



# SPEC® CFP2006 Result

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## Lenovo Global Technology

ThinkSystem SR530  
(1.70 GHz, Intel Xeon Bronze 3104)

SPECfp®\_rate2006 = 361

SPECfp\_rate\_base2006 = 355

CPU2006 license: 9017

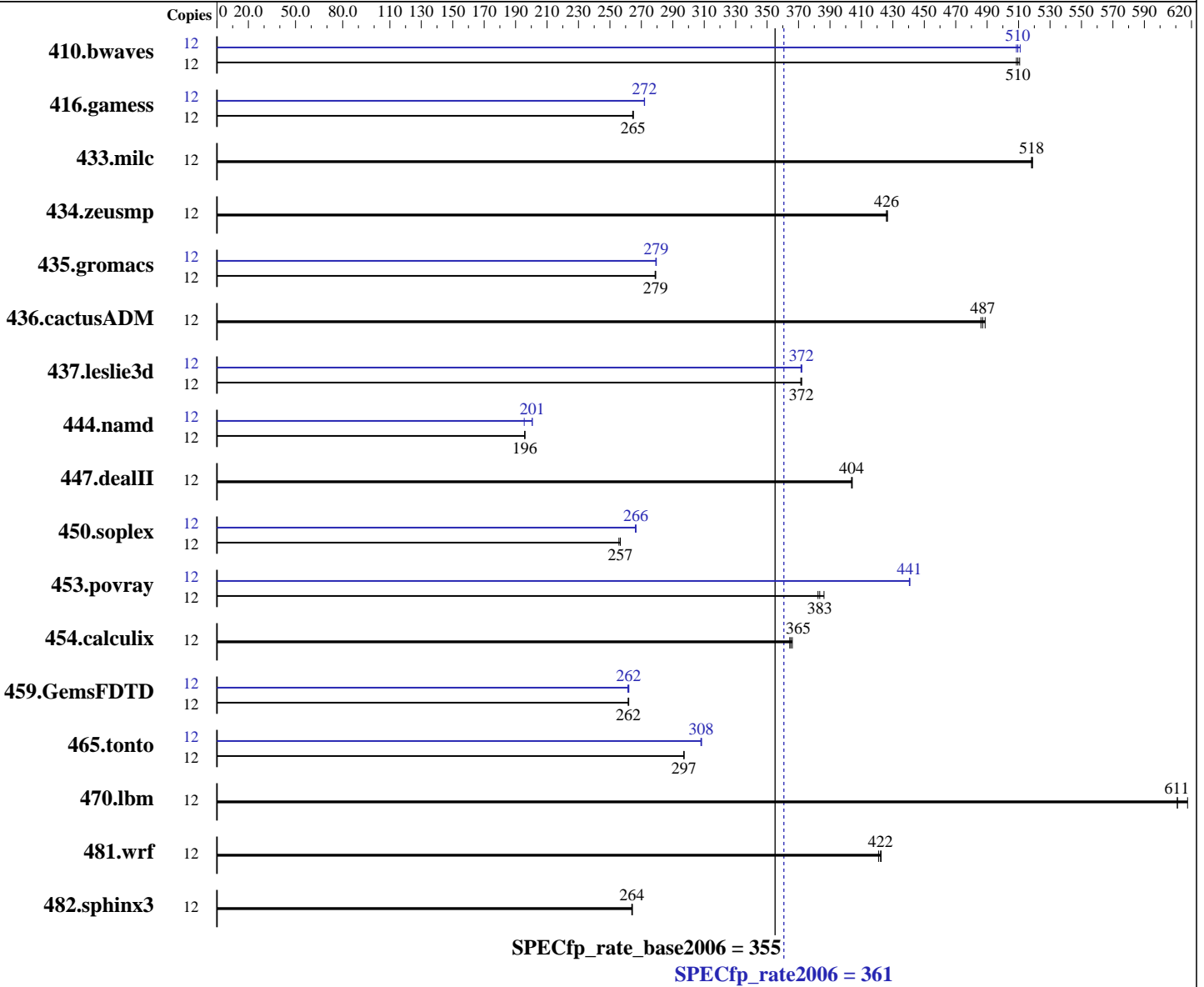
Test sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test date: Jul-2017

Hardware Availability: Aug-2017

Software Availability: Apr-2017



### Hardware

CPU Name: Intel Xeon Bronze 3104  
 CPU Characteristics:  
 CPU MHz: 1700  
 FPU: Integrated  
 CPU(s) enabled: 12 cores, 2 chips, 6 cores/chip  
 CPU(s) orderable: 1,2 chips  
 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: SUSE Linux Enterprise Server 12 SP2 (x86\_64)  
 Kernel 4.4.21-69-default  
 Compiler: C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux;  
 Fortran: Version 17.0.3.191 of Intel Fortran Compiler for Linux  
 Auto Parallel: Yes  
 File System: btrfs  
 System State: Run level 3 (multi-user)

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L3 Cache: 8.25 MB I+D on chip per chip  
Other Cache: None  
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R, running at 2133 MHz)  
Disk Subsystem: 1 x 800 GB SATA SSD  
Other Hardware: None

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	12	319	511	321	509	<b>320</b>	<b>510</b>	12	321	509	<b>320</b>	<b>510</b>	319	511		
416.gamess	12	888	264	887	265	<b>887</b>	<b>265</b>	12	864	272	<b>864</b>	<b>272</b>	864	272		
433.milc	12	212	519	<b>213</b>	<b>518</b>	213	518	12	212	519	<b>213</b>	<b>518</b>	213	518		
434.zeusmp	12	256	427	<b>256</b>	<b>426</b>	256	426	12	256	427	<b>256</b>	<b>426</b>	256	426		
435.gromacs	12	307	279	307	279	<b>307</b>	<b>279</b>	12	307	279	307	280	<b>307</b>	<b>279</b>		
436.cactusADM	12	295	486	293	489	<b>294</b>	<b>487</b>	12	295	486	293	489	<b>294</b>	<b>487</b>		
437.leslie3d	12	303	372	<b>303</b>	<b>372</b>	304	371	12	303	372	<b>303</b>	<b>372</b>	304	372		
444.namd	12	491	196	491	196	<b>491</b>	<b>196</b>	12	480	201	<b>480</b>	<b>201</b>	492	195		
447.dealII	12	340	404	<b>340</b>	<b>404</b>	340	404	12	340	404	<b>340</b>	<b>404</b>	340	404		
450.soplex	12	391	256	<b>390</b>	<b>257</b>	390	257	12	376	266	<b>376</b>	<b>266</b>	375	267		
453.povray	12	<b>166</b>	<b>383</b>	165	386	167	382	12	145	441	145	441	<b>145</b>	<b>441</b>		
454.calculix	12	270	366	<b>271</b>	<b>365</b>	272	364	12	270	366	<b>271</b>	<b>365</b>	272	364		
459.GemsFDTD	12	<b>486</b>	<b>262</b>	486	262	487	262	12	487	261	486	262	<b>486</b>	<b>262</b>		
465.tonto	12	397	297	397	297	<b>397</b>	<b>297</b>	12	<b>383</b>	<b>308</b>	383	308	384	308		
470.lbm	12	267	618	<b>270</b>	<b>611</b>	270	611	12	267	618	<b>270</b>	<b>611</b>	270	611		
481.wrf	12	318	421	<b>318</b>	<b>422</b>	317	423	12	318	421	<b>318</b>	<b>422</b>	317	423		
482.sphinx3	12	885	264	<b>886</b>	<b>264</b>	886	264	12	885	264	<b>886</b>	<b>264</b>	886	264		

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

BIOS configuration:  
Operating Mode set to Maximum Performance  
DCU Streamer Prefetcher set to Disable

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### Platform Notes (Continued)

```

XPT Prefetcher set to Disable
LLC dead line alloc set to Disable
Stale AtoS set to Enable
Sysinfo program /home/cpu2006-1.2-ic17.0u3/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-ickx Thu Jul 20 21:54:46 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) Bronze 3104 CPU @ 1.70GHz
 2 "physical id"s (chips)
 12 "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 : 6
  siblings  : 6
  physical 0: cores 0 1 2 3 4 5
  physical 1: cores 0 1 2 3 4 5
cache size : 8448 KB

```

```

From /proc/meminfo
MemTotal:      395883108 kB
HugePages_Total:    0
Hugepagesize:    2048 kB

```

```

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-ickx 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 Jul 20 21:54

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## Platform Notes (Continued)

SPEC is set to: /home/cpu2006-1.2-ic17.0u3

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda2	btrfs	744G	134G	609G	18%	/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 Lenovo -[TEE105Z-1.00]- 04/27/2017

Memory:

12x Hynix HMA84GR7AFR4N-VK 32 GB 2 rank 2666 MHz, configured at 2133 MHz

(End of data from sysinfo program)

## General Notes

Environment variables set by runspec before the start of the run:

LD\_LIBRARY\_PATH = "/home/cpu2006-1.2-ic17.0u3/lib/ia32:/home/cpu2006-1.2-ic17.0u3/lib/intel64:/home/cpu2006-1.2-ic17.0u3/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:

shell invocation of 'sync; echo 3 > /proc/sys/vm/drop\_caches' prior to run

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

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## Base Portability Flags (Continued)

```

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 -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3

```

C++ benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3

```

Fortran benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch

```

Benchmarks using both Fortran and C:

```

-xCORE-AVX2 -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
```

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## Peak Compiler Invocation (Continued)

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

```

447.dealII: basepeak = yes

```

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

```

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## Peak Optimization Flags (Continued)

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

Fortran benchmarks:

410.bwaves: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch`

416.gamess: `-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) -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-AVX2(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-AVX2(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-revF.html>  
<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.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/Lenovo-Platform-Flags-V1.2-SKL-C.xml>



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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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