads/core
CPU(s) orderable:	1,2 chip
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	1 MB I+D on chip per core

Continued on next page

Software

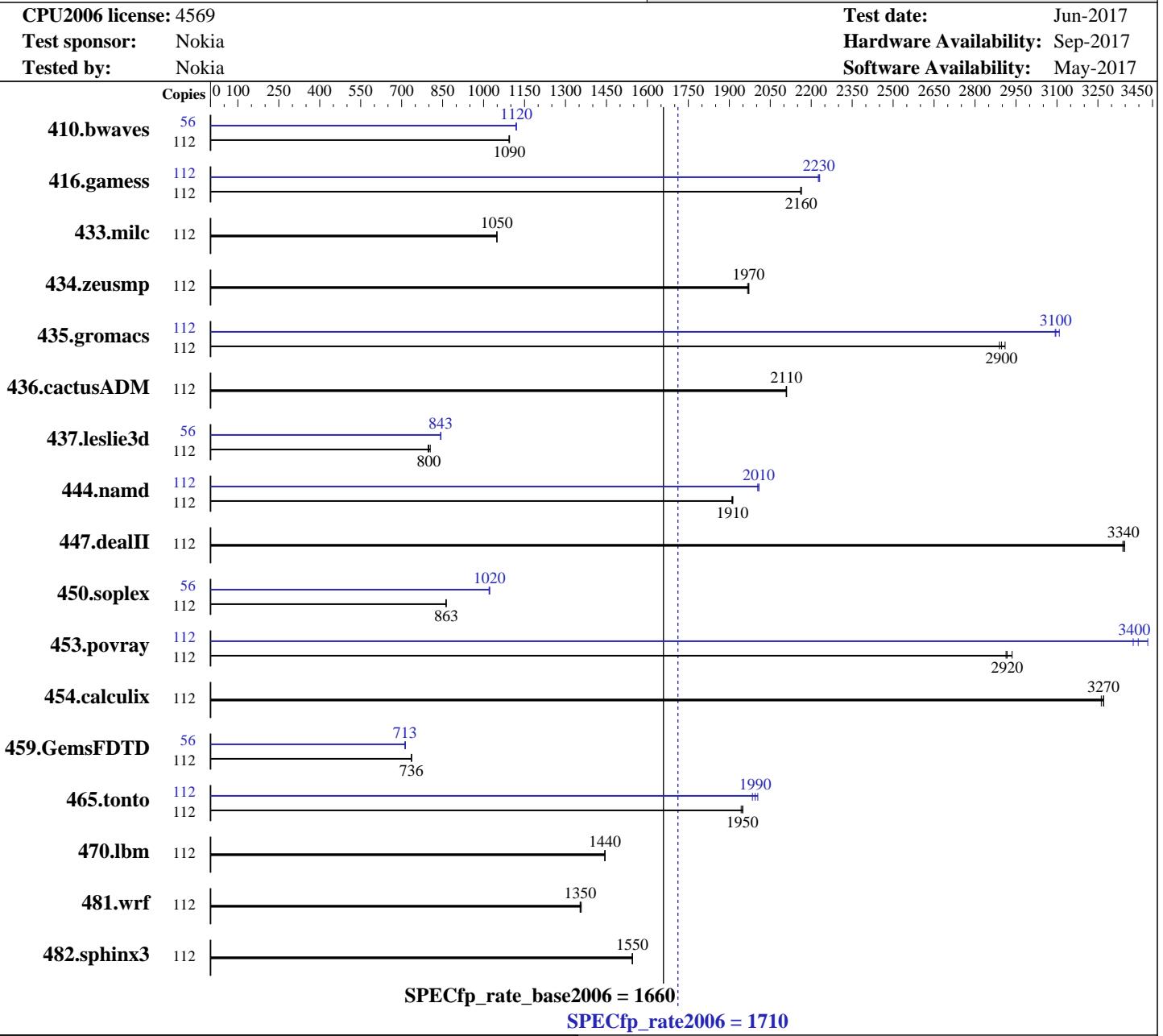|	
Operating System:	Red Hat Enterprise Linux Server release 7.3 (Maipo) 3.10.0-514.21.1.el7.x86_64
Compiler:	C/C++: Version 17.0.1.132 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.1.132 of Intel Fortran Compiler for Linux
Auto Parallel:	No
File System:	ext4

Continued on next page

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CPU2006 license: 4569	**Test date:** Jun-2017
Test sponsor: Nokia	**Hardware Availability:** Sep-2017
Tested by: Nokia	**Software Availability:** May-2017

L3 Cache:	38.5 MB I+D on chip per chip	System State:	Run level 3(multi-user)
Other Cache:	None	Base Pointers:	32/64-bit
Memory:	384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)	Peak Pointers:	32/64-bit
Disk Subsystem:	1.5 TB (Intel NVME)	Other Software:	None
Other Hardware:	None		

Results Table

Benchmark	Base Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Peak Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	112	1389	1100	**1391**	**1090**	1392	1090	56	680	1120	**680**	**1120**	679	1120
416.gamess	112	1015	2160	**1014**	**2160**	1013	2160	112	983	2230	**984**	**2230**	985	2230
433.milc	112	980	1050	980	1050	**980**	**1050**	112	980	1050	980	1050	**980**	**1050**
434.zeusmp	112	**517**	**1970**	517	1970	518	1970	112	**517**	**1970**	517	1970	518	1970
435.gromacs	112	277	2890	**276**	**2900**	275	2910	112	257	3110	**258**	**3100**	258	3090
436.cactusADM	112	634	2110	635	2110	**635**	**2110**	112	634	2110	635	2110	**635**	**2110**
437.leslie3d	112	1308	805	**1317**	**800**	1321	797	56	**624**	**843**	625	843	624	844
444.namd	112	470	1910	**470**	**1910**	469	1910	112	447	2010	**447**	**2010**	448	2000
447.dealII	112	383	3350	383	3340	**383**	**3340**	112	383	3350	383	3340	**383**	**3340**
450.soplex	112	1082	863	1084	862	**1082**	**863**	56	457	1020	**457**	**1020**	458	1020
453.povray	112	205	2910	**204**	**2920**	203	2940	112	176	3380	**175**	**3400**	174	3430
454.calculix	112	283	3270	**283**	**3270**	283	3260	112	283	3270	**283**	**3270**	283	3260
459.GemsFDTD	112	**1615**	**736**	1614	736	1615	736	56	834	712	832	714	**834**	**713**
465.tonto	112	567	1940	565	1950	**566**	**1950**	112	555	1980	**552**	**1990**	550	2000
470.lbm	112	**1065**	**1440**	1066	1440	1065	1440	112	**1065**	**1440**	1066	1440	1065	1440
481.wrf	112	921	1360	**924**	**1350**	924	1350	112	921	1360	**924**	**1350**	924	1350
482.sphinx3	112	**1413**	**1550**	1413	1540	1412	1550	112	**1413**	**1550**	1413	1540	1412	1550

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

Sysinfo program /run/media/root/SPEC/SPEC_AVX3/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on skylake-dual-8180 Tue Jun 13 23:51:15 2017

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Platform Notes (Continued)

```
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) Platinum 8180 CPU @ 2.50GHz
      2 "physical id"s (chips)
      112 "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
   cache size : 39424 KB

From /proc/meminfo
   MemTotal:       394833816 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.3 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.3"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
   redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.3:ga:server

uname -a:
   Linux skylake-dual-8180 3.10.0-514.21.1.el7.x86_64 #1 SMP Sat Apr 22 02:41:35
   EDT 2017 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jun 13 12:53 last=5

SPEC is set to: /run/media/root/SPEC/SPEC_AVX3
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/nvme2n1    ext4  1.5T  191G  1.2T  14% /run/media/root/SPEC
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
```

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Platform Notes (Continued)

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. 2A11 02/22/2017
Memory:
24x Micron 18ASF2G72PDZ-2G6D1 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:
LD_LIBRARY_PATH = "/run/media/root/SPEC/SPEC_AVX3/lib/ia32:/run/media/root/SPEC/SPEC_AVX3/lib/intel64:/run/media/root/SPEC/SPEC_AVX3/sh10.2"

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:
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

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Base Portability Flags (Continued)

```
    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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3
```

C++ benchmarks:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3
```

Fortran benchmarks:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
```

Benchmarks using both Fortran and C:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-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_2017/linux/lib/ia32
```

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

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

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Software Availability: May-2017

Per 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: -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) -fno-alias -auto-ilp32
             -qopt-mem-layout-trans=3

   447.dealII: basepeak = yes

   450.soplex: -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-malloc-options=3
             -qopt-mem-layout-trans=3

   453.povray: -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 -qopt-mem-layout-trans=3
```

Fortran benchmarks:

Nokia

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Software Availability: May-2017

Peak Optimization Flags (Continued)

410.bwaves: `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`

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

434.zeusmp: `basepeak = yes`

437.leslie3d: `Same as 410.bwaves`

459.GemsFDTD: `Same as 410.bwaves`

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

Benchmarks using both Fortran and C:

435.gromacs: `-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)`
`-par-num-threads=1(pass 1) -qopt-prefetch -auto-ilp32`
`-qopt-mem-layout-trans=3`

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-ic17.0-official-linux64-revD.html
http://www.spec.org/cpu2006/flags/Default-Platform-Flags.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-revD.xml
http://www.spec.org/cpu2006/flags/Default-Platform-Flags.xml

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

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