# SPEC® CFP2006 Result

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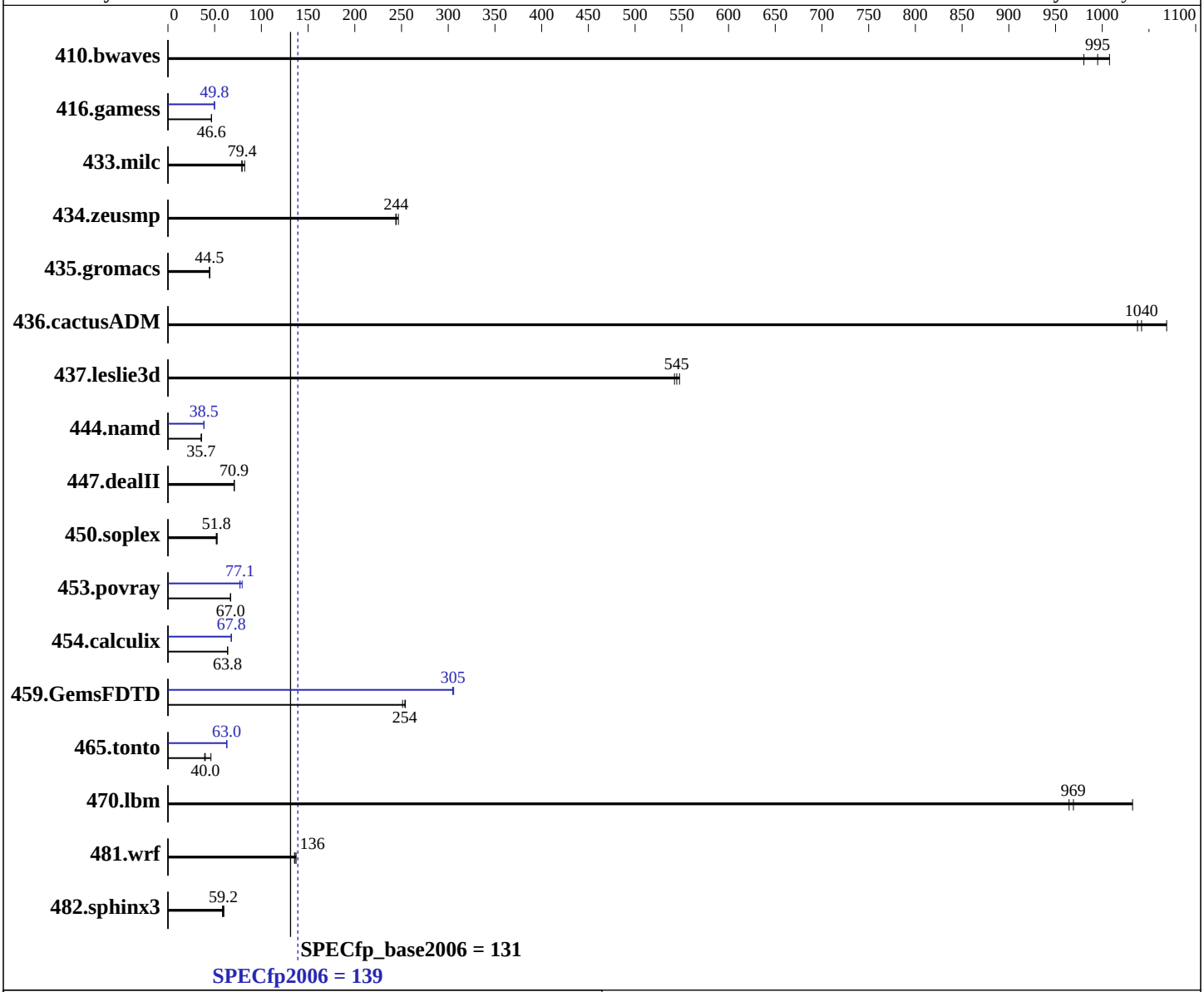
## Nokia
## AirFrame AR-D521U-A

SPECfp®2006 = 139

SPECfp_base2006 = 131

**CPU2006 license:** 4569
**Test sponsor:** Nokia
**Tested by:** Nokia

**Test date:** Jun-2017
**Hardware Availability:** Sep-2017
**Software Availability:** May-2017




### 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 |

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### Software

| | |
|---|---|
| Operating System: | Red Hat Enterprise Linux Server release 7.3 (Maipo)<br>3.10.0-514.21.1.el7.x86_64 |
| Compiler: | C/C++: Version 17.0.1.132 of Intel C/C++ Compiler for Linux;<br>Fortran: Version 17.0.1.132 of Intel Fortran Compiler for Linux |
| Auto Parallel: | Yes |
| File System: | ext4 |

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L3 Cache: 38.5 MB I+D on chip per chip
Other Cache: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)
Disk Subsystem: 1.5 TB (Intel NVME)
Other Hardware: None

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

## Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 13.9 | 980 | **13.7** | **995** | 13.5 | 1010 | 13.9 | 980 | **13.7** | **995** | 13.5 | 1010 |
| 416.gamess | 420 | 46.6 | **420** | **46.6** | 420 | 46.6 | 394 | 49.7 | 393 | 49.8 | **393** | **49.8** |
| 433.milc | 112 | 82.1 | 116 | 79.0 | **116** | **79.4** | 112 | 82.1 | 116 | 79.0 | **116** | **79.4** |
| 434.zeusmp | 36.9 | 247 | 37.3 | 244 | **37.3** | **244** | 36.9 | 247 | 37.3 | 244 | **37.3** | **244** |
| 435.gromacs | 160 | 44.7 | **160** | **44.5** | 160 | 44.5 | 160 | 44.7 | **160** | **44.5** | 160 | 44.5 |
| 436.cactusADM | **11.5** | **1040** | 11.2 | 1070 | 11.5 | 1040 | **11.5** | **1040** | 11.2 | 1070 | 11.5 | 1040 |
| 437.leslie3d | 17.3 | 542 | 17.2 | 548 | **17.3** | **545** | 17.3 | 542 | 17.2 | 548 | **17.3** | **545** |
| 444.namd | 224 | 35.8 | 225 | 35.7 | **224** | **35.7** | **208** | **38.5** | 208 | 38.6 | 208 | 38.5 |
| 447.dealII | **161** | **70.9** | 161 | 70.9 | 161 | 71.0 | **161** | **70.9** | 161 | 70.9 | 161 | 71.0 |
| 450.soplex | **161** | **51.8** | 158 | 52.7 | 161 | 51.8 | **161** | **51.8** | 158 | 52.7 | 161 | 51.8 |
| 453.povray | 79.5 | 66.9 | **79.4** | **67.0** | 79.2 | 67.2 | 67.0 | 79.4 | **69.0** | **77.1** | 69.1 | 77.0 |
| 454.calculix | 129 | 63.9 | **129** | **63.8** | 129 | 63.8 | 122 | 67.8 | 122 | 67.9 | **122** | **67.8** |
| 459.GemsFDTD | **41.8** | **254** | 42.3 | 251 | 41.8 | 254 | 34.7 | 306 | 34.8 | 305 | **34.8** | **305** |
| 465.tonto | **246** | **40.0** | 214 | 46.0 | 251 | 39.2 | 156 | 62.9 | **156** | **63.0** | 156 | 63.0 |
| 470.lbm | 14.2 | 965 | **14.2** | **969** | 13.3 | 1030 | 14.2 | 965 | **14.2** | **969** | 13.3 | 1030 |
| 481.wrf | **82.1** | **136** | 81.4 | 137 | 82.5 | 135 | **82.1** | **136** | 81.4 | 137 | 82.5 | 135 |
| 482.sphinx3 | **329** | **59.2** | 334 | 58.4 | 326 | 59.8 | **329** | **59.2** | 334 | 58.4 | 326 | 59.8 |

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

## 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 Thu Jun 15 14:44:34 2017

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
```

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## Platform Notes (Continued)

```
        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 15 10:21 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  241G  1.2T  18% /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
     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
```

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## Platform Notes (Continued)

```
(End of data from sysinfo program)
```

## General Notes

```
Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
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"
OMP_NUM_THREADS = "56"

 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.
```

# 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-AVX512 -ipo -O3 -no-prec-div -parallel -qopt-prefetch`

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

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

Benchmarks using both Fortran and C:
`-xCORE-AVX512 -ipo -O3 -no-prec-div -parallel -qopt-prefetch`

## Peak Compiler Invocation

C benchmarks:
`icc -m64`

C++ benchmarks:
`icpc -m64`

Fortran benchmarks:
`ifort -m64`

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

## Peak Portability Flags

`Same as Base Portability Flags`

## 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`

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## Peak Optimization Flags (Continued)

447.dealII: basepeak = yes

450.soplex: basepeak = yes

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 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

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: basepeak = yes

459.GemsFDTD: -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 -qopt-prefetch -parallel

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) -inline-calloc -qopt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: -xCORE-AVX512 -ipo -O3 -no-prec-div -auto-ilp32

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

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